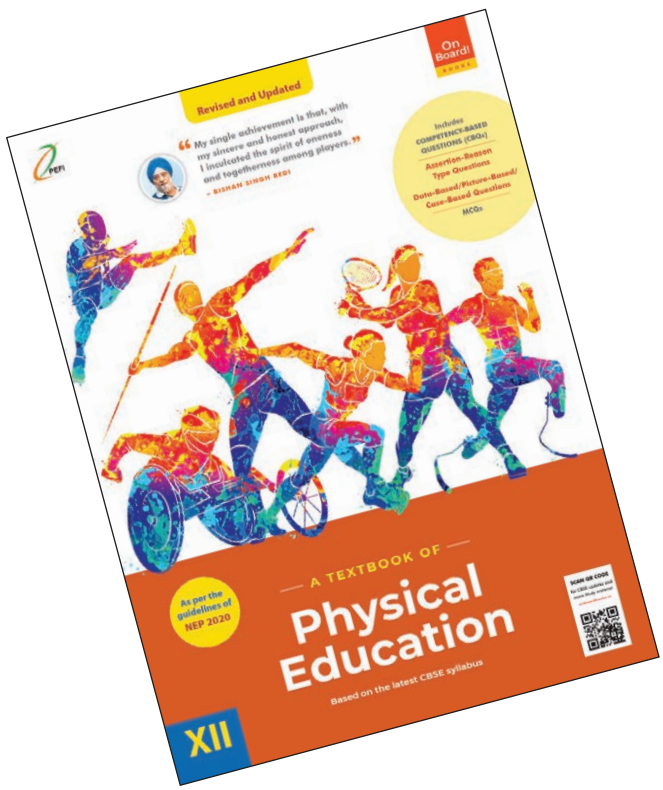
TEACHER'S HANDBOOK

A TEXTBOOK OF
PHYSICAL EDUCATION
Book 12



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CHAPTER 1

PLANNING IN SPORTS

P. 28–32

A. Objective Type/ Multiple-Choice Questions

(1 mark)

I. Multiple-Choice Questions

1. Which of the following is not an objective of planning?

(a) Efficiently supervise all activities

(b) Make room for innovation

(c) Strengthening sports culture

(d) Get the best performance out of the participants

Ans. (c) Strengthening sports culture

2. Which of the following are salient aspects of a tournament?

(a) Nurturing social skills

(b) Means of recreation

(c) Promoting national and international integration

(d) All of these

Ans. (d) All of these

3. What are the types of league tournaments?

(a) Single and Double league tournament

(b) Single and Mixed double league tournament

(c) Double and Combination league tournament

(d) Simple and Complex league tournament

Ans. (a) Single and Double league tournament

4. Which formula is used to find out the number of matches in a double league tournament?

(a) N × N (b) N (N – 1)

(c) (N – 1) (d) N × N × N

Ans. (b) N (N – 1)

5. What is the formula to find the number of matches in a knockout tournament?

(a) N (b) N (N – 1)

(c) (N – 1) (d) (N + 1)

Ans. (c) (N – 1)

6. Which of the following is not a major game?

(a) Hockey (b) Football

(c) Badminton (d) Karate

Ans. (d) Karate

7. It is a process/procedure of shuffling the position of good teams so that they don't meet each other in an early stage of the competition and spectator interest is kept alive till finals. What is the name of this process?

(a) Intramural (b) Seeding

(c) Fixture (d) Extramural

Ans. (b) Seeding

8. The total number of matches in a knock out tournament of 34 teams are

(a) 31 (b) 32

(c) 33 (d) 35 **(CBSE 2020)**

Ans. (c) 33

9. Which sports competition is organised within the school itself?

(a) Extramural (b) Intramural

(c) Inter-state (d) None of these

Ans. (b) Intramural

10. The primary goal of Intramural competition is

(a) To provide opportunity for mass participation of students

(b) To participate in inter-school competition

(c) To provide intra-school competition

(d) All of the above **(CBSE 2020)**

Ans. (a) To provide opportunity for mass participation of students

11. Which of these is not one of the methods used for fixtures in League or Round Robin tournaments?

(a) Cyclic method (b) Spiral method

(c) Staircase method (d) Tabular method

Ans. (b) Spiral method

12. Which of the following is not a part of the intramurals?

(a) Football, hockey, swimming and wrestling

(b) Kho-kho, tag, obstacle race and judo

(c) Marching, dancing, painting and clay modelling

(d) None of these

Ans. (b) Kho-kho, tag, obstacle race and judo

13. Which of the following is not a category of run?

(a) Run for identity (b) Run for fun

(c) Run for specific cause (d) Run for unity

Ans. (a) Run for identity

II. Match the following:

Match list – I with list – II and select the correct answer from the code given below:

List I – Category	List II – Name
(a) Tournament	(1) Health Run
(b) Fixture Procedure	(2) Talent Scouting
(c) Intramural Objective	(3) Knockout
(d) Specific Sports Programme	(4) Staircase and Cyclic

Select the correct set of options:

Code				
	(i)	(ii)	(iii)	(iv)
(a)	3	2	1	4
(b)	4	4	2	3
(c)	2	1	3	2
(d)	1	3	4	1

Ans. (i) (a) – 3; (b) – 4; (c) – 2; (d) – 1

III. Assertion-Reason Type Questions: CBQ

Given below are the two statements labelled Assertion (A) and Reason (R).

1. A: Knockout tournaments save cost and time and make each match intensive.

R: In this type of format, players or teams have to consistently give their best performance to avoid elimination.

2. A: Planning is the foremost function in sports.

R: Planning gives a view of future course of action. **(CBSE SP 2020)**

In the context of the two statements given above, which one of the following is correct?

(a) Both (A) and (R) are true and (R) is the correct explanation of (A).

(b) Both (A) and (R) are true but (R) is not the correct explanation of (A).

(c) (A) is true, but (R) is false.

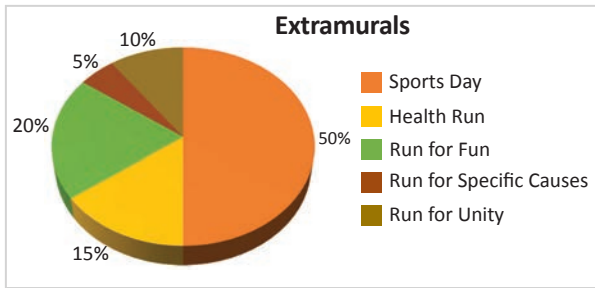
(d) (A) is false, but (R) is true.

Ans. 1. (a) Both (A) and (R) are true and (R) is the correct explanation of (A).

2. (a) Both (A) and (R) are true and (R) is the correct explanation of (A).

IV. Data-Based Questions: CBQ

Given below is the data which depicts the percentage of population participating in different extramurals:



On the basis of the pie-chart given above, answer the following questions:

1. Which of the following extramural sports programme is organised at school level to perfect the physical and motor skills of the students?

(a) Sports Day (b) Run for Fun

(c) Run for Unity (d) Health Run

2. Which of the following extramural sports programme will be organised to make people aware of cancer?

(a) Run for Unity (b) Health Run

(c) Run for a Specific Cause (d) Run for Fun

3. Which of the following is not a benefit of health run?

(a) Ease of participation without strict training and specialised equipment

(b) Promotion of healthiness and physical fitness

(c) Unification of people from various social groups and communities

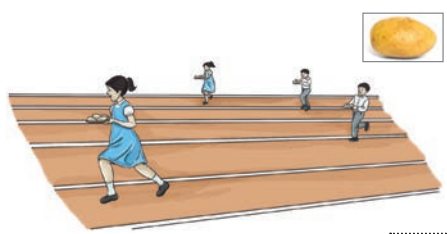
(d) None of the above

Ans. 1. (a) Sports Day; **2.** (c) Run for a Specific Cause; **3.** (d) None of the above

V. Picture-Based Questions: CBQ

Identify the following intramural and write their names:

1.



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2. 

3. 

4. 

Ans. **1.** Potato Race; **2.** Three Legged Runs; **3.** Clay Modelling; **4.** Track and Field

VI. Case-Based Questions: CBQ

A fixture has to be prepared for a knockout tournament between 15 teams. On the basis of the case given, answer the following questions:

1. How many teams will the lower half have?

(a) 8 (b) 10

(c) 7 (d) 12

2. How many byes will the upper half have?

(a) 0 (b) 2

(c) 8 (d) 15

3. In case of byes: The first bye goes to the ..... team of the ..... half.

(a) last; upper (b) last; lower

(c) first; lower (d) first; upper

Ans. **1.** (c) 7; **2.** (a) 0; **3.** (b) last; lower

B. Short Answer Type-I Questions (3 marks)

1. Write any three objectives of planning.

Ans. (i) The purpose of planning is to execute any program in a streamlined manner so that it runs smoothly from start to finish.

(ii) To efficiently supervise all activities during a sports tournament.

(iii) To avoid any type of mistakes during a tournament.

2. List down the important committees during a tournament. **(CBSE 2011)**

Ans. Publicity Committee, Boarding and Lodging Committee, Transport Committee, Grounds and Equipment Committee, Refreshment and Entertainment Committee, Reception Committee, Decoration and Ceremony Committee, Committees on Entries and Programmes, etc. are various important committees during a tournament.

3. What is the task of the decoration and ceremony committees?

Ans. Decoration and Ceremony Committees work in tandem with the refreshment and entertainment committee and the reception committee to make the ceremonies vibrant and well coordinated. They decorate the viewing areas and stages so that the venue looks attractive. This committee is also charged with arranging for certificates, medals and trophies.

4. Your school is organising 'Run for Unity'. Explain the responsibilities of accreditation, technical and finance committee. **(CBSE 2016)**

Ans.

- **Accreditation committee:** This committee registers all the participants with an operational role. The production, distribution and validation of passes is the duty of this committee.
- **Technical committee:** Technical committee looks after the technical aspects of the tournament. It ensures that the field is safe for play for all participants. It ensures the quality of equipment.
- **Finance committee:** This committee prepares the budget of the tournament and maintains every expenditure related to tournament.

5. Give two reasons why tournaments are important.

Ans. The purpose of a tournament is to establish the one team or player who has outperformed the rest. Tournaments introduce the youth to stress that is different from the one they face in the classroom; on the field, their alertness of mind, physical strength, coordination between the mind and the body, and natural and acquired reflexes are all put to test in front of spectators.

6. What are the three types of tournaments?

Ans. Three types of tournaments are knockout; league or round Robin and combination.

7. League tournament is a better way to judge the best team of the tournament. Comment. **(CBSE 2020)**

Ans. League or Round Robin tournament, as opposed to knockouts, allows each team or player to

compete against every other participant in the tournament. A league tournament is a better way to determine the best team in a tournament because each team has the most opportunities to show its efficiency. Teams and players have a lot of chances to show and improve her/his performance. The teams which score more points are eligible for next matches in the tournament.

- Leagues give each participant a chance to prove itself against every opponent involved in the tournament. As such, there is no question of missed opportunities. It is a fair way of determining the best and most consistent competitor. Many footballs and cricket tournaments use this approach.
- There is no such thing as getting lucky in round robins. Even if a team defeats another in the first round due to sheer luck, it will still have to outperform the others.
- Since leagues accurately measure the performances of a particular team or player, their strengths and weaknesses can be evaluated with greater certainty.
- League tournaments tend to be popular and also earn a lot of revenue. Fans get to cheer their players/teams through a greater number of matches. (any three)

8. What is the difference between round robin and knockout?

Ans. In knockout tournaments, the defeated team or player is eliminated with no scope of participating further.

As for the winner, they continue competing against other opponents until they eventually lose or win the tournament.

League or round Robin tournament, as opposed to knockouts, allows each team or player to compete against every other participant in the tournament. This can be either of two variations: single league tournament, in which each team/player plays against every other participant once or double league tournament, in which each team/player plays against every other participant twice.

9. What types of statistics are used while drawing fixtures for knockouts?

Ans. For knockouts, the total number of matches to be played in a single tournament is determined by the following formula:

$$(N - 1)$$

where N is the number of teams/individual players.

So, if in a tournament there are 8 participants, then the total number of matches played will be 7. In the first phase, there will be 4 matches (1 against 1); in the second, the four winners will advance further to decide the two finalists, so there will be 2 matches. Counting the final match, there are 7 in total, as derived from the formula. Lots are drawn to decide the pairs of competitors.

10. How many byes will be allotted in a knockout in which 15 teams are participating?

Ans. Number of Bye = (16 – 15) = 1 (refer to pages 17–18 of textbook)

11. Draw a fixture of 11 football teams participating in a tournament on the basis of a knockout.

(CBSE 2016)

Ans. Refer to pages 18-20 of the textbook.

12. How many rounds will be there in a knockout of (i) 10 teams and (ii) 13 teams?

Ans. (i) When the number of participating teams or players (N) is the power of two (i.e. 2, 4, 8, 16, 32, and so on), then number of rounds will be the number of 2's making up N. For instance, when

N = 10, number of rounds will be

$2 \times 2 \times 2 \times 2$ = three 4s = 4,

(ii) N = 13, number of rounds will be

$2 \times 2 \times 2 \times 2$ = four 2s = 4.

When N is not the power of 2, the number of rounds will be based on the next highest power of 2.

13. Draw a knockout fixture of 24 teams.

(CBSE SP 2016)

Ans. Refer to pages 18-20 of the textbook. Follow the same method to draw a fixture of 24 teams.

14. Differentiate between the cyclic method and staircase method.

Ans. **Cyclic method:** Cyclic method has different applications for even and odd numbers of teams. In the former case, the 1st team is placed at the top of the right hand side. The remaining team numbers are put in ascending order consecutively and then upward on the left side. In the latter, the bye is fixed on the top of the right side, and then followed by the rest of the procedure. Teams are rotated from right to left.

If N (number of teams) is even, the number of rounds will be (N – 1).

Staircase method: In this type, fixtures are

arranged in such a way that it resembles a ladder or a staircase. There is no need to give byes to any team as there is no issue of odd or even number of teams.

15. Write briefly about the objectives of intramurals.

(CBSE 2016)

Ans. Objectives of intramurals:

- Establishing physical education
- Accommodating greater number of participants.
- Promoting positive values in students.
- Providing healthy recreation.
- Introducing new games.
- Development of sportsmanship.
- Development of organisational skills.
- Development of personality
- Scouting of talent.

16. Write three differences between intramurals and extramurals. **(CBSE 2017)**

Ans. (i) Intramurals help mould the physical, mental, emotional, moral and social development of the students.

(ii) They channel the energy of the student and provide a healthy outlet.

(iii) They make students more agile and fit.

while

(i) Extramurals bring much needed exposure to schools and students that might not be able to showcase their own talents due to lack of opportunities.

(ii) Extramurals boost the popularity of physical education by building the interest of students, their parents and the school authorities.

(iii) Extramurals are a healthy excuse for participating in a fun recreational indulgence like sports, which students might not be otherwise able to in their schools and homes.

C. Short Answer Type-II Questions (5 marks)

1. Describe the objectives of planning in detail.

Ans. Objectives of planning are described below:

- **To avoid last minute hassles:** The purpose of planning is to execute any program in a streamlined manner so that it runs smoothly from start to finish. An event like a sporting tournament involves a large number of people. Apart from the organising committee and the players, there will be sports officials, audiences, guests, media persons, etc.
- **To efficiently supervise all activities:** A sports tournament consists of multiple activities – opening and closing ceremonies, entertainment programmes, matches, interviews, boarding and lodging of guests, maintenance of grounds and equipment, etc. A good planning committee takes notes of these components, delegates subcommittees to handle each of them, and supervises them efficiently.
- **To coordinate successfully:** There needs to be sound coordination between each committee involved in organising the sporting event. The boarding and lodging committee must be in touch with the transport committee so that the invitees and participants can travel from their place of stay to the venue of the sports without hiccups.
- **To avoid mistakes:** Though mistakes are bound to happen once or twice, the objective of good planning is to ensure that there are as few of them as possible. A poorly planned event will leave everyone from the guests to the organisers unsatisfied.
- **To make room for innovation:** The process of planning itself creates a space for bringing up ideas to make the events more interesting. This is, however, possible only when the planning committee communicates openly with its members and seeks their cooperation and suggestions.
- **To get the best performance out of the participants:** If the entire event is properly planned and efficiently executed, it leaves the players free to focus on their performance. They do not have to worry about irregularities like poor equipment, matches not beginning on time, lack of officials, etc. as the planning committee is taking care of these elements. They can concentrate on their competition and give their supporters an exciting match.

2. Describe how various planning committees function in sports events.

Ans. Various planning committees function in the following manner in a sports event.

- **Publicity Committee:** The publicity committee completes this preparation before the games. During the games they maintain the interest level for the games with proper advertisement. They also coordinate with

the media for coverage during and after the games.

- **Boarding and lodging committee:** This committee takes care of accommodation and meals for the players, officials, and other members involved in the event. Before the games, they confirm the bookings. Once the tournament has started, they keep track of all boarding and lodgings, switches between departures and new arrivals, etc.
- **Transport committee:** The transport committee handles transportation facilities for the players, officials, etc. They arrange for buses and other vehicles to take the players and officials to the venue of the games from the places where they are staying.
- **Grounds and equipment committee:** This committee has the responsibility of ensuring that the grounds, fields, courts, etc. are in top condition. They also check the equipment and other gears to be used in the games to ensure that no mishap occurs and that plenty of equipment is available for all the players.
- **Refreshment and entertainment committee:** They supply drinks and refreshments to the guests, players, officials and other invitees. The entertainment programmes, such as opening song, closing dance, etc. are also arranged by this committee in advance.
- **Reception committee:** The reception committee welcomes the guests, players, officials, audiences, etc. during the opening and closing ceremonies.
- **Decoration and ceremony committee:** They decorate the viewing areas and stages so that the venue looks attractive. This committee is also charged with arranging for certificates, medals and trophies.
- **Committees on entries and programmes:** The committee on entries and programmes are tasked with sending out entry forms to various institutions early so that the latter can send in their applications on time. The committee then allots slots to the competitors, prepares fixtures if required, build a clear-cut schedule of the programmes and prints it so that it may be distributed to all involved parties.
- **Committee for officials:** There are many officials involved in a sporting event: judges, referees, umpires, recorders, starters, time keepers, lap scorers, clerks of the course, announcers, commentators, etc. The committee for officials selects and manages them for smooth functioning of the sports event.
- **Announcement committee:** The announcement committee is responsible for making announcements during the opening and closing ceremonies, games, important information like when an event is going to take place or changes in schedules, names of officials and players, running commentaries, etc.
- **First aid committee:** One of the most important committees in a sports event, the first aid committee works under the supervision of a medical expert. It provides first aid to injured players and ensures that they receive advanced medical attention if the need arises. The first aid team makes all necessary arrangements before the commencement of the sports event.

3. What is a knockout tournament? Explain different types of knockout tournaments. Draw a fixture of 21 teams on a knockout basis.

(CBSE 2012, 2015)

Ans. In boxing, a match is finished when an opponent is knocked down and unable to rise and return to the game within a certain time limit. This is called knockout. The concept of knockout tournaments is somewhat similar. In this type of tournament, the defeated team or player is eliminated with no scope of participating further. As for the winner, they continue competing against other opponents until they eventually lose or win the tournament.

Single knockout tournament, consolation tournament and double knockout tournament are different types of knockout tournament.

See page 19 of the textbook for a fixture of 21 teams on a knockout basis.

4. What is a league or round robin? Draw a fixture for 6 teams using round robin method.

(CBSE 2012)

Ans. League or Round Robin tournament, as opposed to knockouts, allows each team or player to compete against every other participant in the tournament. This can be either of two variations: single league tournament, in which each team/player plays against every other participant once or double league tournament, in which each team/player plays against every other participant twice.

Example. Draw a fixture of 6 teams on a league basis according to the cyclic method.

Solution. Total number of teams
= 6 (Given)

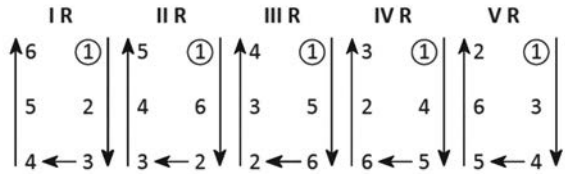
Total number of matches

$$= \frac{N(N-1)}{2} = \frac{6(6-1)}{2}$$

$$= \frac{6 \times 5}{2} = \frac{30}{2} = 15 \text{ matches}$$

Number of rounds
= N – 1 = 6 – 1 = 5 rounds

Fixtures



5. Draw a fixture of 12 teams on a league basis according to the staircase method. How will you decide a winner in league tournament?

(CBSE 2019)

Ans. Fixture of 12 Team on the basis of staircase method

1-2										
1-3	2-3									
1-4	2-4	3-4								
1-5	2-5	3-5	4-5							
1-6	2-6	3-6	4-6	5-6						
1-7	2-7	3-7	4-7	5-7	6-7					
1-8	2-8	3-8	4-8	5-8	6-8	7-8				
1-9	2-9	3-9	4-9	5-9	6-9	7-9	8-9			
1-10	2-10	3-10	4-10	5-10	6-10	7-10	8-10	9-10		
1-11	2-11	3-11	4-11	5-11	6-11	7-11	8-11	9-11	10-11	
1-12	2-12	3-12	4-12	5-12	6-12	7-12	8-12	9-12	10-12	11-12

No. of Rounds = N – 1 = 12 – 1 = 11

$$\text{No. of matches} = \frac{N(N-1)}{2} = \frac{12(12-1)}{2}$$

$$= \frac{12 \times 11}{2} = \frac{132}{2} = 66$$

The following way is used to decide a winner:

(i) The team that wins the match gets
= 2 points.

(ii) The team that loses the match gets
= 0 point.

(iii) If match draws then each team gets
= 1 point.

After the tournament, all the teams are awarded the score as per their performance and the team which scores maximum is declared winner.

If the points of two teams are equal, then a match is held again between both teams.

6. Mention all calculations and steps involved to draw a knockout fixture of 19 teams, where 4 teams are to be seeded. **(CBSE 2018)**

Ans. Total no. of teams = 19 (N = 19)

No. of matches = (N – 1)
= 19 – 1 = 18

$$\text{No. of teams in upper half} = \frac{(N+1)}{2} = 10$$

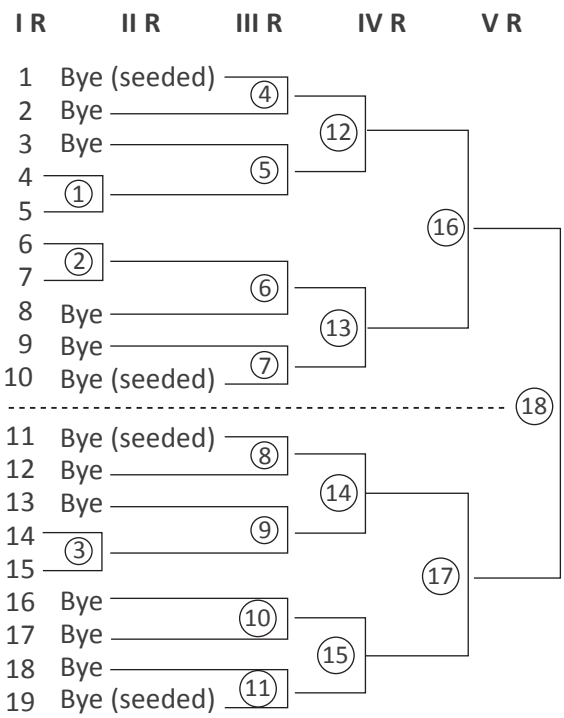
$$\text{No. of teams in lower half} = \frac{(N-1)}{2} = 9$$

Total no. of byes (NB) = next power of 2 – N = 32 – 19 = 13

$$\text{No. of byes in upper half} = \frac{NB-1}{2} = 6$$

$$\text{No. of byes in lower half} = \frac{NB+1}{2} = 7$$

Seeding – 2 teams in upper half with byes
2 teams in lower half with byes



7. What do you mean by intramural? What are its significance and objectives?

Ans. Intramural competitions are organised within the school itself, with the participants being the students of the school. No outsiders are allowed to compete in such events.

Significance of intramurals are as follows:

- Intramurals help mould the physical, mental, emotional, moral and social development of the students.

- They channel the energy of the student and provide a healthy outlet.
- They make students more agile and fit.
- Intramurals are also useful at bringing out hidden talents.
- Intramurals contribute to personality growth of the students and make them leaders who are not afraid to face challenges.

8. Draw a league fixture of 16 teams.

Ans. Number of teams = 16

Number of matches = N – 1 = 16 – 1 = 15

Number of teams in upper half = N/2 = 16/2 = 8

Number of teams in lower half = N/2 = 16/2 = 8

Number of byes = Next nearest power of 2 – Number of teams

= 16 – 16 = 0

Number of rounds = 4

For fixture, refer to pages 18-20 of the textbook.

9. Being sports captain of the school, prepare five important committees with their responsibilities to conduct one day Run for Health Race.

(CBSE 2015)

Ans. (i) **Publicity committee:** The publicity committee completes this preparation before the games. During the games they maintain the interest level for the games with proper advertisement. They also coordinate with the media for coverage during and after the games.

(ii) **Boarding and lodging committee:** The boarding and lodging committee takes care of accommodation and meals for the players, officials, and other members involved in the event. Before the games, they confirm the bookings. Once the tournament has started, they keep track of all boarding and lodgings, switches between departures and new arrivals, etc. They ensure that the guests are taken care of wherever they are staying. After the event is over, they are incharge of settling the bills and other fees incurred by the guests during their stay.

(iii) **Transport committee:** The transport committee handles transportation facilities for the players, officials, etc. They arrange for buses and other vehicles to take the players and officials to the venue of the games from the places where they are staying. Though preparations for logistics begin before the games start, it is during the tournament that the transport committee is at its busiest.

(iv) **Grounds and equipment committee:** This committee has the responsibility of ensuring that the grounds, fields, courts, etc. are in top condition. They also check the equipment and other gears to be used in the games to ensure that no mishap occurs and that plenty of equipment is available for all the players. Their responsibilities start before the games. During the games, they have to maintain the grounds and equipment, and once the competition is over, they ensure that everything is in place and damaged equipment and areas reported for replacements or repairs.

(v) **Refreshment and entertainment committee:** They are different from the boarding and lodging committee. They supply drinks and refreshments to the guests, players, officials and other invitees. The entertainment programmes, such as opening song, closing dance, etc. are also arranged by this committee in advance.

10. Describe five specific sports programmes in detail.

Ans. Five specific sports programmes are as follows:

(i) **Sports day:** A sports day is a special day dedicated to sports. It is usually observed in schools and is an annual feature.

(ii) **Health run:** Health runs are a variety of marathons organised to spread awareness of and improve the physical health of the members of a community. They are planned and executed by the health department, sports department, or social organisations focusing on health.

(iii) **Run for fun:** Run for fun has the same purpose as health runs to increase the spirit of physical fitness in the public.

(iv) **Run for specific causes:** Unlike run for fun, run for specific causes are organised in honour of a cause – spreading awareness of AIDS, cancer, disabilities, etc. are examples of such causes.

(v) **Run for unity:** Run for unity are held to bring people from different communities, castes and creeds together under a single event to promote peace, harmony and unity.

D. Value-Based Question

Planning is a process of setting objective and deciding how to accomplish them. It is the most important task of all administration. Like, there is a new school in our town. The school has a huge campus, so the school authorities have decided to introduce some sports that includes taekwondo, martial arts, archery, boxing, swimming, etc. The school has made it mandatory for each student. So that every student can participate in intramural competitions organised by the school. The idea of introducing such sports is appreciated by the parents of the students. Such sports help students to expand their knowledge and capabilities. These sports help to build confidence and provide healthy recreation.

Answer the following questions based on the above passage:

1. What do you understand by planning?
2. What are the objectives of the intramurals?
3. What are the values shown by the parents of the students in the school?

Ans.

1. Planning is the process of arranging expected activities so that a certain goal or target can be achieved.
2. • **Establishing physical education:** By introducing intramurals at this stage, the students are taught to associate exercise with fun. Sports become an exciting part of their lives in which they can excel.
   • **Accommodating greater number of participants:** Intramurals close gap between good players and average players in a school. The competition is for the school students only. Participation is thus amplified in terms of number. A single student can even compete in more than one event if she/he so wishes.
   • **Promoting positive values in students:** Sports have a positive effect on students. They are about cooperation, leadership, grit, mental alertness and determination. Regular organisation of intramurals instils these values in the students since their involvement in sports increases.
3. Coordination, positive attitude, decision-making, etc.

CHAPTER 2

SPORTS AND NUTRITION

P. 45–49

A. Objective Type / Multiple-Choice Questions

(1 mark)

I. Multiple-Choice Questions

1. Which of the following points must be taken into consideration while planning a balanced diet?

(a) Age, gender and body weight

(b) Activity level and eating habits

(c) Income level and social customs

(d) All of these

Ans. (d) All of these

2. Which of the following are not macronutrients?

(a) Carbohydrates (b) Minerals

(c) Water (d) Proteins

Ans. (b) Minerals

3. What is another name of riboflavin?

(a) Vitamin B (b) Vitamin B_5

(c) Vitamin B_2 (d) Vitamin C

Ans. (c) Vitamin B_2

4. The food component present in sugar is .....

(a) fats. (b) protein.

(c) vitamin. (d) carbohydrate.

(CBSE 2020)

Ans. (d) carbohydrate.

5. Who discovered vitamin A?

(a) Theo Haimann (b) Elmer MacCollum *et.al.*

(c) O'Donnell (d) None of these

Ans. (b) Elmer MacCollum *et.al.*

6. Which of the following vitamins is insoluble in fats?

(a) A (b) E

(c) K (d) C

Ans. (d) C

7. The main source of Vitamin C is .....

(a) guava. (b) egg.

(c) milk. (d) banana. **(CBSE 2020)**

Ans. (a) guava.

8. Deficiency of which of the following leads to rickets?

(a) Iron (b) Iodine

(c) Calcium (d) Chromium

Ans. (c) Calcium

9. What is the calorific value of water?

(a) 10 joules/calorie (b) 0 joules/calorie

(c) 25 joules/calorie (d) 100 joules/calorie

Ans. (b) 0 joules/calorie

10. If the weight is in kg and height in m, which of these is the correct formula for calculating Body Mass Index?

(a) weight × $(\text{height})^2$ (b) weight / $(\text{height})^2$

(c) height / weight (d) weight / height

Ans. (b) weight / $(\text{height})^2$

11. Which of the following is not a step to maintaining a healthy body weight?

(a) Goal setting

(b) Yoga

(c) Intake of calories through drinking

(d) Avoiding carbohydrate rich food

Ans. (c) Intake of calories through drinking

12. Cut ..... calories a day if you have exceeded your ideal weight.

(a) 200 (b) 100

(c) 250 (d) 150

Ans. (b) 100

13. Which of the following can be listed under food myths?

(a) Potatoes make you fat

(b) Spicy food causes ulcer

(c) Fat-free products help you lose weight

(d) All of these

Ans. (d) All of these

II. Match the following:

Match list – I with list – II and select the correct answer from the code given below:

List I – Macronutrient	List II – Source
(a) Carbohydrates	(1) Cucumber
(b) Proteins	(2) Cotton seed
(c) Fats	(3) Soyabean
(d) Water	(4) Colocasia

Select the correct set of options:

Code				
	(i)	(ii)	(iii)	(iv)
(a)	3	2	1	4
(b)	4	4	2	3
(c)	2	1	3	2
(d)	1	3	4	1

Ans. (iv): (a) – 4; (b) – 3; (c) – 2; (d) – 1

III. Assertion-Reason Type Questions: CBQ

Given below are the two statements labelled Assertion (A) and Reason (R).

A: Even what is considered nutritious, such as carbohydrates, should be consumed in appropriate amounts.

R: A balanced diet therefore has a standard structure.

In the context of the two statements given above, which one of the following is correct?

(a) Both (A) and (R) are true and (R) is the correct explanation of (A).

(b) Both (A) and (R) are true but (R) is not the correct explanation of (A).

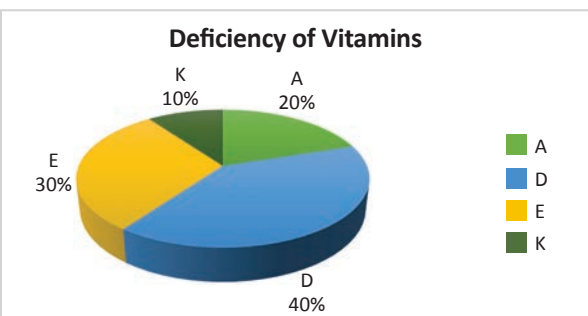
(c) (A) is true, but (R) is false.

(d) (A) is false, but (R) is true.

Ans. (c) (A) is true, but (R) is false.

IV. Data-Based Questions: CBQ

Given below is the data which depicts the percentage of school students suffering from the deficiency of various vitamins:



On the basis of the pie-chart given above, answer the following questions:

1. Which of the deficiency can be reduced by adding a morning outdoor-play-period in the timetable?

(a) Vitamin A (b) Vitamin D

(c) Vitamin K (d) Vitamin E

2. If a student has deficiency of Vitamin A, what is he likely to suffer from?

(a) Anaemia (b) Paralysis

(c) Scurvy (d) Night blindness

3. What is common about the vitamins given above in the pie-chart?

(a) They are all water soluble.

(b) They are all fat soluble.

(c) They are all fat insoluble.

(d) They all affect the immune system.

Ans. 1. (b) Vitamin D; **2.** (d) night blindness; **3.** (b) They are all fat soluble.

V. Picture-Based Questions: CBQ

Identify the following intramural and write their names:

1.

.....

2.

.....

3.

.....

4.

.....

Ans. 1. milk–calcium; **2.** banana–potassium; **3.** table salt–sodium; **4.** lentils–phosphorus

VI. Case-Based Questions: CBQ

The Body Mass Index or the BMI of a male was found to be 30.1. On the basis of the case given, answer the following questions:

1. In which category does the person fall?
   (a) Normal weight (b) Overweight
   (c) Obesity class 1 (d) Obesity class 2
2. What does the person need to do in order to achieve the ideal weight?
   (a) Have a normal and wise attitude towards food selection and portion.
   (b) Have only cooked carrots.
   (c) Only opt for fat-free products and avoid potato.
   (d) Reduce the calorie intake to nil.
3. The ideal BMI for a person should lie between .....
   (a) 25 – 29.9 (b) 18.3 – 24.9
   (c) < 20 (d) < 40

Ans. **1.** (c) obesity class 1; **2.** (a) Have a normal and wise attitude towards food selection and portion; **3.** (b) 18.3 – 24.9

B. Short Answer Type-I Questions **3 marks**

1. Define balance diet. Explain any four micronutrients. **(CBSE 2020)**

Ans. A diet which consists of different food types and sufficient amounts of nutrients for the development of human body is called a balanced diet. The micronutrients are: Iodine, Iron, Chromium and copper. (See pages 36-37 of textbook)

2. How is nutrition different from food?

Ans. Foods are those substances which we eat for the sustenance of our life while nutrition concerns substances present in the food we eat which affects our body.

3. Write briefly about minerals as an important nutritive component. **(CBSE 2016)**

Ans. Minerals are very important nutritive component. Approximately 4% of our body mass is made up of minerals, which are found in an ionised state. These are broadly classified as macronutrients such as calcium, potassium, phosphorus, sodium, chlorine, magnesium and sulphur and micronutrients such as copper, iron, iodine, fluoride, cobalt, chromium, selenium and zinc.

4. Write a short note on vitamins and their types.

Ans. Vitamins contribute to our energy level and boost our immune system. They are classified into fat soluble vitamins and water soluble vitamins.

Fat-soluble vitamins: Vitamins which dissolve in fat are called fat soluble vitamins. They are stored in the liver and fatty tissue. Vitamins A, D, E and K are fat soluble. Vitamin A is composed of hydrogen, carbon and oxygen. It is needed for new cell growth. Vitamin D is made up of carbon, hydrogen and oxygen elements. It releases parathyroid hormone which can reabsorb bone tissue, making bones thin and brittle. Vitamin K is necessary for blood clotting. It plays a vital role in cell growth.

Water - soluble vitamins: Vitamin B complex and Vitamin C are water soluble vitamins. These are ejected from the body during urination. B complex is a group of eight water- soluble vitamins.

5. What are the different forms of Vitamin B Complex? Explain any one of them.

Ans. **The different forms of Vitamin B complex are:**

- Vitamin B_1: Thiamine
- Vitamin B_2: Riboflavin
- Vitamin B_3: Niacin
- Vitamin B_5: Pantothenic acid
- Vitamin B_6: Pyridoxine
- Vitamin B_7: Biotin
- Vitamin B_9: Folic acid
- Vitamin B_{12}: Cobalamin

B_{12} / Cobalamin

- It helps in protein metabolism.
- Formation of red blood cells and maintenance of central nervous system.
- Deficiency diseases like anaemia, weakness and tingling, numbness in arms and legs.
- Its food sources are low fat dairy, cheese, red meat, liver, fortified soy products and cereals.

6. Explain the role of fibre in diet.

Ans. The role of fibre in diet is as follows:

- It bulks up our body, making it appear fuller.
- It plays a role in digestion and prevents constipation.
- **Two types of fibres:**
  (i) Soluble fibre, which attracts water and reduces cholesterol and brings alterations in blood sugar level,

(ii) Insoluble fibre, which dissolves in water and softens the stool, thereby bringing relief from chronic constipation.

- It lowers the risk of heart diseases and certain forms of cancer.

7. What do you understand by micronutrients? Explain the sources and role of any two macronutrients. **(CBSE 2019)**

Ans. Micronutrients are needed in small quantities though they are indispensable for our health. Commonly known micronutrients are minerals and vitamins. Their primary function is to enable chemical reactions. They are not responsible for energy production.

Sources and role of two macronutrients:

(i) ***Carbohydrates***

Sources: Cereals, pulses, dried peas, dates, potato, rice, sugar, gur, etc

Role: Source of energy, lack of carbohydrates causes loose skin, weight loss, weakening of the body, fatigue

(ii) ***Proteins***

Sources: Egg, fish, meat, dairy products, vegetables, pulses, soya beans, mustard, dry fruits, nuts, etc.

Role: As building blocks of life, involved in the production of hormones, enzymes, tissues and antibodies, deficiency causes marasmus, kwashiorkor diseases.

8. Discuss any three macrominerals and their importance.

Ans. The three macrominerals can be discussed as under:

(i) Phosphorus: The main source of phosphorus are meat and meat products, milk and milk products, lentils, nuts and whole grains. It maintains the bones and teeth, and also makes our gums healthy. The daily intake value for phosphorus is 1 g. Phosphorus deficiency causes hypophosphatemia, rickets in children and osteomalacia.

(ii) Magnesium: It is found in dark leafy green vegetables, nuts, leafy greens, avocados, yogurt, bananas, dried fruits and dark chocolate. Magnesium enables the proper functioning of nerves and muscles, boosts the immune system, normalise heart beat and strengthen bones.

(iii) Sodium: It is found in large amount in canned foods, fast foods, table salt, cured meat, salad dressing, pickles, instant foods etc. Sodium aids muscular activities and transmission of nerve impulse. The daily intake value for sodium is 2.3 g. Its deficiency causes hypernatremia, the symptoms of which include vomiting, nausea, muscle spasms and seizures.

9. Discuss any three microminerals and their importance.

Ans. Three microminerals and their importance:

(i) Iodine: Iron is an important ingredient of hormones produced by the thyroid gland which are required for the growth, production of body cells, metabolism, reproduction, and maintenance of body temperature. Lack of iodine intake causes enlargement of thyroid glands. It main sources are sea food, dish and iodized salt.

(ii) Iron: Iron is required for the production of haemoglobin. The deficiency of iron causes anaemia. Red meats, fish, poultry, whole grains, dark leafy vegetables are rich in iron.

(iii) Chromium: It regulates the blood sugar levels. It is mainly found in whole grains, nuts, cheese, orange juice, potatoes, raw tomatoes, etc. Deficiency of chromium causes anxiety and fatigue. Deficiency of chromium increases the risk of diabetes.

10. Why is water important even though it is non-nutritive?

Ans. Water is important though it is non-nutritive for the reason that it serves as a transporter of nutrients to cells and removes of waste through urine. It is also crucial for control of body temperature, ionic balance of the blood as well as body's metabolism.

11. How would you differentiate between flavour compounds and colour compounds?

Ans. **Colour compounds:** It is a known fact that we like our food to have certain appetizing colours. Some foods are naturally enriched with attractive colours, like fruits while others like animal products have dull, monochromatic shades. Sometimes pigments are added to lend characteristic hues.

Flavour compounds: Flavours are derived from both nutritive and non-nutritive compounds of food. Acidic content gives a sour taste like citric acid in lemons. Alkalinity meanwhile lends a bitter taste and soapy feeling to the mouth in foods.

12. How does protein act as a nutritive component of diet?

Ans. Protein containing carbon compounds, hydrogen, nitrogen, oxygen and sometimes sulphur, phosphorus and iron gets converted by our body to amino acids as the large size of protein molecules. It forms protoplasm, and is found in many physiological parts. It produces the hormones, enzymes, tissues and antibodies, regulates water and acid balance in the body, and transports oxygen and nutrients. Thus, protein acts as a very important component of food.

13. Discuss water-soluble vitamins briefly.

Ans. Vitamin B complex and Vitamin C are water soluble vitamins. These vitamins are ejected from the body during urination. Thus, daily intake of vitamins is recommended.

- **Vitamin B Complex:** It is a group of eight water soluble B vitamins. These work alongside each other and each has its own specific benefits. Together they play a vital role in keeping and running our body like well-oiled machine.
- **Vitamin C:** It is considered one of the healthiest and safest nutrients. It comes with a broad spectrum of benefits, ranging from growth and repair of tissues, healing of wounds, production of collagen, bone and tooth formation, increasing the absorption and utilization of iron, to lowering hypertension, curing cataracts, reducing the risk of cardiovascular diseases and controlling asthma as well as diabetes. Its deficiency may cause diseases like: scurvy, gingivitis, anaemia, fatigue, and weakness.

14. Discuss fat-soluble vitamins briefly.

Ans. These are so called because they dissolve in fat. These vitamins are stored in the liver and fatty tissues. Vitamins A, D, E and K are fat soluble.

- **Vitamin A:** It is available in different forms like retinol, renal, retinoic acid and a number of pro vitamin A carotenoids. Vitamin A is composed of hydrogen, carbon and oxygen. It is needed for new cell growth, good vision, healthy skin, hair and maintenance of immune system.
- **Vitamin D:** It is made up of carbon, hydrogen and oxygen elements. Vitamin D along with calcium helps in building bones, and keeping them strong and healthy. It also blocks the release of parathyroid hormone which can reabsorb bone tissue, making bones thin and brittle. Its deficiency causes the diseases like rickets in children, periodontitis, dental cavities and highest risk of cancer.
- **Vitamin K:** It is necessary for normal blood clotting. It plays a vital role in cell growth, metabolism of bone and other tissues, prevention of haemorrhagic disease in new born babies, heavy menstrual cycle, gum bleeding, nose bleeding, and easy bruising, defecting blood coagulation and anaemia.

15. What are the pitfalls of dieting? **(CBSE 2020)**

Ans. There are various pitfalls of dieting that keep us away from reducing weight at a steady pace:

- **Extreme Reduction of Calories:** Our body needs a specific amount of calories for proper functioning. Cutting that intake severely, say 1800 calories a day, cannot supply sufficient energy. Any dieting method that reduces your calories intake drastically lowers body metabolism. Though weight will be lost ultimately, it will be too excessive and dangerous for health. We now know that being underweight is just as destructive as being overweight.
- **Restriction of Selected Nutrients:** Dieting restricts components of food like carbohydrates and fats since they can get converted to body fat. If this continues, then the body will weaken, lose its immunity and become vulnerable to several deficiency diseases and conditions.
- **Skipping Meals:** There is a direct relationship between metabolic rate and body weight. A good metabolic rate allows you to maintain or lose weight. Skipping meals therefore ends up lowering metabolism to conserve energy. This also means you are more likely to eat more than your body can process in the next meal.
- **Intake of Calories through Drinking:** The idea that calorie-laden fluids are a better dieting option is incorrect. Drinks such as sodas, processed juices with added sugar, coffee with cream and sugar, etc. all contribute to weight gain.

16. Explain the causes and management of food intolerance.

Ans. The management and the causes of the food intolerance are:

- **Causeas of the food intolerance:** Food intolerance is caused by part or complete

ineffectiveness of the body enzymes responsible for breaking down or absorbing the food. This effect may be innate, diet related or induced by some illness.

- **Management of food intolerance:** There are no valid tests for intolerance. The only way to identify the cause is by accurately recording the times and duration of all symptoms as well as everything you eat. Guidance can also be provided by a doctor who can diagnose and manage dietary consumption.

17. What do you understand by food myths? Discuss briefly about various food myths.

(CBSE 2016, 2020)

Ans. Food myths mean a legendary story about food with or without a determinable basic of fact or a natural explanation. What to eat, when to eat, and how often to eat are such questions which usually confuse.

Some food myths are as follows:

- Potatoes make you fat
- Drinking water in between your meals will mess up your digestion
- Fat free products will help you in losing weight
- Egg increases cholesterol levels
- The peel of fruits & vegetables contains no nutrients
- Having milk immediately after eating fish
- Starve yourself if you want to lose weight
- Eating ghee after pregnancy
- Exercise makes you eat more
- It's necessary to have carbohydrate – load before races
- All sports drinks are the same
- Supplement are necessary for maximum performance

18. Explain any three myths about dieting.

(CBSE SP 2017)

Ans. The three myths of dieting are:

(i) Less Carbohydrates Make Healthier: Whole grains are the healthiest carbohydrates. They reduce the risk of chronic diseases. Avoid refined carbohydrates.

(ii) Less Calories in Oils/Margarine than Ghee/butter: Oils/Margarine are made from vegetable oils. Researches show that margarine is unhealthy as it contains transfats. Transfats are bad for heart health.

(iii) Apples and Brinjals are Rich Source of Iron Because They Turn Brown When Cut: Due to an enzymatic reaction, apples and brinjals turn brown when cut. They are good source of fibre but not iron. It is a misconception.

C. Short Answer Type–II Questions 5 marks

1. What is balanced diet? Elucidate its any four constituents. **(CBSE 2013)**

Ans. A balanced diet is one that consists of different food types and sufficient amounts of nutrients for the development of human body. It has not a standard structure. It should be planned according to the individual body type. There are six constituents of balanced diet like Carbohydrates, Proteins, Minerals, Vitamins, Fats and Water. It is necessary that each is consumed regularly.

The four constituents are elucidated as under:

(i) Carbohydrates are organic compounds which are the primary sources of energy. They are known as 'energy giving foods' and are made of small simple sugars that enter the body as glucose. They provide 17 kJ/g of energy. These molecules consist of carbon (carbo-), hydrogen(hydro-) and oxygen (-ate) atoms with a hydrogen oxygen atom ratio of 2 : 1 just like in water that is H_2O.

(ii) Proteins: Proteins are substances that have carbon compounds, hydrogen, nitrogen, oxygen and sometimes sulphur, phosphorous and iron. Our body converts them to amino acids as the large size of protein molecules make it bit difficult for them to be used without being broken down. Proteins are known as the building blocks of life.

(iii) Fats: These are also called lipids. These are composed of the elements carbon, hydrogen and oxygen in the ratio of 76 : 12 : 12. Fats are backup energy source.

(iv) Water: Water is made up of hydrogen and oxygen elements in the ratio of 2 : 1. It serves as a transporter of nutrients to cell and remover of waste through urine. It is also crucial for control of body temperature, ionic balance of the blood as well as the body's metabolism.

2. Explain macronutrients and their role in our diet.

(CBSE 2019)

Ans. Nutrients that are required in large amounts in the diet are known as macronutrients, i.e. carbohydrates, proteins, fats and water. The functions of macronutrients are to provide energy, promote growth and development and regulate body functions. Carbohydrates, proteins, fats and water which are the macronutrients are very essential for the growth of a persona. Carbonates come in two main forms, i.e. simple carbohydrates and complex carbohydrates. Simple carbohydrates are formed by smaller chains. Carbonates are one of our body's dependable sources of energy.

Proteins are substances that have carbon and nitrogen compounds. Proteins are involved in the production of hormones, enzymes, tissues and antibodies, regulation of water and acid balance in the body. Fats known as lipids are a backup energy source. These are classified into saturated fats, polyunsaturated fats and monounsaturated fats. Water serves as the transporter of nutrients to cells and remover of waste through urine. It may not always be considered as macronutrient but it is needed by our body in large amount.

3. Discuss micronutrients in detail.

Ans. Micronutrients are needed in small quantities though they are indispensable for our health. Commonly known micronutrients are minerals and vitamins. Their primary function is to enable chemical reactions. They are not responsible for energy production. Approximately 4% of our body mass is made up of minerals which are found in an ionized state. The minerals present in and needed by our body are broadly classified into two types: macro-minerals such as calcium, potassium, phosphorus, sodium, chlorine, magnesium and sulphur and micro-minerals such as copper, iron, iodine, fluoride, cobalt, chromium, selenium and zinc. We need 0.1 g of macro-minerals and 0.01 g of trace minerals on a daily basis.

4. 'Vitamins are essential for our metabolic process.' What happens if our diet is devoid of vitamins? **(CBSE 2012)**

Ans. Vitamins serve primarily as regulators of metabolic functions, many of which are essential for improving performance of various activities. There is little evidence that vitamin enhances performance. Among the vitamins, only three vitamins are considered important, i.e. Vitamins C, E, and B complex. Though excessive intake of these vitamins do not enhance the performance level, but the deficiency or the devoid of vitamins might affect the health of athletes negatively and reduce their potential.

5. How do minerals contribute to our health? Explain citing at least four examples of each type of minerals.

Ans. Minerals play a vital role in our life. Minerals which contribute to our health are of two types:

(i) Macrominerals: Calcium, potassium, sodium, magnesium and phosphorus, and

(ii) Microminerals: Iodine, iron, chromium, copper and zinc.

6. What are fats? Write a detailed note on its types. Also mention its importance in the proper functioning of the body. **(CBSE 2012)**

Ans. Fats also called lipids are composed of the elements carbon, oxygen, and hydrogen in the ratio 76 : 12 : 12. Fats are a backup energy source. They regulate the body's core temperature, boost hormone production, protect organs and are a good solvent for fat soluble vitamin (A, D, E and K) and carotenoids. It is recommended that 20–35% of our daily energy requirement should come from fats.

Fats are classified into saturated fats, polyunsaturated fats and monounsaturated fats. The fats present in processed foods, packaged foods, sea foods and dairy products are saturated fats; these fats have the tendency to raise the level of cholesterol in the blood stream and heighten the risk of getting cardiovascular diseases. Polyunsaturated fats and monounsaturated fats on the other hand, help in lowering the blood cholesterol. Inclusion of these fats in the diet must naturally take into account which type should be struck from the list. These fats are very important for the health and can be obtained from animal sources and vegetarian sources also.

7. Write a note on the nutritive components of diet.

Ans. Nutritive components of diet consist of:

- **Macronutrients:** Proteins, carbohydrates and fats. (Refer to P–34-35 of the textbook)
- **Micronutrients:** Vitamins and minerals. (Refer to P–35-36 of the textbook)

8. Write a note on the non-nutritive components of diet.

Ans. Non-nutritive components of diet are:

- Fibre or roughage
- Water

- Colour compounds
- Flavour compounds
- Plant compounds

(For detail description refer to P–39-40 of the textbook.)

9. Explain any five essential elements of diet.

(CBSE 2014)

Ans. Essential elements of diet are:

- **Carbohydrates:** Carbohydrates are the major source of energy.
- **Fat:** It is a major nutritional element and a vital aspect of healthy diet though having a bad reputation.
- **Protein:** Protein plays more physiological role than other major nutrients.
- **Vitamins:** We need vitamins to grow and develop.
- **Minerals:** Minerals are required to grow and develop properly.
- **Water:** Water is a major nutritional element that regulates body temperature, lubricate joints and protect the major organs and tissues.

10. How can healthy weight be maintained? Explain.

Ans. Healthy weight can be maintained by taking into consideration the following points:

- Setting goal for losing weight
- Control calories count
- Change lifestyle for the better
- Regular practice of yoga
- Saying no to fatty foods
- Avoid overeating
- Avoid carbohydrate-rich food
- Eat the right number of meals.
- Say no to alcohol and
- Do exercise daily.

11. What are the various pitfalls of dieting?

Ans. The various pitfalls of dieting are:

- Extreme reduction of calories.
- Restriction of selected nutrients.
- Skipping meals.
- Intake of calories through drinking.
- Intake of pre-packaged and labelled foods.
- Avoiding exercises.

D. Value-Based Question

Naman was a Class 6 student. He used to bring junk food in his lunch box daily. His teacher observed that he was neither concentrating on his studies nor actively participating in physical activities. In this matter, he had a talk with his parents and came to know that he refuses to eat roti, dal, fruits and vegetables. Due to this, he is facing these problems. **(CBSE 2018)**

Answer the following questions based on the above passage:

1. What type of problems was Naman facing?

2. Why should junk food not to be recommended?

3. What values has his teacher shown in this matter?

Ans.

1. Naman was facing problems like lack of concentration and active participation in physical activities in his school.

2.
- Junk food does not contain the required nutrients for healthy life.
- It leads to overweight and other health problems.
- Adversely affects the growth and development.

3. Being concerned, helpful, dedicated, caring, inspiring, etc.

CHAPTER 3

YOGA AND LIFESTYLE

P. 66–70

A. Objective Type/Multiple-Choice Questions

(1 mark)

I. Multiple-Choice Questions

1. Which of the following factors does not cause obesity?

(a) Genetics

(b) Frequency of eating

(c) Psychological factors

(d) None of these

Ans. (d) None of these

2. What is/are the cause/s of obesity?

(a) Genetics (b) Overeating

(c) Physical inactivity (d) All of these

Ans. (d) All of these

3. Which of the following asanas are beneficial for diabetes?

(a) Hastasana, Vajrasana, Vrikshasana

(b) Bhujangasana, Paschimottanasana, Ardha Matsyendrasana

(c) Vajrasana, Trikonasana, Matsyasana

(d) Parvatasana, Shavasana, Chakrasana

Ans. (b) Bhujangasana, Paschimottanasana, Ardha Matsyendrasana

4. What is type 3 diabetes also known as?

(a) Insulin dependent diabetes

(b) Gestational diabetes

(c) Insulin independent diabetes

(d) Both (b) and (c)

Ans. (b) Gestational diabetes

5. What should be the normal blood pressure range at rest?

(a) 80–120 mm/Hg systolic and 60-90 mm/Hg diastolic

(b) 100–120 mm/Hg systolic and 60-100 mm/Hg diastolic

(c) 100–140 mm/Hg systolic and 60-90 mm/Hg diastolic

(d) 80–140 mm/Hg systolic and 50-90 mm/Hg diastolic

Ans. (c) 100–140 mm/Hg systolic and 60-90 mm/Hg diastolic

6. ..... makes the spine flexible and increases its elasticity.

(a) Ardha chandrasana

(b) Paschimottanasana

(c) Ardha matsyendrasana

(d) Shavasana

Ans. (c) Ardha matsyendrasana

7. Which one of the following is not a cause of hypertension?

(a) Genetic causes

(b) Obesity

(c) Lack of exercise

(d) Incorrect body posture

Ans. (d) Incorrect body posture

8. Which asana is also known as the upward facing bow pose?

(a) Dhanurasana (b) Tadasana

(c) Chakrasana (d) Vakrasana

Ans. (c) Chakrasana

9. Which asana is also known as the diamond pose?

(a) Tadasana (b) Vajrasana

(c) Shalabhasana (d) Shavasana

Ans. (b) Vajrasana

10. Which of these is not one of the asanas prescribed for relief from asthma?

(a) Sukhasana (b) Matsyasana

(c) Parvatasana (d) Hastasana

Ans. (d) Hastasana

11. Which of the following is not a benefit of trikonasana?

(a) Relieves gastritis

(b) Stretches armpits and shoulders

(c) Improves flexibility of spine

(d) Massages and strengthens pelvic muscles

Ans. (c) Improves flexibility of spine

12. Which asana is helpful in maintaining normal blood pressure?

(a) Shavasana (b) Padmasana

(c) Shalabhasana (d) Vakrasana **(CBSE 2020)**

Ans. (a) Shavasana

13. Gomukhasana, Chakrasana and Matsyasana are helpful in curing which disease?

(a) Diabetes (b) Backpain

(c) Asthama (d) Obesity **(CBSE 2020)**

Ans. (c) Asthama

II. Match the following:

Match list – I with list – II and select the correct answer from the code given below:

List I – Problem	List II – Causes
(a) Diabetes	(1) Allergic
(b) Back pain	(2) Sugar build-up
(c) Asthma	(3) Genetics
(d) Obesity	(4) Incorrect posture

Select the correct set of options:

Code				
	(i)	(ii)	(iii)	(iv)
(a)	3	2	1	4
(b)	4	4	2	3
(c)	2	1	3	2
(d)	1	3	4	1

Ans. (ii): (a) – 2; (b) – 4; (c) – 1; (d) – 3

III. Assertion-Reason Type Questions: CBQ

Given below are the two statements labelled Assertion (A) and Reason (R).

A: Obesity is a physical condition in which a person accumulates fat in excess so much so that it has a negative effect on his/her health.

R: Obesity has become a universal problem.

In the context of the two statements given above, which one of the following is correct?

(a) Both (A) and (R) are true and (R) is the correct explanation of (A).

(b) Both (A) and (R) are true but (R) is not the correct explanation of (A).

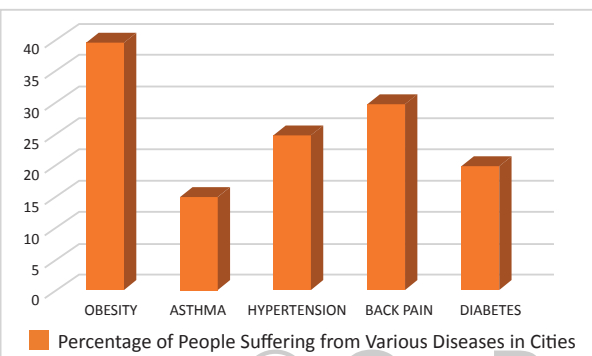
(c) (A) is true, but (R) is false.

(d) (A) is false, but (R) is true.

Ans. (b) Both (A) and (R) are true but (R) is not the correct explanation of (A).

IV. Data-Based Questions: CBQ

Given below is the graph which depicts the percentage of people suffering from various diseases in cities:



On the basis of the graph given above, answer the following questions:

1. Which of the following reasons can cause asthma?
   (a) Genetics (b) Allergens
   (c) Respiratory infections (d) All of these
2. Slouching due to electric gadgets causes which type of back/neck pain?
   (a) Cervical (b) Lumbar
   (c) Both (a) and (b) (d) None of these
3. Which of the given diseases can be classified as insulin dependent and insulin independent?
   (a) Diabetes (b) Asthma
   (c) Hypertension (d) Obesity

Ans. **1.** (d) All of these; **2.** (c) Both (a) and (b); **3.** (a) Diabetes

V. Picture-Based Questions: CBQ

Identify the following asanas and write their names:

1.  .....
2.  .....
3.  .....
4.  .....

Ans. **1.** Gomukhasana; **2.** Matsyasana; **3.** Shalabhasana; **4.** Paschimottanasana

VI. Case-Based Questions: CBQ

A 30-year-old hotel manager, weighing 105 kg is suffering from hypertension and is extremely prone to strokes and chronic kidney diseases.

On the basis of the case given, answer the following questions:

1. Which of the following could possibly be a cause of his hypertension?
   (a) Obesity (b) Age
   (c) Profession (d) Excess of exercise

2. Which of the following asanas should he preferably practice?

(a) Vakrasana (b) Sukhasana

(c) Ardha chakrasana

(d) Ardha matsyendrasana

3. What is hypertension?

(a) Increase in blood sugar level beyond normal

(b) Increase in blood pressure level beyond normal

(c) Increase in blood density level beyond normal

(d) Increase in blood oxygen level beyond normal

Ans. **1.** (a) Obesity; **2.** (c) Ardha chakrasana; **3.** (b) Increase in blood pressure level beyond normal

B. Short Answer Type-I Questions 3 marks

1. "Asanas can be used as a preventive measure". Comment **(CBSE 2020)**

Ans. Recent studies have shown that asanas improve flexibility, strength, and balance; reduce stress and the conditions associated with it. It enables us to become fully aware of our body. At the same time, it helps in reducing stress and anxiety, weight, hypertension, sleep disturbances, symptoms of lower back pain and fatigue. The flexibility of the spine increases, joints become more mobile, the lymphatic system and metabolism are stimulated, circulation of blood is boosted, blood pressure is normalized and stabilised, the nervous system is soothed and sharpened, and the skin becomes clear and fresh.

2. How do asanas function as a preventive measure?

or

What is the role of yoga in preventing lifestyle diseases. **(CBSE 2019)**

Ans. Asanas play an important role in preventing the onset of many adverse health conditions. It is a simple and economical preventive measure that can help in treating most of the widespread non-communicable lifestyle diseases and improving the health of people. As a preventive measure, asanas are useful in many ways:

- Mental health can be improved by performing suitable asanas.
- Bone diseases can be prevented by performing suitable asanas.
- The various types of asanas involve twisting the body, backward and forward bends and other activities that promote digestion and help in weight loss.

3. What are some causes of obesity?

Ans. Obesity is caused by the following factors:

- **Genetics:** A person whose parents are obese can develop obesity.
- **Overeating:** Overeating is when the intake of calories is much more than what the body actually needs. This results in regular deposition of unused calories causing obesity.
- **Frequency of eating:** Eating frequently leads to deposition of unused calories.
- **Physical inactivity:** Sedentary people burn fewer calories than those who are physically active, resulting in weight gain.
- **Psychological factors:** For some people, emotions influence eating habits which is termed as binge eating. It occurs out of sadness, boredom, stress or anger.

4. Which asanas are helpful in reducing obesity? Explain the procedure and contraindications of any one asana. **(CBSE 2019)**

Ans. Vajrasana, hastasana, trikonasana, ardha matsendrasana

VAJRASANA

Procedure:

- First kneel down on a flat surface.
- Your lower legs should stretch straight backwards with the toes crossing each other.
- Sit with your buttocks resting on the heels and the thighs of the calf muscles.
- Your spine should be straight and head should face forward.
- Your hands should be rested on the knees.
- Take deep breaths.

Contraindications:

- Beginners should take care not to overexert themselves to avoid straining the joints and breath.
- It might cause severe stiffness in the feet, ankles and knees.
- Patients of hernia, intestinal ulcers and other diseases of the small and large intestines should be extra careful.
- Patients of knee and back injuries should be extra careful while practising this position and should take it up only under the guidance of a trained experts.

5. How do the following affect obese or overweight people?

(a) Vajrasana

(b) Hastasana

(c) Trikonasana

(d) Ardha Matsyendrasana

Ans. (a) **Vajrasana:** Improvement of digestion helps in case of gas in the stomach and stops the formation of ulcers. Bring relief from constipation.

(b) **Hastasana:** Beneficial for those with weight problem. Boosts circulation of blood throughout the body. Reduces stress, brings relief from sciatica and tighten the buttocks and abdomen.

(c) **Trikonasana:** Relieves gastritis, indigestion, flatulence and acidity. Improves flexibility of the spine and corrects the posture of the shoulders. Massages the pelvic organs and strengthens them. Reduces stiffness in the back, neck, shoulders and knees. Reduces anxiety and stress.

(d) **Ardha matsyendrasana:** Massages the abdominal organs**.** Increases the release of digestive juices. Improves the functioning of the digestive system. Brings relief from stiffness, stress and tension in the back. Increases the supply of oxygen to the lungs. Loosens up the hip and makes the spine more flexible.

6. How do the following affect people with diabetes?

(a) Bhujangasana

(b) Paschimottanasana

(c) Pavanmuktasana

(d) Ardha Matsyendrasana

Ans. (a) **Bhujangasana:** Puts the abdominal muscles and shoulders to work. Increases the circulation of blood. Raises the body temperature and boosts the body's metabolism. Fights acidity, indigestion and constipation and helps to lose weight. Enhances the function of the liver, kidney, pancreas and gall bladder.

(b) **Paschimottanasana:** The intestine, gall bladder are smoothly pressed and stimulated, enhancing their functions. Massages and tones the abdominal and pelvic organs and improves blood circulation. Reduces belly fat and brings relief from constipation.

(c) **Pavanmuktasana:** Strengthens the abdominal muscles and massages the intestines and internal organs of the digestive system. Helps to burn fat in the thighs, buttocks and abdominal area. Contributes to loss of weight. Brings relief from menstrual cramps and pain in the lower back. Boosts blood circulation in the hip areas.

(d) **Ardha Matsyendrasana:** Massages and stimulates the pancreas, thereby instructing the beta cells of this organ to secrete more insulin. Secretion of insulin helps control of blood sugar level. Regulates the secretion of adrenaline and bile.

7. Explain about the procedure and advantages of Bhujangasana. **(CBSE 2019)**

Ans. Procedure:

- First, you must lie flat on your stomach. Place your hands on the side and make sure the toes of each foot touches each other.
- Move your hands to the front, keeping them at the shoulder level, and place your palms on the floor.
- Balancing your body's weight on the palms, breathe in and slowly raise your head and trunk. Your arms should be bent at your elbows at this stage.
- Work towards arching your neck backward. This is done to assume the pose of a cobra with a raised hood. It is important that your shoulder blades remain firm and that your shoulders are away from your ears.
- Press your hips, thighs and feet to the floor.
- Hold the position for 15–30 seconds while breathing normally.
- To undo the pose, slowly bring your hands back to the sides. Rest your head on the ground by bringing your forehead in contact with the floor. Place your hands under your head. Then slowly rest your head on one side and breathe.

Advantages:

It puts the abdominal muscles and shoulders to work, increasing the circulation of the blood and oxygen in those regions in which they turn. It raises the body temperature and boosts the body's metabolism to the levels that are beneficial at controlling diabetes. It fights acidity, indigestion and constipation, and helps the practitioner lose weight. It enhances the function of the liver, kidney, pancreas and gall bladder. It strengthens the arms and shoulders.

8. How do the following affect people with asthma?

(a) Sukhasana (b) Chakrasana

(c) Gomukhasana (d) Parvatasana

(e) Bhujangasana (f) Paschimottanasana

(g) Matsyasana

Ans. (a) **Sukhasana:** Asthma patients will benefit a lot from practicing sukhasana as it opens up the air passage by broadening the collar bones and chest. It also brings a sense of calmness, reducing stress, fatigue and anxiety. It lengthens and strengthens the spines and stretches the knee and ankles.

(b) **Chakrasana:** Opens up our lungs and stretches our chest and shoulders. Makes the shoulder blades, wrists, arms, legs, spine, buttocks, the heart and the muscles of the hips stronger. Stimulates the thyroid and pituitary glands.

(c) **Gomukhasana:** Strengthens the chest and eases breathing. Gets rid of stiffness in the shoulders and the back. Trains an individual to breathe correctly by making them focus on their own breathing. Includes relaxation, stretching of muscles, and bringing relief from frequent urination.

(d) **Parvatasana:** Stretches the entire body. Improves blood circulation. Eliminates blood congestion. Increases lung capacity. Increases the flexibility of the intercostal muscles. This is very useful for asthma patients.

(e) **Bhujangasana:** The symptoms of asthma can be eased with regular practice of bhujangasana. It involves stretching of the abdominal organs and opens the chest and lungs, improving their functions. It helps to push out the excessive carbon oxide and other toxic gases in our body and increases blood circulation, breathing and lungs capacity.

(f) **Paschimottanasana:** It stretches the spine, hamstrings and shoulders and encourages the free flow of the breath. It relaxes posterior muscles, eases mild depression and stress. It also helps in removing anxiety, anger and irritability.

(g) **Matsyasana:** It expands the chest by increasing the lungs capacity and strengthens the back muscles. It is beneficial for individuals suffering from depression and anxiety. Also, it aids in proper nutrient absorption, releases tension in the shoulders and neck, tones the pituitary, parathyroid and pineal glands. It stretches the hip flexors and intercostal, massages the throat and digestive organs and corrects posture.

9. How do the following affect people with hypertension?

(a) Tadasana (b) Vajrasana

(c) Pavanmuktasana (d) Ardha Chakrasana

(e) Bhujangasana (f) Shavasana

Ans. (a) **Tadasana:** It strengthens the chest and improves the respiration and opens the heart and spine. Enhances the nervous system and strengthens ability to focus. It improves posture and makes the buttocks and abdomen firmer. Also strengthens the thigh, knees, and ankle and increases their flexibility.

(b) **Vajrasana:** This is one of the best for going into a meditative state. It calms the mind, soothes the nerves and slows down the heart rate. It helps an individual deal effectively with stress and anxiety. It also improves digestion and eliminates constipation, ulcers and acidity, and strengthens the back and pelvic muscles and brings relief from lower back problems and sciatica as well as menstrual cramps. Therefore, very useful for the person with hypertension.

(c) **Pavanmuktasana:** It releases unwanted and toxic gases from the digestive system which further improves the quality and efficiency of the digestive system. It is useful in giving relief from indigestion, bloating, flatulence, acidity and constipation. It also helps to release tension in the lower back, hips and thighs. It helps in reducing belly fat, digestions and tension which are the main causes for hypertension.

(d) **Ardha Chakrasana:** It eases constipation when practised in the morning, which helps in maintaining a proper digestive system. It is an important asana for people with excessive fat especially around the waist. It also helps in improving the heart rate and we can control two common problems like asthma and high blood pressure by this asana.

(e) **Bhujangasana:** It helps in stimulating the digestive system to function well. It is regarded as one of the best asanas for getting a flat belly. It is very useful in relieving depression and the symptoms of stress like

fatigue, headache and weakness. Besides, it helps in improving blood circulation and maintains hormonal balance. It is a useful asana for getting rid of hypertension.

(f) **Shavasana:** It replenishes and rejuvenates the body. It helps in reducing high blood pressure and also relaxes the heart which keeps anxiety in check. It improves concentration, memory retention and also repairs the cells and tissues. It boosts energy levels and enhances productivity.

10. How do the following affect people with back pain?

(a) Tadasana (b) Bhujangasana

(c) Vakrasana (d) Shalabhasana

(e) Ardha Matsyendrasana

Ans. (a) **Tadasana:** This asana allows the whole body to stretch, thereby refining its flexibility, correcting its posture, and getting rid of the tension and stress in the lower back.

(b) **Bhujangasana:** It is very useful for stretching our back , thus strengthening the spine and increasing its flexibility. It helps in curing back pain, spondylitis and slip disc. It helps in losing weight which is one of the causes of back pain.

(c) **Vakrasana:** It helps to reduce abdominal fat, which can cause back pain. It improves the function of the spine. It massages the abdominal organs and enhances digestion by regulating the secretion of digestive juices. It strengthens the kidneys and prevents enlargement of the liver and spleen.

(d) **Shalabhasana:** It is beneficial for the disorders of the lower end of the spine, especially backache and sciatica. It helps in reducing extra fat around abdomen, waist, hips and thighs. It has the ability to cure cervical spondylitis and spinal cord ailments if practised daily. Also it strengthens the muscles at the back.

(e) **Ardha Matsyendrasana:** It makes the spine flexible and increases the elasticity of the spine. It permits the spine to be twisted all the way from the base of the spine to the very top. It improves the spinal nerves and ligaments, digestion, liver, and pancreas. It helps in opening the chest and helps in raising the supply of oxygen to the lungs. Therefore, it helps in curing back pain.

C. Short Answer Type-II Questions 5 marks

1. Discuss the impact of asanas on health.

Ans. We see the health of human beings is deteriorating day by day and lifestyle diseases are spiking due to factors such as sedentary lifestyle, bad diet and increasing presence of bacteria, parasites and viruses in the environment. Globally, the challenge is to develop new and stronger antibiotics and drugs to control and kill these new viruses and bacteria. In such circumstances, asanas play an important role in preventing the onset of many adverse health conditions.

Asana is a simple and economical preventive measure that can help in treating most of the widespread non-communicable lifestyle diseases and improve the health of people. The aim of an asana is to clean the body from within, fix the internal imbalance and then strengthen the exteriors. It enables us to become fully aware of our body. It helps in reducing stress and anxiety, weight, hypertension, sleep disturbances, symptoms of lower back pain and fatigue. The flexibility of the spine increases, joints become more mobile, the lymphatic system and metabolism are stimulated, circulation of blood is boosted, blood pressure is normalised and stabilised, the nervous system is soothed and sharpened, and the skin becomes clear and fresh.

2. Briefly explain the symptoms and causes of asthma. Explain the procedure, benefits and contraindications of any two asanas to prevent asthma. **(CBSE 2018)**

Ans. Asthma is a disease associated with respiratory tracks (air ways in the lungs)

Symptoms: Excessive amount of mucus, coughing, heavy breathing, wheezing or whistling, shortness of breath, swelling of air ways, chest tightness, fatigue,

Causes of Asthma:

- Allergy
- Heredity
- Occupational Asthma (caused by inhaling fumes, gases, dust or other potentially harmful substances in work place)
- Cigarette smoking/passive smoking and polluted air
- Exposure to animals that cause allergy (pets)

1. SUKHASANA

Sukhasana (‘*sukha*’ meaning ‘pleasure’), also

known as decent pose, easy pose or pleasant pose is a simple sitting pose in which the practitioner takes on a cross-legged position. It is one of the easiest asanas to perform and it is preferred for its meditative and calming effects.

Procedure:

- Sit down on the floor as you normally do. You can use a mat or a thick folded blanket as per your wish to make yourself comfortable.
- Stretch out your legs in front of you, then cross them.
- Broaden your knees and slip each foot under the opposite knee.
- Relax your feet so that the toes rest on the floor and the inner arches are resting below the opposite shin. Your thighs and shins should form a triangular shape. Make sure that there is a gap between your pelvis and feet.
- Press your hands on the ground and lift your sitting bones so as to allow the buttocks to sit neutrally. Hold this position for a few seconds and then slowly lower your sit bones back to the support.
- Align your tail bone and pubic bone so that they are equidistant from the floor.
- Rest your hands on your knees with the palm facing down and extend your tailbone towards the floor.

Benefits:

- Asthma patients will benefit a lot from practising sukhasana as it opens up the air passage by broadening the collar bones and chest.
- It also brings a sense of calmness, reducing stress, fatigue and anxiety.
- Additionally, it lengthens and strengthens the spines and stretches the knees and ankles.

Contraindications

- Sukhasana should be avoided by individuals with recent or chronic knee injuries, hip injuries, inflammation in the knee or hip and spinal disc problems.
- Simple though it may appear, it is always advisable to first learn the technique from a trained expert.
- If you experience extreme discomfort while practising this pose, consult a health expert before continuing further.

2. CHAKRASANA

Chakrasana (‘*chakra*’ meaning ‘wheel’) also known as Urdhva Dhanurasana or upward facing bow pose, is a back-bending pose commonly referred to as ‘back bridge’ in acrobatics and gymnastics. It is one of the final sequences in Ashtanga Vinyasa Yoga, the modernised version of classical yoga popularised by K Pattabhi Jois.

Procedure:

- You may begin this asana with a performance of bhujangasana.
- Lie on the back with the feet parted, bend the knees and bring your feet closer to the buttocks.
- Fold your arms and bring the palms under the shoulders. The two elbows should have a shoulder width distance between them.
- Inhale and press your palms firmly against floor.
- Lift your shoulders using your elbows as levers. Both your palms and feet should be firmly pressed against the floor as you do this.
- Now, raise your hips so that your spine is arched in a semicircular fashion.
- Stretch your arms and legs as much as possible so that the hips and chest are pushed up. Hold this position for at least 15–30 seconds.
- To release yourself from this pose, lower your head and shoulders to the floor by bending the elbows. Then bend your knees and lower your spine and hips. Breathe normally.

Benefits:

- Chakrasana opens up our lungs and stretches our chest and shoulders. As this refines the act of breathing, this asana is highly advantageous for asthma patients.
- Additionally, it makes the shoulder blades, wrists, arms, legs, spine, buttocks, the heart and the muscles of the hips stronger.
- It also stimulates the thyroid and pituitary glands.

Contraindications

- This asana is not recommended for those with carpal tunnel syndrome, back injuries, blood pressure problems, headache, diarrhoea, hernia or heart problems.
- Pregnant women too are advised against taking up this asana.

3. Discuss the procedure, benefits and contraindications of:

(a) Vajrasana (b) Hastasana

(c) Trikonasana (d) Ardha Matsyendrasana

(e) Bhujangasana (f) Paschimottanasana

(g) Pavanmuktasana (h) Sukhasana

(i) Chakrasana (j) Gomukhasana

(k) Parvatasana (l) Matsyasana

(m) Shavasana (n) Vakrasana

(o) Shalabhasana.

Ans. (a) **VAJRASANA:**

Procedure:

- First kneel down on a flat surface.
- Your lower legs should stretch straight backwards with the toes crossing each other.
- Sit with your buttocks resting on the heels and the thighs of the calf muscles.
- Your spine should be straight and head should face forward.
- Your hands should be rested on the knees.
- Take deep breaths.

Benefits:

- The most significant benefit of this asana for obese individuals is the improvement in digestion.
- It helps in case of gaseousness in the stomach and stops the formation of ulcers.
- It brings relief from constipation.
- Calm the nerves, strengthen the legs and thighs, makes the joints of the knees and ankles more flexible, and corrects posture.
- Alleviates lower back problems.

Contraindications:

- Beginners should take care not to overexert themselves to avoid straining the joints and breath.
- It might cause severe stiffness in the feet, ankles and knees.
- Patients of hernia, intestinal ulcers and other diseases of the small and large intestines should be extra careful.
- Patients of knee and back injuries should be extra careful while practising this position and should take it up only under the guidance of a trained experts.

(b) **HASTASANA:**

Procedure:

- It begins with Tadasana or the palm tree pose. Stand with your arms at the sides.
- Raise your arms gently upwards till they are stretched above you. The arms should be parallel to each other.
- Slowly bring your palms together over your head, making sure your shoulders are not hunched.
- If you prefer to keep your palms apart, they should be facing each other.
- For full extension and activation of your arms they should be straight throughout. Your shoulder should not touch the ears and the shoulder blades must be pressed firmly on your back.
- Calmly direct your gaze upwards. Align your thighs in such a way that they pull the kneecaps up.
- Straighten your legs without locking your knees.
- Hold the position for a minute at the least. To undo, exhale and bend the arms back to lower them.

Benefits:

- It is especially beneficial for those with weight problems since it fully stretches the stomach organs and improves digestion.
- It stretches the armpits and shoulders and, boosts circulation throughout the body.
- It is also known to correct body posture, reduce stress, bring relief from sciatica and tighten the buttocks and abdomen.

Contraindications:

- Individuals who have shoulders or neck injuries should avoid this posture.
- Beginners should first practise strengthening their arms and properly practice tadasana before talking up hastasana. Arms can be strengthened by securing them with shoulder-width loop around the upper arms, just above the elbows.

(c) **TRIKONASANA:**

Procedure:

- The first step is to stand straight with the knees unbent and the feet about 3 or 4 ft apart.
- Turn your right foot completely to the outside by 90 degrees and the left foot inside by 15

degree. Your heels should be kept in line with the hips.

- Align the centre of the right heel with the centre of the arch of the left foot. Your feet should press the ground firmly and the weight of the body should be equally balanced on both the feet.
- Spread your arms to the sides. They should be parallel to the ground with the palms facing down. Extend your trunk to the right.
- Drop the right arm so that the right hand reaches the front of the right foot.
- Now, extend the left arm vertically. Twist the spine and trunk gently in a counter clockwise direction. This time, the spine should remain parallel to the ground.
- Stretch the arms away from one another. You may turn your head and look up to intensify the spinal twist.
- Hold the position for 5 to 10 breaths. Inhale deeply. Relax your body with each exhalation.
- Repeat the posture by switching the position of the legs.

Benefits:

- It relieves gastritis, indigestion, flatulence, and acidity. Since it helps burn fat, it is highly recommended for those hoping to lose excess weight.
- It also improves flexibility of the spine and corrects the posture of the shoulders.
- It massages the pelvic organs and strengthens them.
- It reduces stiffness in the back, neck, shoulders and knees.
- It reduces anxiety and stress.
- It improves blood circulation and strengthens and stretches the hips, back, arms, thighs and legs.

Contraindications:

- This asana should be avoided by those who have migraine, diarrhoea, blood pressure problems or injuries of the neck and back.
- Those with high blood pressure should not raise their hand overhead if they want to try this pose, as the stance may raise the blood pressure.
- Beginners should practice this under the guidance of an expert.
- Those with cervical spondylitis should not look up for too long.
- Those with a heart conditions should practice against a wall and avoid raising the arm. Rather the arm should rest along the hip.

(d) **ARDHA MATSYENDRASANA:**

Procedure:

- First sit up with the legs stretched out straight in front of you. Keep the feet together and the spine erect.
- Bend your left leg. Place the heel of the left foot beside the right hip, and bring the right leg over the left knee.
- Place the left hand on the right knee and the right hand behind you.
- Gently twist your waist, shoulders and neck in this sequence to the right, looking over the right shoulder. Your spine should be erect.
- Hold the position for a few seconds, keeping your breath steady.
- Exhale and release the right hand first, followed by the waist, chest and then finally the neck.
- Sit up relaxed yet straight. Repeat with the other side.

Benefits:

- The twisting position massages the abdominal organs, increasing the release of digestive juices and improving the functioning of the digestive system.
- It brings relief from stiffness, stress and tension in the back.
- By opening up the chest, it greatly increases the supply of oxygen to the lungs.
- It also loosens up the hip and makes the spine more flexible.
- It improves the circulation of blood.
- It improves the flexibility of the back muscles, leg muscles, etc. and tones the muscles.

Contraindications:

- Pregnant and menstruating women should avoid this position as the twisting of the abdomen might be too strong for them
- People who have had heart, abdominal or brain surgeries, and those with spinal problems and slipped discs should not practice this asana.
- People who have severe back or neck pain should practice carefully and under the supervision of an expert.

(e) **BHUJANGASANA:**

Procedure:

- First, you must lie flat on your stomach. Place your hands on the side and make sure the toes of each foot touches each other.
- Move your hands to the front, keeping them at the shoulder level, and place your palms on the floor.
- Balancing your body's weight on the palms, breathe in and slowly raise your head and trunk. Your arms should be bent at your elbows at this stage.
- Work towards arching your neck backward. This is done to assume the pose of a cobra with a raised hood. It is important that your shoulder blades remain firm and that your shoulders are away from your ears.
- Press your hips, thighs and feet to the floor.
- Hold the position for 15–30 seconds while breathing normally.
- To undo the pose, slowly bring your hands back to the sides. Rest your head on the ground by bringing your forehead in contact with the floor. Place your hands under your head. Then slowly rest your head on one side and breathe.

Benefits:

- It puts the abdominal muscles and shoulders to work, increasing the circulation of the blood and oxygen in those regions in which in turn raises the body temperature and boosts the body's metabolism to levels that are beneficial at controlling diabetes.
- It fights acidity, indigestion and constipation, and helps the practitioner lose weight.
- It enhances the function of the liver, kidney, pancreas and gall bladder.
- It strengthens the arms and shoulders.

Contraindications:

- Those with severe back problems, neck problems, hernia and carpal tunnel syndrome and pregnant women should avoid this yoga pose.
- Those suffering from stomach disorders like ulcers and intestinal tuberculosis should perform this under the guidance of a trained expert.

(f) **PASCHIMOTTANASANA:**

Procedure:

- The first step is to lie down on your back on a mat. Your legs should be straight.
- Stretch your hands upward, keeping your fingers straight. Inhale deeply.
- With your arms still stretched, slowly raise your body and sit. Your spine should be erect and toes flexed towards you. Breathe normally.
- Slowly raise both the arms straight above your head and stretch your back. This should be done while inhaling.
- With slow exhalation, bend forward from the hip joint. Move your chin towards the toes keeping the spine erect.
- Place your hands on your legs without over exerting them.
- If you can hold your toes, pull on them to help you go forward. If do not put undue pressure trying to achieve this step. The trick is to start with you are comfortable with.
- Stay in this position as long as possible. Then breathe in and rise, stretching your arms above your head.
- Exhale and bring your arms down, placing the palms on the ground.

Benefits:

- While practicing this asana, the intestines, gall bladder are smoothly pressed and stimulated enhancing their functions.
- It massages and tones the abdominal and pelvic organs and improves blood circulation.
- It also reduces belly fat and brings relief from constipation.

Contraindications:

- Pregnant women and those who have had stomach operation should avoid this asana.
- In case of a damaged and enlarged liver and/or spleen or if you have a herniated disc or acute appendicitis it is advisable not to practice this asana.

(g) **PAVANMUKTASANA:**

Procedure:

- This asana should be performed in the morning in order to get rid of gas inside your body. It is particularly effective to do it as the first step of your morning routine since it will make other poses easier. If not then allow at least four to six hours to pass after your meal.
- Lie on your back on a smooth and flat surface and keep the legs straight and relax.
- Inhaling slowly, raise your legs and bend

the knees. Bring them gradually towards the chest till your thighs touch the stomach.

- Clasp your hands around your legs to hug your knees. Lock your fingers to secure the position.
- Next try to touch the knee with the nose tip.
- Hold this position for 20-30 seconds.
- Exhale slowly and undo the pose after you roll from side about three to five times relax.
- Practise 3 to 5 cycles daily.

Benefits:

- It strengthens the abdominal muscles and massages the intestines and internal organs of the digestive system. Consequently trapped gases are released and digestion is enhanced.
- It helps burn fat in the thighs, buttocks and abdominal area thereby controlling loss of weight.
- It also brings relief from menstrual cramps and pain in the back.
- It boosts blood circulation in the hip areas.

Contraindications:

- Those who have had abdominal surgery recently or are suffering from hernia or piles must avoid this asana.
- Pregnant women must avoid this asana in order to avoid causing stress to the body or causing complications.
- It should also be avoided by patients of heart problems, hyper acidity, high blood pressure, slipped disc, hernia, back and neck problems or a testicle disorder.
- An individual with a neck injury should practice this asana with their head resting on the floor and only with the approval of a doctor.

(h) **SUKHASANA:**

Procedure:

- Sit down on the floor as you normally do. You can either use a mat or a thick folded blanket as per your wish to make yourself comfortable.
- Stretch out your legs in front of you, then cross them.
- Broaden your knees and slip each foot under the opposite knee.
- Relax your feet so that the toes rest on the floor and the inner arches are resting below the opposite skin. Your thighs and shins should form a triangular shape. Make sure that there is a gap between your pelvis and feet.
- Press your hands so as to allow the buttocks to sit neutrally. Hold this position for a few seconds and then slowly lower your sit bones back to the support.
- Align your tail bone and pubic bone so that they are equidistant from the floor.
- Rest your hands on your knees with the palm facing down and extend your tailbone towards the floor.

Benefits:

- Asthma patients will benefit a lot from practicing this asana as it opens up the air passage by broadening the collar bones and chest.
- It also brings a sense of calmness, reducing stress, fatigue and anxiety.
- It lengthens and strengthens the spines and stretches the knees and ankles.

Contraindications:

- This asana should be avoided by individuals with recent or chronic knee injuries, hip injuries, inflammation in the knee or hip and spinal disc problems.
- Simple though it may appear, it is always advisable to first learn the technique from trained expert.
- If you experience extreme discomfort while practicing this pose, consult a health expert before continuing further.

(i) **CHAKRASANA:**

Procedure:

- You may begin this asana with a performance of bhujangasana.
- Lie on the back with the feet parted, bend the knees and bring your feet closer to the buttocks.
- Fold your arms and bring the palms under the shoulders. The two elbows should have a shoulder width distance between them.
- Inhale and press your palms against floor.
- Lift your shoulders using your elbows as levers. Both your palms and feet should be firmly pressed against the floor as you do this.
- Now raise your hips so that your spine is arched in a semi-circular fashion.

- Stretch your arms and legs as much as possible so that the hips and chest are pushed up. Hold this position for at least 15-30 seconds.
- To release yourself from this pose, lower your head and shoulders to the floor by bending the elbows. Then your knees and lower your spine and hips. Breathe normally.

Benefits:

- Chakrasana opens up our lungs and stretches our chest and shoulders. As this refines the act of breathing, this asana is highly advantageous for asthma patients.
- Additionally, it makes the shoulder blades, wrists, arms, legs, spine, buttocks, the heart and the muscles of the hips stronger.
- It also stimulates the thyroid and pituitary glands.

Contraindications:

- This asana is not recommended for those with carpal tunnel syndrome, back injuries, blood pressure problems, headache, diarrhoea, hernia or heart problems.
- Pregnant women too are advised not to take this asana.

(j) **GOMUKHASANA:**

Procedure:

- Sit on the floor with your legs stretched out in front of you. Your spine should be erect.
- Gently bend your left leg and bring it under your right leg so that the calf rests beneath the right hip. Fold your right leg and position the calf above the left thigh.
- Stack your right knee on top of the left one.
- Now fold your left arm and place it behind your back. The elbow should point downwards. Fold your right arm and bring it behind the shoulder with the elbow pointing upwards.
- Stretch your arms till the two hands are touching each other. Do not worry if you cannot achieve this the first time.
- Still keeping the spine straight, open up your chest then lean back slightly.
- Hold pose for as long as you can taking deep and slow breath.

Benefits:

- This asana strengthens the chest and eases breathing. It also gets rid of stiffness in the shoulders and the back.
- It also trains an individual to breathe correctly by making them focus on their own breathing. It includes relaxation, stretching of muscles and bringing relief from frequent urination.

Contraindications:

- This asana should be avoided by those who have ailments of the knee, back and neck.
- Overweight individuals should start slowly and not exert themselves beyond comfortable limits.

(k) **PARVATASANA:**

Procedure:

- Sit on the floor and cross your legs or to sit in sukhasana. An alternative position is to sit down, spread the legs wider than the width of the hip or to sit in padmasana.
- Place your hands in front of you and interlock the fingers enabling your palms to face towards you.
- Exhale and stretch your hands over your head all the while keeping your fingers interlocked.
- Stretch your torso as much as you can in the upward direction. This position should be held for a long time while breathing normally.
- Unlock your fingers, bring your hands down, stretch your legs in front of you and relax.

Benefits:

- It improves blood circulation and eliminates blood congestion. It also increases lung capacity as well as the flexibility of the intercostal muscles. Asthma patients will, therefore, find this pose advantageous for health reasons.
- It tones the core muscles, aids in improving the health of internal organs, and prevents potential onset of muscles and joint related problems like carpal tunnel syndrome, rheumatic stiffness and arthritis.
- It also stimulates growth hormones and reduces extra fat deposited at the back and the waist.

Contraindications:

- Parvatasana should not be performed by individuals experiencing complaints of a reeling sensation or knee problems.

(l) **MATSYASANA:**

Procedure:

- Lie flat on your back, making sure your knees

are straightened, and your legs and feet are together. Place your hands beside your body.

- Place your palms beneath your hips such that the palms are facing the ground.
- Your elbows and forearms should be near the sides of your torso and pressed against the floor.
- Inhale and lift your chest and head away from the floor. Exhale deeply as you raise your head and torso till you are sitting halfway up.
- The weight of your body should be supported by your forearms and elbows and not your head.
- Breathe normally as you hold this breath until you are uncomfortable.
- Exhale and release yourself from the position by gently lowering your torso and your head to the ground.

Benefits:

- This asana expands the chest by increasing the lungs capacity and strengthens the back muscles.
- It aids in proper nutrient absorption, releases tension in the shoulders and neck, tones the pituitary, parathyroid and pineal glands.
- It stretches the hip flexors and intercostal massages the throat and digestive organs and corrects posture.

Contraindications:

- Any individual suffering from high or low blood pressure, insomnia and migraine should avoid this asana.
- Any individual with a history of back injury should avoid this pose.

(m) **SHAVASANA:**

Procedure:

- Lie flat on the floor and make sure you are comfortable. Close your eyes.
- Place your legs in such a way that your toes are facing sideways. The legs should be placed comfortably apart.
- Place your arms along your body with open palms facing upwards. While doing so, leave a space between your body and arms.
- After reaching a position direct your attention to every area of your body, starting from your toes.
- Take slow but deep breaths, allowing your body to go into a state of intense relaxation. Avoid falling asleep.
- Once your body feels relaxed and refreshed roll to one side keeping your eyes closed. Hold the position for a minute and rise to sit in sukhasana.
- Breathing deeply, become aware of your surroundings before you open your eyes again.

Benefits:

- It replenishes and rejuvenates the body.
- It helps in reducing high blood pressure and also relaxes the heart which keeps anxiety in check.
- It improves concentration, memory retention and also repairs the cells and tissues.
- It boosts energy levels and enhances productivity.

Contraindications:

- Shavasana can be done by anyone, unless they have been instructed by their doctor not to lie on their back.

(n) **VAKRASANA:**

Procedure:

- Sit down and stretch your legs. Rest your hands beside your thighs or buttocks.
- Keep your right leg straight and stretched.
- Place your left foot beside the right knee as you keep your left knee raised upward.
- Inhale and straighten your elbows by raising the shoulder. As you exhale, twist your body to the left by placing the right arm by the outer side of the left knee and with your right hand, hold on to the left ankle. Then place the left hand behind the back by resting the palm on the floor.
- Turn your head backward from the left side. The final position of each stage should be held while breathing naturally. Hold the position as long as it is comfortable.
- Next, inhale and straighten the elbow of your right arm by raising your shoulder. As you exhale, release your body that is twisted towards the left by placing your right hand by the side of right buttock and left by the side of left buttock.
- Relax as you take a deep breath. Repeat the same steps on the other side.

Benefits:

- It helps to reduce abdominal fat, which can cause back pain. It also improves the functioning of the spine.
- It massages the abdominal organs and enhances digestion by regulating the secretion of digestive juices.
- It strengthens the kidneys and prevents enlargement of the liver and spleen.

Contraindications:

- This asana should not be performed by individuals who have ulcer and liver problems.

(o) **SHALABHASANA:**

Procedure:

- Lie down on your stomach and place both hands underneath the thighs.
- Inhale and lift up your outstretched right leg. Rest your chin on the ground.
- Maintain this position for 10 to 20 seconds. Then exhale and bring back your leg to its initial position.
- Follow the same steps with your left leg and repeat the cycle 5 to 7 times.
- Inhale and lift up both your legs without bending the knees. Repeat the same process for both your legs 2 to 4 times.

Benefits:

- It is beneficial for the disorders of the lower end of the spine, especially backache and sciatica.
- It helps in reducing extra fat around abdomen, waist, hips and thighs.
- It has the ability to cure cervical spondylitis and spinal cord ailments if practised daily.
- It strengthens the muscles at the back.

Contraindications:

- Do not practise this asana if you have injured or weak knees.
- Avoid this pose if you have injured ankle.

D. Value-Based Question

Neeti along with her father was regular at district park in early morning. She realised that most of the children are obese. She along with her few classmates wanted to help those children. She discussed with her physical education teacher and the principal of the school. School decided to organise awareness rally for the neighbourhood.

Answer the following questions based on the above passage:

1. How can be obesity prevented? Give two ways.
2. Give any two disadvantages of obesity.
3. What values are shown by Neeti and her classmates? **(CBSE 2015)**

Ans.

1. Obesity can be prevented by avoiding overeating, and doing asanas like vajrasana and trikonasana.
2. Hypertension, liver problem.
3. Sharing knowledge, concern for others, etc.

CHAPTER 4

PHYSICAL EDUCATION AND SPORTS FOR CWSN (CHILDREN WITH SPECIAL NEEDS- *DIVYANG*)

P. 83–87

A. Objective Type/ Multiple-Choice Questions **(1 mark)**

I. Multiple-Choice Questions

1. Which of the following cannot be categorised under cognitive disability?

(a) Toxicity (b) Memory disorder

(c) Hyperactivity (d) Dyslexia

Ans. (c) Toxicity

2. Cognitive disability may cause difficulty in which of the following activity?

(a) Reading (b) Writing

(c) Mathematics (d) All of these

(CBSE 2020)

Ans. (d) All of these

3. How can physical disabilities be diagnosed?

(a) Through observation of child's development

(b) Behaviour and physical performance

(c) Understanding of the mental status

(d) Only through (a) and (b)

Ans. (d) Only through (a) and (b)

4. What is the name for the condition under which a person has difficulty in comprehending written text, spelling and writing accurately?

(a) Spina bifida (b) Epilepsy

(c) Dyslexia (d) Arthritis

Ans. (c) Dyslexia

5. What do poverty, hormonal imbalance, radiation, etc. cause?

(a) Accidents (b) Disabilities

(c) Disorders (d) All of these

Ans. (b) Disabilities

6. For a child to be considered in the severe intellectual disability category, his/her IQ has to be below what value?

(a) 70 (b) 55

(c) 30 (d) 15

Ans. (c) 30

7. Children suffering from which disorder find it difficult to pay attention to things and are always restless?

(a) SPD (b) ADHD

(c) OCD (d) ODD

Ans. (b) ADHD

8. Which of these is a disorder suffered by people who have experienced some kind of extreme violence?

(a) PTSD (b) SPD

(c) ASD (d) ODD

Ans. (a) PTSD

9. Which of the following is not a symptom of ASD?

(a) Failing to respond to their name

(b) Hateful and vengeful

(c) Obsession with certain objects & activities

(d) Inability to give or sustain eye contact

Ans. (b) Hateful and vengeful

10. When a child is not able to adjust within society or having no friends, she/he is suffering from

(a) ADHD. (b) ASD.

(c) ODD. (d) OCD. **(CBSE 2020)**

Ans. (b) ASD.

11. Obsessive Compulsive Disorder is a/an .....

(a) Argumentative disorder.

(b) Anxiety disorder.

(c) Receiving and responding disorder.

(d) All of these. **(CBSE 2020)**

Ans. (b) Anxiety disorder.

12. Sam's sister has the habit of washing her hands every few minutes and spends her entire day arranging things exactly the way she wants. Which of these is a possible disorder she might be suffering from?

(a) ADHD (b) ASD

(c) OCD (d) ODD

Ans. (c) OCD

13. What will the obsessive thoughts of a person suffering from OCD include?

(a) Hostile behaviour

(b) Paranoia about safety for oneself or loved ones

(c) Particular about symmetry and specific order

(d) All of these

Ans. (d) All of these

14. A pattern of disobedience can be observed in children suffering from .....

(a) ODD. (b) ADHD.

(c) OCD. (d) SPD. **(CBSE SP 2020)**

Ans. (a) ODD.

15. Which of these is not one of the results of physical activities in children with special needs?

(a) Improvement in confidence

(b) Improvement in endurance

(c) Increase in depression

(d) Better hand-eye coordination

Ans. (c) Increase in depression

II. Match the following:

Match list – I with list – II and select the correct answer from the code given below:

List I – Types of Disorders	**List II – Causes**
(a) ADHD	(1) Fragile X syndrome
(b) SPD	(2) Unhappy home
(c) ODD	(3) Low birth weight
(d) ASD	(4) Brain injury during birth

Select the correct set of options:

Code				
	(i)	(ii)	(iii)	(iv)
(a)	3	2	1	4
(b)	4	4	2	3
(c)	2	1	3	2
(d)	1	3	4	1

Ans. (iv): (a) – 4; (b) – 3; (c) – 2; (d) – 1

III. Assertion-Reason Type Questions: CBQ

Given below are the two statements labelled Assertion (A) and Reason (R).

A: Physical activities sharpen the mind, allowing the child with disability to have enhanced cognitive skills.

R: Physical activities are performed in an interactive environment. By taking part in such group activities, the social life of the child improves and she/he learns to establish relationships with her/his peers.

In the context of the two statements given above, which one of the following is correct?

(a) Both (A) and (R) are true and (R) is the correct explanation of (A).

(b) Both (A) and (R) are true but (R) is not the correct explanation of (A).

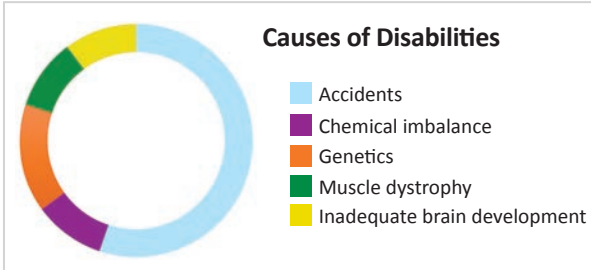
(c) (A) is true, but (R) is false.

(d) (A) is false, but (R) is true.

Ans. (b) Both (A) and (R) are true but (R) is not the correct explanation of (A).

IV. Data-Based Questions: CBQ

Given below is the chart which depicts the causes of disabilities:



On the basis of the pie-chart given above, answer the following questions:

1. Which of the following factors can cause Down Syndrome?

(a) Genetics (b) Accidents

(c) Chemical imbalance (d) All of these

2. Which of the following disability is likely to be caused by accidents?

(a) Down syndrome (b) Amputation

(c) Genetic mutation (d) Fragile X syndrome

3. Which of the following is the most common and likely cause of disabilities?

(a) Accidents (b) Radiation

(c) Toxicity (d) Violence and trauma

Ans. **1.** (a) Genetics; **2.** (b) Amputation; **3.** (a) Accidents

V. Picture-Based Questions: CBQ

Identify the following disorders/disabilities:

1.

.....

2.

.....

3.

.....

4.

.....

Ans. **1.** Autism Spectrum Disorder; **2.** Down Syndrome; **3.** Obsessive-Compulsive Disorder; **4.** Oppositional Defiant Disorder

VI. Case-Based Questions: CBQ

A couple has a premature, malnourished child. They live in small a village and in severe poverty.

On the basis of the case given, answer the following questions:

1. Which of the following disabilities is the child not likely to have?

(a) Blindness (b) Osteomalacia

(c) Functional disability (d) None of these

2. Which of the following vitamins does the child lack if he is suffering from blindness?

(a) Vitamin B_{12} (b) Vitamin A

(c) Vitamin D (d) Vitamin K

3. Which of the following factors may have contributed indirectly to the condition of the child?

(a) Diseases (b) Poverty

(c) Violence (d) Radiation

Ans. 1. (d) None of these; **2.** (b) Vitamin A; **3.** (b) Poverty

B. Short Answer Type-I Questions 3 marks

1. What is cognitive disability?

OR

Discuss in detail any one type of disorder.

(CBSE 2020)

Ans. Cognitive disability is something related to inability of assimilating the thoughts and understanding towards performing a physical action. It hampers the pressures of acquiring knowledge, understanding attention, speech and so on.

2. What is intellectual disability?

Ans. The Intellectual disability refers to the limitation of the functioning of mental capacities like learning, reasoning, problem-solving and IQ level.

3. What are the causes of physical disability?

Ans. The word physical disability means the limitations on a person's physical functioning. This may affect the person's movement, mobility, strength, speed, posture and so on. In other words, the physical disability means limitations in the physical performance of a person with respect to the all types of her/his movements or motions.

4. What is adaptive behaviour?

Ans. Adaptive behaviour refers to the conceptual skills, social and practical skills.

5. What are the major causes of disorder?

Ans. Disorders in a person can be caused due to various reasons. It can be hormonal, nutritional, functional, structural, behavioural, mental, social and so on. It is due to all these reasons or any one of the reasons the person's life skills and functional performance is affected.

6. What are some causes of:

(a) ODD (b) OCD

(c) ASD (d) ADHD?

Ans. (a) **Causes of ODD:** It means Oppositional Defiant Disorder. Its main causes are:

- **Genetics:** ODD can be inherited. It can also be developed in children with family members suffering from psychological disorders.
- **Neurology:** Presence of abnormal amounts of neurotransmitters in the brains has been linked to ODD. Due to this chemical anomaly, the different areas of individual's brain are unable to communicate properly.
- **Environment:** Environmental factors such as an unhappy home in which there is animosity and violence between the members, social isolation outside the home, poverty, general lack of discipline in one's surrounding, neglectful parents, etc.

(b) **Causes of OCD:** OCD means Obsessive – Compulsive Disorder. Its cause is not known but researchers believe that genetics and environmental factors may contribute to OCD. Some other causes like anxiety, emotional instability, depression, behavioural aggression, oppositional behaviour, etc. can also contribute to this kind of disorder.

(c) **Causes of ASD:** Autism Spectrum Disorder is a spectrum of developmental disorder. This is a wide range of impairment where various symptoms can be observed in a child's skill performance and can be graded at various levels. It is difficult to find the cause. But it may occur due to genetic predisposition, environmental and other health conditions.

(d) **Causes of ADHD:** This refers to Attention Deficit Hyperactivity Disorder. This is related to a neurodevelopmental problem and is considered as a mental disorder. ADHD has been found to have genetic linkage. It

can be passed socially from one person to another but may be inherited from parents.

7. What are the benefits of physical activities for children with special needs? Explain.

(CBSE 2018)

Ans. The benefits of physical activities for children with special needs are as follows:

- Physical improvement
- Reduce risk of health complications
- Mental improvement
- Behavioral patterns
- Improve self-esteem and develop self confidence
- Reduce level of anxiety, stress and depression
- Cognitive benefits
- Better emotional and psychological health (explain any three)

C. Short Answer Type-II Questions 5 marks

1. Explain the disability etiquette.

Ans. The word disability etiquette means acceptable behaviour in society with good manners and code of conduct. Disability etiquette does not have separate code of conducts. It is the way to make the differently abled person comfortable in her or his own world. A person with a disability may be comfortable in doing whatever she / he is doing.

2. What are the characteristics of cognitive disability?

Ans. The characteristics of cognitive disability are:

- It hampers the pressures of acquiring knowledge, understanding attention, physical actions, judgment, coordination, speech and so on.
- It needs to have hypo intellectual functioning and also needs to demonstrate impairment in adaptive behaviour.
- Impairment in intellectual functioning and adaptive behaviour are among the causes of cognitive disability. There cannot be only one cause but a number of causes like hormonal imbalance, genetic disorders, environmental factors, malnutrition, infringement during the growth and development stages of infancy, substance abuse, physical injury and so on. Therefore, cognitive disability may be characterised as mild, moderate and severe. These characteristics may be judged according to their IQ tests scores.
- If the IQ of a child is between 55-70, she/ he is considered to have mild cognitive disability. If the IQ of a child is between 30- 55, then the child is in the category of mild cognitive disability. A child falls in the severe cognitive category if the IQ is below 30.

3. Elaborate the nature of intellectual disability.

Ans. Intellectual disability usually occurs before the age of 18 years. A child with intellectual disability will have the limitations in the intellectual functioning and also in adaptive behaviour focuses on the conceptual skills, social and practical skills. A child with intellectual disability will always show the limitations like:

- Low in the concept of language, time, numbers, directions (conceptual skills).
- Poor interpersonal relations, social responsibility, poor self-esteem, feelings of negativity (social skills).
- Daily living activities will be slow, occupational skills and health care will be affected, money handling and safety will be affected (practical skill).

4. Explain the characteristics of physical disability.

Ans. This may affect the person's movement, mobility, strength, speed, posture, and so on.

- Limitation on an individual's physical functioning.
- Motor deficiency or sensory impairment that affects the mobility and manual skills is physical disability.

5. Write in detail about the causes and symptoms of Attention Deficit/Hyperactivity Disorder (ADHD).

OR

Write about the symptoms, causes and management of oppositional Defiant Disorder (ODD). **(CBSE 2019)**

Ans. **Causes of ADHD are:** This refers to Attention Deficit Hyperactivity Disorder. This is related to a neurodevelopmental problem and is considered as a mental disorder. ADHD has been found to have genetic linkage. It can be passed socially from one person to another but may be inherited from parents. Brain injuries during birth and neurological diseases also cause ADHD. Alcohol, cigarette smoking, drugs also cause ADHD. Infants born with low birth weight are more likely to develop this disorder. A disturbed life at home because of financial troubles, hostility between members or any other reason lead to the development of this disorder.

Symptoms of ADHD: Anxiety or a quick temper, impulsive, disorganised, easily frustrated, having low- esteem and mood swings and who easily fall into depression, is forgetful or has short attention span are the symptoms of the development of ADHD.

OR

Symptoms of ODD:

- A short temper of characterised by tantrums
- Tendency to argue, fight, and disobey rules
- A liking for annoying people
- Tendency to blame others
- Inability to negotiate
- Hateful and vengeful
- Impulsive in action and speech, etc.

Causes of ODD: Its main causes are:

1. **Genetics:** ODD can be inherited. It can also be developed in children with family members suffering from psychological disorders.
2. **Neurology:** Presence of abnormal amounts of neurotransmitters in the brains has been linked to ODD. Due to this chemical anomaly, the different areas of individual's brain are unable to communicate properly.
3. **Environment:** Environmental factors such as an unhappy home in which there is animosity and violence between the members, social isolation outside the home, poverty, general lack of discipline in one's surrounding, neglectful parents, etc.

Management: The parents with the help of doctors, teachers and therapists can together treat ODD. A positive patient interaction and effort is required for the child suffering from ODD.

6. Explain a few strategies to make physical activity assessable for children with special needs.

Ans. We can discuss a few strategies to make the physical activity assessable for children with special needs as under

- All the schools must have a separate wing to admit children with special needs.
- Expert or trained personnel should be made available in the school on regular basis.
- In all clubs and community centres of different societies, provision should be made for physical activity and sports for special needs persons with proper supervision.
- Society level activities should be organised for such children to lift their lifestyle.
- District, state and national level competitions must be organised for the children with special needs, so that they can prove their potentials on a regular basis.
- Individuals and organisations should be recognised by the society and government who are working to provide physical activity and sports to the children with special needs.
- Equipment should be made available at subsidised rates so that activity centres can be built-up at the society level.
- In all recreational and entertainment centre, provision for participation the special needs children should be made so that these children also feel that they are the part of society.
- In total, the attitude of the people needs to be changed towards the children with special needs and the concept of inclusion should develop among everyone to make activities assessable for the children with special needs.

7. How physical activities are helpful for children with special need? Explain strategies to make physical activities assessable for them.

(CBSE 2020)

Ans. It is a universal fact that physical activities enhance the quality of life and productivity of a person. In case of children with special needs, one needs to be very sensitive. Exposure to physical activity will certainly help them to uplift their lifestyle but at the same time their specific requirements need to be taken care of. A child may be light sensitive, heat sensitive or sound sensitive. So, her/his physical activity should be planned accordingly and preferably be indoors. In other words, if the physical activities are planned according to her/his disability type and level of impairment, it is certainly going to benefit the child.

Strategies to make physical activities assessable for the CWSN:

- All the schools must have a separate wing to admit children with special needs.
- Experts or trained personnel should be made available in the school on regular basis.
- In all clubs and community centres of different societies, provision should be made for physical activities and sports for persons with special needs with proper supervision.

- Society level activities should be organised for such children to uplift their lifestyle.
- District, state and national level competitions must be organised for the children with special needs, so that they can prove their potentials on a regular basis.
- Individuals and organisations should be recognised by the society and government who are working to make accessible physical activities and sports to the children with special needs.
- Equipment should be made available at subsidised rates so that activity centres can be built-up at the society level.

8. Write short notes on:

(a) ADHD (b) SPD

(c) ASD (d) ODD

(e) OCD.

Ans. (a) **ADHD:** This refers to Attention Deficit Hyperactivity Disorder. This is related to a neurodevelopmental problem and is considered as a mental disorder. A child with this disorder faces problems in paying attention, difficulty in controlling hyperactive behaviour. The symptoms can be identified before the age of 12 years. The child may show poor academic performance and social acceptability.

b. SPD: This refers to as Sensory Processing Disorder in which the brain is not able to integrate the sensory information and the sensory response becomes poor or sometimes slow. The sensory information organisation gets disturbed and the responding process also gets interrupted. A child with SPD may become oversensitive to things related to their surroundings. The exact cause of this disorder is not identified. Some sensory disturbance like light and sound may have a genetic limitations.

c. ASD: Autism Spectrum Disorder is a spectrum of developmental disorder. This is a wide range of impairment where various symptoms can be observed in a child's skill performance and can be graded at various levels. ASD maybe mild, moderate or severe depending upon the symptoms. A child with ASD may have social problems, interaction problems, communication problems, behavioural limitations, limited interests in activities, adjustment in the school, peer group and family members, etc. It is difficult to find the cause. But it may occur due to genetic predisposition, environmental and other health conditions.

d. ODD: It refers to Oppositional Defiant Disorder. A child with ODD will show a persistent pattern of anger, irritability, arguing and disobedient behaviour. The child will argue and talk back. The exact cause of this disorder is hard to identify. Studies reveal that a combination of biological, genetic and environmental factors may contribute this disorder. Injury to brain, disturbed family life, anxiety and mood disorder in parents may also expose the child to this disorder.

e. OCD: OCD means Obsessive – Compulsive Disorder. A child suffering from OCD will have only one behavioural change among the two. Obsessive thoughts will include:

- Fear of germs and contamination.
- Non-acceptance of any matter
- Hostile behaviour
- Particular about symmetry and specific order.

Symptoms:

- Over conscious about arranging things.
- Repeated action of checking.
- Performing superstitious actions repeatedly and getting relief after performing. It is actually an anxiety disorder which increases the worry in the person's life. Its cause is not known but researchers believe that genetics and environmental factors may contribute to OCD. Some other causes like anxiety, emotional instability, depression, behavioural aggression, oppositional behaviour, etc. can also contribute to this kind of disorder.

D. Value-Based Question

Pawan got admission in Class IX in a reputed school. All the students of his class welcomed him. After few days Aryaman, the class monitor observed that Pawan's behaviour is different from other students. He is aggressive, rude and non-cooperative. He finds it difficult to make friends. Even in school, nobody wants to be his friend. Aryaman had read about ODD in a science magazine in the library, which was similar to Pawan's behaviour. He discussed this situation with his classmates and suggested to interact and be friends with Pawan. This would help him to remain calm and happy.

(CBSE 2019)

Answer the following questions based on the above passage:

1. What do you mean by ODD?
2. What are the symptoms of ODD?
3. What values are shown by Aryaman?

Ans.

1. ODD refers to Oppositional Defiant Disorder which is a behavioural problem in a child.
2. The symptoms of ODD are: anger, irritability, disobedience, argue and so on. The exact cause is hard to identify. Studies reveal that a combination of biological, genetic and environmental factors may contribute to this disorder. Injury to certain areas of the brain may lead to behavioural problems or ODD in the child. Anxiety, stress and mood disorder in parents may also expose the child to this disorder. A disturbed family life, substance abuse, inconsistent discipline by parents may also lead to ODD.
3. Helpfulness, caring others, friendliness, etc.

CHAPTER 5

CHILDREN AND WOMEN IN SPORTS

P. 110–114

A. Objective Type/Multiple-Choice Questions

(1 mark)

I. Multiple-Choice Questions

1. What are the two types of motor development of muscles in the body?

(a) Gross and fine (b) Gross and net

(c) Coarse and fine (d) Gross and measured

Ans. (a) Gross and fine

2. In children, motor control of the head comes before the control of the legs. This head to tail sequence is known as the ..... trend. Which of these words fills the blank?

(a) Proximodistal (b) Cephalocaudal

(c) Cephalopodal (d) Proximoaxial

Ans. (b) Cephalocaudal

3. Which of these asanas is suggested for relief from Lordosis?

(a) Chakrasana (b) Vajrasana

(c) Halasana (d) Matsyasana

Ans. (c) Halasana

4. Which of the following are counted amongst the commonly known postural deformities?

(a) Spinal curvature (b) Flat foot

(c) Bow legs (d) All of these

Ans. (d) All of these

5. Running on an uneven terrain can cause .....

(a) lordosis. (b) kyphosis.

(c) scoliosis. (d) none of these.

Ans. (c) scoliosis.

6. Which yogic poses help in correcting round shoulders?

(a) Bhujangasana and Ustrasana

(b) Gomukhasana and Padmasana

(c) Ardh Matsyendrasana and Garudasana

(d) Chakrasana and Dhanurasana

Ans. (a) Bhujangasana and Ustrasana

7. In which postural deformity is there an abnormal lateral curvature of the spine?

(a) Kyphosis (b) Lordosis

(c) Fibrosis (d) Scoliosis

Ans. (d) Scoliosis

8. Who was the first Indian to win a silver medal in badminton at the Summer Olympics?

(a) Saina Nehwal (b) P V Sindhu

(c) Jwala Gutta (d) Sania Mirza

Ans. (b) P V Sindhu

9. Scoliosis is a postural deformity related with .....

(a) foot. (b) leg.

(c) vertebral column. (d) hand. **(CBSE 2020)**

Ans. (c) vertebral column.

10. Menarche is defined as the .....

(a) ending of menstrual period in women.

(b) beginning of menstrual period in women.

(c) time of pregnancy.

(d) beginning of pregnancy. **(CBSE 2020)**

Ans. (b) beginning of menstrual period in women.

11. Amenorrhoea, dysmenorrhoea and Menorrhogia are the types of .....

(a) menarche. (b) menstrual dysfunctions.

(c) osteoporosis. (d) anorexia nervosa.

Ans. (b) menstrual dysfunctions.

12. Which of these is an eating disorder in which patients have an obsessive fear of gaining weight?

(a) Bulimia (b) Amenorrhoea

(c) Leukaemia (d) Anorexia

Ans. (d) Anorexia

II. Match the following:

Match list – I with list – II and select the correct answer from the code given below:

List I – Postural Deformities	**List II – Causes**
(a) Scoliosis	(1) Long distance running
(b) Lordosis	(2) Lack of phosphorus
(c) Flat foot	(3) Obesity
(d) Knock knee	(4) Uncomfortable shoes

Select the correct set of options:

Code				
	(i)	(ii)	(iii)	(iv)
(a)	3	2	1	4
(b)	4	4	3	3
(c)	2	1	4	2
(d)	1	3	2	1

Ans. (iii): (a) – 1; (b) – 3; (c) – 4; (d) – 2

III. Assertion-Reason Type Questions: CBQ

Given below are the two statements labelled Assertion (A) and Reason (R).

A: The children in their middle childhood run faster, are able to jump higher, throw farther and their balancing and coordination becomes perfect.

R: In this age group, the urge for competition among children of their own age group declines due to growing pain in their limbs.

In the context of the two statements given above, which one of the following is correct?

(a) Both (A) and (R) are true and (R) is the correct explanation of (A).

(b) Both (A) and (R) are true but (R) is not the correct explanation of (A).

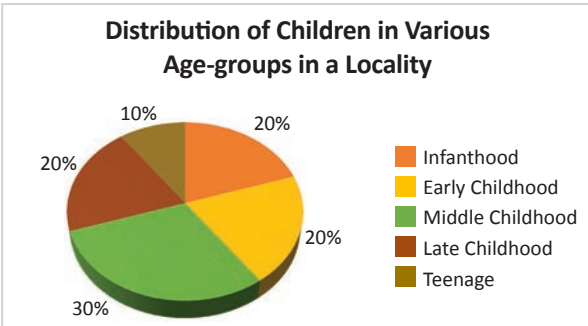
(c) (A) is true, but (R) is false.

(d) (A) is false, but (R) is true.

Ans. (c) (A) is true, but (R) is false.

IV. Data-Based Questions: CBQ

Given below is the chart which depicts the distribution of children in various age-groups in a locality:



On the basis of the pie-chart given above, answer the following questions:

1. The locality has a jungle gym. Which age-group(s) do you think it would benefit?

(a) Early and middle childhood

(b) Infanthood and teenage

(c) Late childhood and infanthood

(d) None of these

2. A child who is almost able to converse at an adult level belongs to

(a) infanthood. (b) early childhood.

(c) middle childhood. (d) late childhood.

3. In late childhood when a child hits puberty, what is likely to be her/his age?

(a) 10 years (b) 9 years

(c) 13 years (d) 12 years

Ans. 1. (a) Early and middle childhood; **2.** (c) Middle childhood; **3.** (d) 12 years

V. Picture-Based Questions: CBQ

Identify the following asana and write the name of the postural deformity that it is helpful in treating:

1.

.....

2.

.....

3.

.....

4.

.....

Ans. 1. Dhanurasana – Kyphosis; **2.** Halasana – Lordosis; **3.** Padmasana – Knock Knee; **4.** Trikonasana – Scoliosis

VI. Case-Based Questions: CBQ

A female athlete has an abnormal eating behaviour and suffers from Anorexia Nervosa.

On the basis of the case given, answer the following questions:

1. Which of the following cannot possibly be a reason behind the behaviour?

(a) Madness for perfection

(b) Pressure of conforming to standards

(c) Genetic inheritance

(d) None of these

2. Which of the following symptoms confirm Anorexia Nervosa?

(a) Fatigue and insomnia

(b) Frequent visits to the washroom

(c) Damaged teeth enamel

(d) Visible broken blood vessels in eyes

3. What can possibly help the athlete manage her condition?

(a) Physiotherapy (b) Psychotherapy

(c) Anti-inflammatories (d) Escapism

Ans. 1. (d) None of these; **2.** (a) Fatigue and insomnia; **3.** (b) Psychotherapy

B. Short Answer Type –I Questions 3 marks

1. Write a brief note on the motor development of:

(a) infants (0 to 2 years)

(b) early childhood (2 to 6 years) **(CBSE SP 2016)**

(c) middle childhood (7 to 10 years) **(CBSE SP 2016)**

(d) late childhood (11 to 12 years).

Ans. (a) Infanthood is marked by rapid growth and development of muscles. The child achieves motor control of the head first, then the arms and legs.

(b) During early childhood the child starts climbing and crawling and manages to walk like an adult by the age of four years.

(c) Middle childhood is characterised by the child's ability to focus on the development of hand eye coordination and balance. They also like to compete with their peers during this period.

(d) By late childhood, all individuals have the fundamental aspects of motor development. Puberty sets in for both male and female children.

2. How do biological factors affect motor development?

Ans. Biological factors are linked with genes and are also known as genetic or heredity factors. Various types of motor development depend on the genes we get from our parents like the percentage of fast twitch fibres and slow twitch fibers which decide our muscular speed and endurance. These factors influence the rate and ability of motor development and are connected to body weight, size and strength. Another important biological factor is the development of nerve cells or neurons. They transmit messages to the brain and connect with other nerves and form pathways in the brain during the first months of life.

3. How is motor development in children affected by the environment factors?

Ans. Motor development of children is affected by environmental factors such as physical and social factors. Motor development takes place at a quicker rate in children who are encouraged to discover their surroundings. Climate, housing and culture have a strong impact on the development of motor skills of children. In many societies, children are encouraged to explore their surroundings and take part in motor activities. It is support, love and security of the elders that help a child to take risks, explore courageously and enjoy effective motor development.

4. What effects do nutrition and physical activities have on motor development?

Ans. Nutrition and physical activities do have the effects on motor development as under:

- **Nutrition:** Wholesome nutrition is an essential requirement for all round development of a child. Good motor development can be derived from nutritious food. On the other hand, children without proper nutrition lose their energy and have poorly developed motor skills.
- **Physical activities:** Regular physical activities help the motor development to be at a faster rate but the physical activities must correspond to the capabilities and limitations of a child. Children who do not practice or take-up physical activities regularly will have a slower rate of motor development and show deficiency in coordinative abilities and technical skills.

5. Describe briefly how sensory impairments and postural deformities affect motor development.

Ans. Sensory impairment and postural deformities affect motor development as under:

- **Sensory impairments:** Sensory impairments like visual impairments, hearing impairments etc. are likely to affect the motor development of children. Movements are the product of the coordination between the central nervous system, the sensory organs, the muscles and joints. Inability to perceive stimuli correctly will lead to failure of the appropriate timely motor response.
- **Postural deformities:** Postural deformities like spinal curvature deformities, flat foot, knock knee, bow leg, etc. slow down or obstruct the process of motor development in children. Children with no postural deformities will have a faster rate of motor development.

6. Suggest physical exercises for childhood and adulthood. **(CBSE 2020)**

Ans. Physical exercises for childhood are as follows:

- **Children between 5–8 years:** short distance or light running, throwing, jumping, coordinative activities, etc.
- **Children between 9–12 years:** flexible exercises, riding bicycle, coordinative activities, etc.
- **Children between 13–19 years:** All games and sports can be played at this stage. Aerobic activities are good for proper growth and development. Good coaching and sports environment should be offered to develop

leadership qualities and team spirit among children.

- **Adulthood:** All games and activities can be done in a progressive manner. Adults having any medical problem should take the advice of physical trainer or coach. Muscular strengthening or aerobic exercises can be done. Activities like walking, jogging, dancing, swimming, weight training, cycling, gardening, etc. can be done.

7. Write about the deformities of spinal curvature. **(CBSE 2016)**

Ans. The lumber spine is characterised by a moderate anterior hyperextension curve, i.e. everybody's spine has some form of curvature. Spinal curve helps our backs absorb shock. A healthy spine should run however straight down the centre. Sometimes, abnormal spinal curvatures are formed. They are associated with the abnormality in the formation, alignment or shape of the vertebral column or spine. These deformities are the result of carrying excessive weight beyond capacity of the body. We have three types of spinal curvatures:

- Kyphosis
- Lordosis
- Scoliosis

8. Enlist the spinal postural deformities. Explain the cause of kyphosis and precautions to avoid it. **(CBSE SP 2016)**

Ans. The list of spinal posture deformities are:

- Kyphosis
- Lordosis
- Scoliosis

Causes of kyphosis: Kyphosis is caused by malnutrition, illness, deficiency of pure air, insufficient exercises, rickets, carrying heavy loads, poorly shaped furniture, weak muscles, ageing, spinal injury, arthritis and other degenerative bone diseases and the habit of doing work by leaning forward.

Precautions: It can be prevented by following correct posture while sitting, standing and walking from an early age. Proper exercise and diet are also important measures.

9. Briefly explain lordosis, its causes and remedial and preventive measures.

Ans. Lordosis is the excessive inward curvature of spine resulting in a forward curve in the lumber region. The body becomes stiff and painful.

Causes: It can be caused because of imbalanced diet, improper environment, improper development of muscles, obesity and diseases affecting vertebrae and spinal muscles like spondylitis and osteoporosis. Physical inactivity and excessive intake of food are also the major causes.

Precautions: The following are the precautionary and remedial measures:

- Good nutrition
- By weight control especially at an early age.
- While carrying a heavy load, the person has to lean forward which results in a bad posture. Even if carrying weight one should align her/ his body in straight position.
- Stand straight with the feet and shoulder width apart.
- Bend your knee and hold your ankle. When you pull your back, tilt your pelvis forward. Hold this position for 25-30 seconds.
- Lie down on the floor facing the ceiling and put your feet on the floor; tilt your pelvic back by pushing the lower back into the floor. Lift your torso off the floor to 30° angle by supporting your neck with your hands. Come back slowly to starting position and repeat exercises 10 times.
- Lie down your back on the floor facing upward with the flexion of knees while keeping your feet flat on the floor apart from each other. Squeeze your gluteus and lift up your hip upward as much as you can. Hold for 20 to 30 seconds and return to starting position. Repeat this exercise 20 times a day.
- Toe touching exercises, sit up and *halasana* should be performed regularly.
- For performing head to knee exercises, remain seated on the mat with your legs stretched forward. Slowly, lower your head and try to touch your forehead to your knees. Hold to count of 10 and repeat it for 10 to 15 times.

10. Briefly explain scoliosis, its causes and preventive and remedial measures.

Ans. Scoliosis is the abnormal lateral curvature of the spine. It can be bending, twisting or rotating of the spine. People with scoliosis develop additional sideways curves on either side of the body and may be called scoliotic curves. These curves are defined in terms of their convexities and identified as right convexities and left convexities.

Primary causes: The primary causes are diseases in the joints of bones, polio, rickets,

infantile paralysis, cerebral palsy and juvenile osteoporosis or other diseases.

Precautionary measures:

- An unhealthy diet and low levels of specific minerals can contribute to scoliosis progression.
- Carrying heavy things especially on one side should be avoided as it adds to natural pull of gravity and compresses the spine further.
- Long distance running on uneven terrain and prolonged running can result spinal compression, may bend or rotate your curve and cause greater risk of scoliosis progression. Thus, running should be limited.

Remedies:

- Lie down facing the ground, bend your elbow, and support your body with your toes. Squeeze your abs in and hold this position for 5 seconds. Repeat technique step 10 times.
- Scoliosis can be cured by breast stroke or butterfly technique of swimming.
- Yoga has been one of the best practices to cure any ailment and also helps in enhancing overall physical strength. It maintains a balance for the body in case of scoliosis.
- Use a firm quality mattress. Avoid the soft mattresses and use extra pillows for comfort instead.
- Sitting or standing in one place for prolonged period stresses the spine. Stretch or take a walk as often as possible. Choose a chair with good support if you sit for extended period.
- For mild scoliosis football is another great exercise that can strengthen the core muscle. All positions except goalkeeper are fine.

11. Briefly explain flat foot, its causes and preventive and remedial measures.

Ans. The appearance of flat foot is natural and common in infants. Flat foot in children usually disappears when they attain adolescence and adulthood. Persisting during the later periods of childhood becomes a postural deformity. A child with a flat foot cannot become an efficient sportsperson. They feel pain mainly in the heel area and experience difficulty in standing and walking.

Causes: It usually develops due to excessive stress on the feet. Weak muscles in feet, ankles and lower leg cannot bear body weight. Conditions related to ageing such as weakness of muscles and bones, uncomfortable shoes, foot injuries and carrying heavy loads for longer period also cause flat foot.

Precautions:

- Wearing comfortable shoes that fully support the arch and help stabilise the heel.
- Walking bare feet should be avoided.
- Losing excess weight can reduce the stress on feet.
- Infants or toddlers should not be compelled to walk at very early stage.
- Carrying heavy loads should be avoided at the early stage of development.
- High-heeled shoes should be avoided.

Remedial measures:

The exercises like walking on the toes, walking on the lateral border of the foot, making the fist with the foot relaxing them and then repeating it again, skipping on a rope, the vajrasana yogic asana and heel walking involves walking on the heels with the whole body weight on the heels.

12. Briefly explain knock knee, its causes and preventive and remedial measures.

Ans. The scientific name of knock knee is *genu valgum*. The term originates from the Latin word '*genu*' which means '*knee*' and '*valgus*' which means 'bent outside'. It is a condition of postural deformity where the knees knock or rub together while walking or standing and the feet and ankles are fat apart than normal. One having this problem faces problems in walking and running.

Causes:

- Lack of vitamin D and minerals like calcium and phosphorus.
- Problems associated with the development of bones and joints like rickets, osteoporosis and arthritis also contribute to knock knee.
- Other possible factors include obesity, flat foot, an injury or infection affecting the knees or leg bones and carrying a heavy load at an early age.

Precautions and remedies:

- Daily cycling for 20 to 30 minutes and horse riding would help naturally in making a gap between the knees.
- Keep a pillow between the legs while sleeping, walking or sitting daily for 15 to 20 minutes.
- Knock knees' special shoes, night braces and walking calipers may prevent knocking.

- Perform the padmasana and gomukhasana yogic poses daily.
- Supplement of vitamins D like cod liver oil and minerals like calcium and phosphorus should be taken for strengthening the bones.

13. Briefly explain bow legs, its causes and preventive and remedial measures.

Ans. Bow leg is simply a normal variation in leg appearance. It is a condition of physical deformity marked by an outward bowing of the leg, i.e. knees are wide apart and ankles are touching. There is a distinct space between lower legs and knees which is opposite to knock knees. When standing with feet together, the individual legs appear like an archer's bow. It may be on either side or both legs curving outward. Bowed legs are most apparent while walking, running and standing.

Causes: Rickets is the main cause of bow legs. Children with rickets do not get enough calcium, phosphorus and vitamin D all of which are vital for healthy growing of bones.

Precautions and remedies:

- Never force babies to walk at a very tender age.
- Appropriate body weight with respect to ages should be maintained.
- A balanced diet is essential for the timely growth and maintenance.
- Vitamin D should be taken in a recommended amount.
- Intake of well balanced diet is crucial for overall development and functioning of body.
- Some special shoes, casts and leg braces can be used for correcting bow legs in young children.
- Bow-legged person should try to walk for some distance on the inner edge of the feet.
- In-toeing position of walking where feet turn inward instead of pointing straight should be adopted.

14. What do you mean by round shoulders? Suggest any four physical activities for correcting round shoulders. **(CBSE 2015)**

Ans. This postural abnormality is characterised by a drooping shoulder which appears round and a slight forward bending of the back.

Causes: There are many factors which promote development of rounded shoulders:

- Heredity factors led to rounded shoulders.
- Tight clothing and shoes affect posture.
- High-heeled shoes, tight fitting clothes, wide belt, etc. change the centre of gravity which ultimately leads to poor posture.
- Poor posture of sitting, standing and walking, improper furniture, excessive weight training like bench press, bicep curls and shoulders press exercises result in rounded shoulders.
- Complete lack of exercises which are concerned with shoulders also affects the shoulders, leaving them vulnerable to rounded shoulder.

Precautions and remedies:

- Never slouch while sitting and walking and always stand flat back position.
- Those who have rounded shoulders should not wear tight fitting clothes and avoid high heeled shoes.
- Avoid sitting on faulty furniture which is not comfortable.
- Place the tips of fingers of both hands on shoulders and encircle the elbows in a clockwise and anticlockwise direction.
- Hang on the horizontal bar for some time.
- Perform yogic techniques especially chakrasana and dhanurasana on a regular basis.

15. Suggest at least two exercise methods for treating (a) lordosis, (b) round shoulder, (c) flat feet, (d) scoliosis, (e) kyphosis, (f) knock knee, and (g) bow legs.

Ans. (a) **Lordosis:**

- First lie down in a prone position with hands under abdomen. Then keep hips and shoulder down and gently press hands upon abdomen and raise the lower back.
- Bend knees forward while allowing hips to bend back behind. Keeping the back straight and knees pointed in the same direction as feet, lower your body until thighs are parallel to floor. Extend the same from the starting position.

(b) **Round shoulder:**

- Place the tips of fingers of both hands on shoulders and encircle the elbows in a clockwise and anticlockwise direction.
- Hang on the horizontal bar for some time.

(c) **Flat feet:**

- Practise jumping on toes for some time.
- Rope skipping exercise.

(d) **Scoliosis:**

- Lie down in prone position. Raise right arm upward and left arm at the side. After this position, bring right arm towards the left over the head, by pressing down with left hand and then slide the left hip up.
- Stand erect with feet few inches apart. Lift up the left and hip. Extend the right arm and bend the arm towards the left over head while pressing the left side of rib by the left hand.

(e) **Kyphosis:**

- Lie down in a prone position with hands on hips. After that raise your head and chest several inches from the ground and tuck your chin during this exercise. Hold this position for some time and return to previous position. Repeat this exercise at least 10 times.
- Sit in a normal position with a stick held in horizontal position over the head and trunk, hands well stretched. After that lower the stick and then raise it behind head and shoulders. Repeat this exercise 10 to 12 times.

(f) **Knock knee:**

- Daily cycling for 20 to 30 minutes and horse riding would help naturally in making a gap between the knees.
- Perform the padmasana and gomukhasana daily that may counteract the effects of knock knee.

(g) **Bow legs:**

- Bow-legged persons should try to walk for some distance on the inner edge of the feet.
- Do yogic exercises like garudasana and ardha matsyendrasana regularly.

16. Give two examples of Indian sportswomen facing discrimination due to their gender.

Ans. World champion boxer Mary Kom's father strongly disapproved of her decision to pursue boxing. The reason he gave was that it would disfigure her appearance and ruin her marriage prospects. More recently, in the 2014 Asian Games, Sarita Devi, a boxer, was banned for a year by All India Boxing Association when she refused to accept the Bronze medal because of the unfair and biased decision by the judges. It was evident that she was the clear winner. But the Indian Government did not even support her and she and her husband had to borrow money to lodge a complaint against the decision.

Olympian performer and world-class athlete P T Usha had to share a room with five other women at the National Open Athletic Championship in 2009, notwithstanding her rank.

17. Briefly discuss how Indian sportswomen are affected by lack of gender equality and the culture of masculinity in the country.

Ans. In ancient Olympics women were not allowed even to watch the sports competition. It is a matter of regret for all of us to know that sports where gender inequality is strongly evident. It is a fact that this problem is more of socio psychological nature than anything else. It is really a matter of shame that men and women are considered so differently especially in the field of sports. It is also observed that women are not provided equal opportunities in comparison to their male counterparts. It is a reality that men still considered the better. The social environment not only makes it easier for men to participate in sports but also makes it harder for women to do so. All these differences can be visiualised in schools, colleges and any other places also. But now the time has started to change and we expect the bright future for sportswomen.

Boxing gold medallist Rishu Mittal works as a domestic helper to continue her career due to lack of government funding. Sita Sahu, two times bronze medallist at Athens Special Olympics, sells gol appas along with her mother and has discontinued her profession. Nisha Rani, a Bronze medallist, had to sell her archery equipment for her family's subsistence.

18. What are the consequences of not having a fitness and wellness movement for women?

Ans. Due to lack of movements to create awareness about fitness and wellness the majority of women in India have a poor knowledge about their own health and the role of sports in maintaining it. Many of them pay little attention to their overall fitness. This lack of concern arises from ignorance about the necessity of preservation of health. In the absence of a fitness movement, vital information about their health is not communicated effectively to them and they fail to see the importance of sports for the welfare of their health.

19. How does incorrect and insufficient education affect the prospects of women players in India?

Ans. The reasons behind the low rate of women's participation in sports in India is lack of education among women as there are many women who do not receive a proper education even now, especially the lower class. The literacy rate of the male population surpasses that of their female counterparts. Therefore, the latter are in the dark about many subjects. Our

society is full of theories that are not based on any solid foundation or scientific reasoning. In fact, these theories arise from prejudice, gender bias, superstitions, pointless assumptions of a male-dominated society and lack of scientific knowledge. For instance, our society claims that sports participation alters the psychological, physical and social traits natural to women and give rise to complications during pregnancy and child delivery. It even asserts that women compromise their femininity and suffer from health problems, like: bone weakening, abnormal psychological changes, etc. due to sports participation. These statements are absurd and far from the truth. Due to lack of proper education and knowledge, women also entertain the same opinions which is why there are few sportswomen in India.

20. Suggest any four ways through which women participation in sports across age group can be enhanced. **(CBSE 2015)**

Ans. The four ways through which women participation in spouts across age group can be enhanced under:

- **Family environment:** The support of one's family is important for pursuing a desired career, especially in a country like India. If girls are motivated to discover and perfect their talent and skills, they can excel in sports.
- **Culture:** The social climate of the society we live in is a big factor in cultivating a prosperous sports culture for girls and women. If the women are not confined in traditional roles, they will be able to utilise their potential.
- **Confidence:** It is the first and foremost thing that we should develop the confidence among women folk. The women athlete can be more competitive and can do better in sports.
- **School:** Schools have a big role in instilling a progressive and confident spark in their students. When school will help the girl students in realising their potential, then there will be an increase in the participation of women in sports.

21. How does intensive exercise impact menarche?

Ans. It has been found that intensive exercise and sports activities can cause abnormalities, like delayed menarche and amenorrhoea. Such activities create physiological stress which affects the reproductive process and disrupts the normal patterns. It is true that menstrual abnormalities or other health issues are frequent among women who are involved in intensive exercises and sports activities.

22. Briefly describe female athletes triad.

Ans. It is a serious disorder of three interrelated medical conditions; energy deficiency with or without eating disorders; menstrual disturbances; and reduced bone mineral density which is likely to cause osteoporosis. The triad usually affects teenage girls who consume less calories and exercise excessively. They may develop eating disorders and become obsessed with exercise to achieve low body weight and enhance and performance in sports. Therefore, they are at greater risk of suffering from this syndrome. Energy deficiency leads to menstrual disturbances like amenorrhoea which is associated with low oestrogen levels. Low oestrogen levels contribute to a decrease in bone density and lack of calcium and vitamin D in the body. This is one of the main causes of osteoporosis. A women is likely to have the other two conditions if she is suffering from one condition of the triad.

23. How can women participation in sports and games be encouraged in India? Explain. **(CBSE 2017)**

Ans. Women in India can be encouraged to participate in sports as under:

(i) Do not treat them as low profile.

(ii) Encourage them at their primary level.

(iii) Provide good facilities and infrastructure.

24. Briefly explain eating disorders and classify them.

Ans. Eating disorders are a range of psychological disorders in which a person's eating behaviour is abnormal. It may include inadequate or excessive food intake which can ultimately harm an individual's well-being. It is commonly exhibited along with conditions such as anxiety, depression and other addictive or self-destructive behaviours. It can be either Anorexia Nervosa or Bulimia Nervosa.

(a) Anorexia Nervosa is an eating disorder in which the patients have an obsessive fear of gaining weight.

(b) Bulimia Nervosa is an eating disorder in which the patient consumes a large quantity of food within a short period and subsequently ejects it from the body through vomiting, or with the help of laxatives or diuretics.

25. Write briefly about menstrual dysfunctions and their effect on sports participation of female athletes. **(CBSE 2018)**

Ans. **Menstrual Dysfunction**

The average menstrual cycle consists of 21–35 days and menstrual bleeding or periods occur during the first 2–7 days of the cycle. Each cycle ends on the first day of the next menstrual bleeding. Any abnormality or irregularity in this process is termed as menstrual dysfunction. It is reported that about 9 – 30% of women suffer from menstrual dysfunction of one form or the other. Some common types of menstrual dysfunction are listed below:

Amenorrhoea

A case of delayed menarche or a case of absence of menstrual period for 6 months or more after the last period is called amenorrhoea. Sometimes, it may be absent for years.

Dysmenorrhoea

A menstrual period accompanied by sharp pain or cramps in the lower abdomen and pelvic area is called dysmenorrhoea or painful menstruation. During menstruation, the muscles of the uterus contract due to release of molecular compounds called prostaglandins and other inflammatory mediators.

Premenstrual Syndrome

Experiencing symptoms like, pain in the back legs or abdomen, acne, irritability, mood swings, water retention, tender breasts, headaches, constipation, depression or emotional stress, etc. before the onset of menstrual periods is called premenstrual syndrome. A female may have one or more symptoms a few days before her periods.

Menorrhagia or Heavy Periods

Normally the menstrual flow is heavy at first and then gradually decreases. But increased and heavy flow at regular intervals or a loss of more than 80 mL of blood during each menstrual bleeding indicates menorrhagia or heavy periods.

Irregular Periods

Mostly, menstrual cycles form a regular pattern of every 21–35 days after 1–3 years from the first bleeding or menarche. For some females, periods might skip altogether for months or come earlier than expected.

Prolonged Periods

On an average, the menstrual bleeding or periods lasts about 2–7 days. Prolonged periods are longer than this duration and occur at unpredictable intervals.

Delay in Menarche

The average age of menarche in a female ranges from 12–14 years. If it is later than 14 years and above, it is a case of delayed menarche, which is also termed as primary amenorrhoea. At times, it may be as late as in 18 years of age or more.

26. Explain the 4meaning of anorexia nervosa and cite its types.

Ans. It is an eating disorder in which the patients have an obsessive fear of gaining weight. They have an unrealistic fear of gaining weight. They have an unrealistic perception of body image and view themselves as overweight even when they are clearly underweight. It usually begins during the teens and is more common in women than men. It may become a lifelong disease without intervention at the initial stage. This disorder can have damaging health consequences such as heart problems, brain damage, multiple organ failure, osteoporosis and infertility. It should, however, be noted that anorexia nervosa does not necessarily mean loss of appetite. The patient can retain their appetite and suppress it systematically. It is of two types:

- **Restricting type:** In this form, consumption of food is severely restricted in various ways like maintaining a calorie count that is too low for the body's requirement. The patient reduces her/his weight effectively through obsessive rules like drastic exercising.
- **Purging / Binge eating type:** In this type, the restriction of food intake is accompanied by binge-eating and purging phases.

27. Explain briefly about eating disorder bulimia.

(CBSE 2019)

OR

Comment on the outlook of Indian society towards the participation of women in sports.

(CBSE 2019)

Ans. Bulimia nervosa or simply bulimia, is an eating disorder in which the patient consumes a large quantity of food within a short period and subsequently ejects it from the body through vomiting, or with the help of laxatives or diuretics. The term 'bulimia' means 'the ravenous hunger of an fox', a reference to the voracious appetite of the patient. When a person suffers from bulimia, she/he is under the grip of a hunger that that is induced by psychological reasons, physiological ones.

OR

The following aspects show the outlook of Indian society towards the participation of women in sports :

Gender Role Orientation

Many people claimed that women should not indulge in athletics because it will compromise their gender identity. But nowadays, not only has women's participation in sports increased, but also there is a rise in their participation in many kinds of sports which were open only to men in the past, such as, boxing, wrestling, weightlifting, bodybuilding, kabaddi, etc.

Competitiveness

Comparison shows that men are more competitive than women. Generally, women focus more on their goals rather than outdoing each other. They show brilliant artistic skills in aesthetic sports like gymnastics, figure skating, etc.

Confidence

Confidence means self-reliance and a belief in one's abilities, female athletes are usually less confident due to lack of support, society's views towards them, physical limitations, etc. But women who take part in sports are found to have more confidence when we compare them with other women.

Self-image or Body Image

Women tend to be more conscious about their self-image than men. They are constantly concerned about becoming overweight, getting the perfect figure and skin, maintaining physical beauty, etc. In their efforts to achieve these, they often develop a negative self-image.

Depression

It is observed that women are more susceptible to depression than men. In this scenario, sports play a vital role. Sports participation not only improves physical fitness, but it also helps to achieve psychological well-being. It is a proven fact that engaging in sports activities aids to cope with depression in men as well as women.

28. Explain the meaning of bulimia nervosa.

Ans. Bulimia nervosa or simply bulimia, is an eating disorder in which the patient consumes a large quantity of food within a short period and subsequently ejects it from the body through vomiting, or with the help of laxatives or diuretics. It has two types like:

- Purging Bulimia: In this type of bulimia, the patient undergoes self-induced vomiting or abuses diuretics, laxatives or enemas. The aim is to remove food from the body before it gets digested and deposited.
- Non-purging Bulimia: In this type of bulimia the individual uses methods like fasting, strict dieting or excessive exercising to get rid of the calories and to prevent weight gain.

29. What are the causes of osteoporosis?

(CBSE 2019)

Ans. Osteoporosis can be caused due to:

- **Calcium Deficiency:** Calcium is a key component is building the density and strength of bones. The recommended daily requirement of calcium is 1000-1500 mg. Insufficient calcium in the body can have lifelong consequences for bones. Insufficient amount of calcium in the body causes other prgans such as heart, muscles, nerves, etc to use up the calcium stored in the bones. This results in depletion of calcium in the bones, decreasing their density and hardness, therefore causing osteoporosis.
- **Amenorrhoea:** Our bones are constantly braking down and rebuilding again to maintain their structure and strength. Oestrogen is essential to keep a balance between the two and helps absorption of calcium. Since women suffering from amenorrhoea have decreased oestrogen level in the body, it also disrupts the remodelling process in bones. Formation of abnormal bone structure and loss of calcium deposit takes place. Bones become weak, porous and prone to fractures. Therefore amenorrhoea can also cause osteoporosis.

C. Short Answer Type-II Questions 5 marks

1. What are the different motor development stages in children? Discuss in detail.

Ans. Different stages of motor development in children:

(a) Infanthood is marked by rapid growth and development of muscles. The child achieves motor control of the head first, then the arms and legs.

(b) During early childhood the child starts climbing and crawling and manages to walk like an adult by the age of four years.

(c) Middle childhood is characterised by the child's ability to focus on the development of hand eye coordination and balance. They also like to compete with their peers during this period.

(d) By late childhood, all individuals have the fundamental aspects of motor development. Puberty sets in for both male and female children. (For detail description refer to pages 90-91)

2. What are the types of motor development?

Describe any six factors affecting motor development in children. **(CBSE 2016, 2018)**

Ans. Types of Motor Development:

- Gross motor development – large muscles of the body- sitting, standing, walking, running, jumping
- Fine motor development – associated with small muscles- catching, holding, throwing, aerobic exercises, etc.

The factors affecting motor development:

- Biological factors
- Environmental factors
- Nutrition
- Physical activities
- Opportunities
- Sensory impairments
- Postural deformities
- Obesity

(Refer pages 91 and 92 of the text for the detailed description for these factors.)

3. Explain any five postural deformities. **(CBSE 2012)**

Ans. Some of the commonly known postural deformities are:

(i) Spinal curvature

(ii) Flat foot

(iii) Knock knees

(iv) Bow legs

(v) Round shoulder

(For detailed description refer to pages 93 to 99 of the book)

4. Explain the causes and corrective measures for knock knee and scoliosis. **(CBSE 2019)**

Ans. **Causes of Knock Knee:**

- Lack of vitamin D and minerals like calcium and phosphorus.
- Problems associated with the development of bones and joints like rickets, osteoporosis and arthritis also contribute to knock knee.
- Other possible factors include obesity, flat foot, an injury or infection affecting the knees or leg bones and carrying a heavy load at an early age.

Corrective measures

- Daily cycling for 20 to 30 minutes and horse riding would help naturally in making a gap between the knees.
- Keep a pillow between the legs while sleeping, walking or sitting daily for 15 to 20 minutes.
- Knock knees' special shoes, night braces and walking calipers may prevent knocking.
- Perform the padmasana and gomukhasana yogic poses daily.
- Supplement of vitamins D like cod liver oil and minerals like calcium and phosphorus should be taken for strengthening the bones.

Causes of Scoliosis

- The primary causes are diseases in the joints of bones, polio, rickets, infantile paralysis, cerebral palsy and juvenile osteoporosis or other diseases.
- An unhealthy diet and low levels of specific minerals can contribute to scoliosis progression.
- Carrying heavy things especially on one side should be avoided as it adds to natural pull of gravity and compresses the spine further.
- Long distance running on uneven terrain and prolonged running can result spinal compression, may bend or rotate your curve and cause greater risk of scoliosis progression. Thus, running should be limited.

Corrective measures

- Lie down facing the ground, bend your elbow, and support your body with your toes. Squeeze your abs in and hold this position for 5 seconds. Repeat technique step 10 times.
- Scoliosis can be cured by breast stroke or butterfly technique of swimming.
- Yoga has been one of the best practices to cure any ailment and also helps in enhancing overall physical strength. It maintains a balance for the body in case of scoliosis.
- Use a firm quality mattress. Avoid the soft mattresses and use extra pillows for comfort instead.
- Sitting or standing in one place for prolonged period stresses the spine. Stretch or take a walk as often as possible. Choose a chair with good support if you sit for extended period.
- For mild scoliosis football is another great exercise that can strengthen the core muscle. All positions except goalkeeper are fine.

5. What are some ways in which postural deformities can be rectified?

Ans. The ways in which postural deformities can be rectified are as follows:

- We have two types of postural deformities like functional and structural. In functional deformities only the soft tissues are affected

and can be corrected by various types of physical activities. On the other hand, structural deformities affect the bony structure of body. In this case physical activities are not quite helpful but with the help of surgery desired improvement and correction can be done.

- In functional deformities, physical activities are very effective especially for those elementary school years. Most of the deformities can be corrected at this tender age.
- Corrective exercises and physical activity should be encouraged and conducted during the physical and health education period. There are numerous physical activities or exercises which would be helpful in correcting postural deformities.

6. Discuss in detail why few women in India participate in sports.

Ans. Society differentiates between men and women on the basis of a set of characteristic traits natural to their gender. These differences are physical and psychological. For example men tend to be muscular, competitive, self-reliant, aggressive and imposing in nature while women are mostly emotionally and physically sensitive, gentle, dependent, cooperative and sympathetic. With all such conditions the issue of gender discrimination arises.

Psychological aspects:

Woman have as much right as men to take up any profession they like, including sports. Women are now coming out of their domestic circles and making their presence felt in sports. Due to this, consideration of psychological aspects of women athletes is increasingly finding relevance in recent times. Therefore, the various psychological aspects of women athletes can be viewed under the following:

- Gender role orientation.
- Competitiveness.
- Confidence
- Self-image or body image
- Depression and
- Aggression.

Sociological aspects of female athletes:

- **Family environment:** The support of one's family is important for pursuing a desired career, especially in a country like India, where family culture and values are largely respected. They also have a large number of role models they can look up to. The case is slightly different for female players and aspirants, since the pressure to settle down, marriage and have children is one they face with more seriousness. On the contrary, the rising number of female sports stars should be testament to the fact that there are parents and families who want their daughters to achieve their dreams, unconventional though the dreams may be.
- **School environment:** School is the second home of children, a place where mentality and attitude are changed. Here the teachers and the class mates leave an impact on the child's mind. Apart from the emotional and psychological perspectives, even technical considerations like availability of proper facilities such as separate changing rooms and showers for girls, ample equipment and gear, female coaches, etc. are also necessary in increasing the participation of female students in sports activities.
- **Culture:** The social climate of the society we live in is a big factor in cultivating a prosperous sports culture for girls and women. It is important and urgent to change old concepts and adjust our collective mind set for the betterment of female sports enthusiasts.

7. Give your outlook on participation of Indian women in sports. **(CBSE 2020)**

Ans. In spite of many achievements of Indian sportswomen, they are not given their due recognition in India. There is a social stigma attached to participation in sports, which is primarily seen as a male domain.

Discrimination and gender inequality have become part and parcel of everyday life for women in every sphere, such as education, politics and jobs, etc. Society looks on a woman only as a housewife and child-bearer. Such an outlook is even more prominent in India. This disparity is also evident at school or intercollegiate level. Society has enabled men to establish dominance in the field of sports. It has discouraged women from pursuing a career in sports. Many obstacles are placed in their way to retard any progress. In addition to lack of assistance from the government, they do not even get the support of their family and friends. Those who participate are labelled 'unwomanly' and looked down on with contempt. Their trainability is questioned due to the physical attributes of women. They are not provided the same facilities as their male counterparts. Safety issues also worsen the situation, especially in India. There are numerous incidents of such discrimination.

These are the harsh realities faced by every sportswoman in India. It is vital for every citizen or the government to realise that this type of social the progress of the nation. We should show our gratitude to these women achievers for their efforts and determination. More and more women are breaking records and making India proud at the national as well as international levels in sports. Family, friends, educational institutions, society and the governing bodies need to acknowledge this and give them their support instead of creating social barriers and treating them unfairly. Sports is the very embodiment of equality and universal harmony. Therefore, we need to change the scenario and reform the system.

8. Discuss menstrual dysfunction and its types.

Ans. Menstural dysfunction: The average menstrual cycle consists of 21–35 days and menstrual bleeding or periods occur during the first 2–7 days of the circle. Each cycle ends on the first day of the next menstrual bleeding. Any abnormality or irregularity in this process is termed as menstrual dysfunction. Its types can be:

- **Amenorrhoea:** A case of delayed menarche or a case of absence of menstrual period for 6 months or more after the last period is called amenorrhoea. Sometimes, it may be absent for years.
- **Dysmenorrhoea:** A menstrual period accompanied by sharp pain or cramps in the lower abdomen and pelvic area is called dysmenorrhoea or painful menstruation.
- **Premenstrual syndrome:** Experiencing symptoms like, pain in the back legs or abdomen, acne, irritability, mood swings, water retention, tender breasts, headaches, constipation, depression or emotional stress, etc. before the onset of menstrual periods is called premenstrual syndrome.
- **Menorrhagia or heavy periods:** Normally the menstrual flow is heavy at first and then gradually decreases. But increased and heavy flow at regular intervals or a loss of more than 80 mL of blood during each menstrual bleeding indicates menorrhagia or heavy periods.
- **Irregular periods:** Mostly, menstrual cycles form a regular pattern of every 21–35 days after 1–3 years from the first bleeding or menarche. For some females, periods might skip altogether for months or come earlier than expected.
- **Prolonged periods:** On an average, the menstrual bleeding or periods lasts about 2–7 days. Prolonged periods are longer than this duration and occur at unpredictable intervals.
- **Delay in menarche:** The average age of menarche in a female ranges from 12–14 years. If it is later than 14 years and above, it is a case of delayed menarche, which is also termed as primary amenorrhoea.

9. Describe the relationship between menstruation, women's health and sports participation.

Ans. Relationship between menstruation, women's health and sports participation can be discussed as under:

- It is commonly believed that taking part in exercises and sports activities during menstruation causes serious damage to health and effects women's sports performance. There have been a umber of discussions on the subject and, therefore, we cannot overlook this reproductive process during training, planning, schedules and preparing for competitions, etc. But we cannot take it as final. It is simply a normal cycle every healthy woman experiences during her reproductive years. A woman has two menstrual cycles each of different schedules and it is during the second phase, i.e. luteal phase the oestrogen rises and causes changes in body temperature, metabolism and recovery time. During the bleeding period, there is a slight drop in a woman's weight but it has been found that women perform even better during their periods.
- The fact is effects of menstruation have different mechanism in different women and women does not always respond to it in similar cases in most cases. Performance can be poor but better at any time.
- Lastly, exercises and sports activities are essential for every individual to lead a healthy life and the overall well-being.

10. Discuss female athletes triad in detail.

(CBSE 2016)

Ans. It is a serious disorder of three interrelated medical conditions: energy deficiency with or without eating disorders; menstrual disturbances; and reduced bone mineral density which is likely to cause osteoporosis. The triad usually affects teenage girls who consume less calories and exercise excessively. They may develop eating disorders and become obsessed with exercise in their efforts to maintain their physique. Female

athletes often restrict calorie intake and perform intensive training and exercise to achieve low body weight to enhance sports performance. Therefore, they are at greater risk of suffering from this syndrome.

Energy deficiency leads to menstrual disturbances like amenorrhoea which is associated with low oestrogen levels. Low oestrogen levels contribute to a decrease in bone density and lack of calcium and vitamin D in the body. This is one of the main causes of osteoporosis. A female is likely to have the other two conditions if she is suffering from one condition of the triad. In this endeavour, the help of coaches, trainers, physicians and fitness experts is crucial.

11. Discuss eating disorders, their causes, symptoms and management.

Ans. Eating disorders are a range of psychological disorders in which a person's eating behaviour is abnormal. Eating disorders may include inadequate or excessive food intake which can ultimately harm an individual's well-being. It is commonly exhibited along with conditions such as anxiety, depression and other addictive or self-destructive behaviours. Patients of eating disorders are often obsessed with food, body image and weight. Eating disorders are serious emotional and physical problems that can have life-threatening consequences, it is dangerous to view them as a lifestyle choice. Any one can fall prey to it at any stage. It severely undermines growth and development inflicting side effects like malnutrition and electrolyte imbalance. Major eating disorders include anorexia nervosa and bulimia nervosa.

Anorexia nervosa: Anorexia nervosa is an eating disorder in which the patients have an obsessive fear of gaining weight.

Causes of anorexia nervosa

- Psychological factors
- Social factors
- Biological factors

Symptoms:

- Physical symptoms
- Emotional symptoms

Management of anorexia:

- It is paramount to accept the reality of the situation. The patients must realise their own condition and accept that they have to recover. The physical aspects of the treatment can only start after this acceptance.
- The main goal is to regain the appropriate weight as per the individual's height and age. This can be achieved with the help of a psychologist and a fitness expert.

Bulimia nervosa:

Bulimia nervosa, or simply bulimia, is an eating disorder in which the patient consumes a large quantity of food within a short period and subsequently ejects it from the body through vomiting, or with the help of laxatives or diuretics.

Causes of bulimia:

The factors that cause or contribute to bulimia are:

- Genetics
- Psychological factors
- Performance pressure in sports
- Social factors

Symptoms:

- The affected individuals visit the bathroom after every meal to immediately vomit and purge themselves.
- They become dehydrated due to repeated vomiting. Another side effect is inflammation of the food pipe.
- The individuals eat until they begin to experience abdominal pain and discomfort.
- They undergo extreme exercise routines to control their weight.

Treatment of bulimia

- Psychological treatment
- Healthy weight and proper nutrition
- Exercise correctly

D. Value-Based Question

Recently Sarita Devi refused to accept the bronze medal during the ceremony. The international body (AIBA) which regulates boxing has taken a stringent action against Sarita Devi and the coaches.

Answer the following questions based on the above passage:

1. Do you agree with the decision of Sarita Devi? Justify your answer.

2. What values do you think Sarita Devi has not shown by her behaviour during the medal distribution ceremony? **(CBSE 2015)**

Ans.

1. Yes, I do agree with the decision of Sarita Devi for not accepting the Bronze medal because of the unfair and biased decision by the judges.

2. Sarita Devi has not shown the values of sportsmanship by refusing to accept her Bronze medal.

CHAPTER 6

TEST AND MEASUREMENTS IN SPORTS

P. 127–131

A. Objective Type/Multiple-Choice Questions

(1 mark)

I. Multiple-Choice Questions

1. Which of the following motor fitness test items is meant exclusively for girls?

(a) Modified push ups

(b) Standing broad jump

(c) Sit and reach

(d) Partial curl up

Ans. (a) Modified push ups

2. Sit and reach test is conducted for

(a) flexibility. (b) motor fitness.

(c) endurance. (d) speed. **(CBSE 2020)**

Ans. (a) flexibility.

3. Which of these is not one of the variables used in calculating VO_2 max according to the formula for the Rockport Fitness Walking Test?

(a) Height (b) Weight

(c) Age (d) Gender

Ans. (a) Height

4. What aspect of motor ability is the Zigzag Run in the Barrow Three Item Test supposed to test?

(a) Power (b) Agility

(c) Strength (d) Endurance

Ans. (b) Agility

5. Which of these is a disadvantage of the Harvard Step Test?

(a) It does not measure cardiovascular endurance.

(b) It is expensive to execute.

(c) It is designed only for men.

(d) It does not account for height and weight differences.

Ans. (d) It does not account for height and weight differences.

6. Barrow Fitness Test does not include:

(a) Medicine Ball Put (b) Zig-zag Run

(c) 600 metres Run (d) Standing Broad Jump **(CBSE 2020)**

Ans. (c) 600 metres Run

7. Rock Port one mile test is conducted to measure .....

(a) Cardio-vascular fitness.

(b) Senior citizen's fitness.

(c) Vital capacity.

(d) Muscular strength. **(CBSE 2020)**

Ans. (a) Cardio-vascular fitness.

8. In the Rockport Fitness Walking Test, what is the total distance that an individual has to cover?

(a) 1 km (b) 1 mile (c) 100 m (d) 1 yard

Ans. (b) 1 mile

9. Barrow three item test for motor ability includes .....

(a) standing broad jump, zigzag run and medicine ball put.

(b) standing broad jump, push ups and shuttle run.

(c) partial curl up, sit and reach test and medicine ball put.

(d) zigzag run, shuttle run and 50 m dash.

Ans. (a) standing broad jump, zigzag run and medicine ball put.

10. Boys use a ..... ball in medicine ball put.

(a) 5 kg (b) 2 kg (c) 1 kg (d) 3 kg

Ans. (d) 3 kg

11. What is Fullerton Functional Fitness Test meant for checking?

(a) Lower and upper body strength

(b) A gility

(c) A erobic endurance

(d) All of these

Ans. (d) All of these

12. How many tests are there in Senior Fitness test?

(a) Five (b) Seven (c) Six (d) Three

Ans. (c) Six

13. Which of the six tests designed by Rikli and Jones for senior citizens is meant to test speed and balance while moving?

(a) Arm curl test

(b) Chair sit and reach test

(c) Eight foot up and go test

(d) Back scratch test

Ans. (c) Eight foot up and go test

14. What component of senior citizens' fitness is tested by the Six Minute Walk Test?

(a) Lower body strength

(b) Upper body strength

(c) Balance

(d) Endurance

Ans. (d) Endurance

II. Match the following:

Match list – I with list – II and select the correct answer from the code given below:

List I – Test	List II – Developer
(a) Motor Fitness Test	(1) Rikli and Jones
(b) Barrow Three Item Test	(2) Lucien Brouha
(c) Harvard Step Test	(3) Dr Herald M
(d) Senior Citizen Fitness Test	(4) AAPHERD

Select the correct set of options:

Code				
	(i)	(ii)	(iii)	(iv)
(a)	3	2	1	4
(b)	4	4	3	3
(c)	2	1	4	2
(d)	1	3	2	1

Ans. (iv): (a) – 4; (b) – 3; (c) – 2; (d) – 1

III. Assertion-Reason Type Questions: CBQ

Given below are the two statements labelled Assertion (A) and Reason (R).

A: The Fullerton Functional Fitness Test is an expensive method of assessing the physical traits that senior citizens need in order to carry out their occasional activities.

R: It is a tool to measure the functional fitness of senior citizens by using six parameters.

In the context of the two statements given above, which one of the following is correct?

(a) Both (A) and (R) are true and (R) is the correct explanation of (A).

(b) Both (A) and (R) are true but (R) is not the correct explanation of (A).

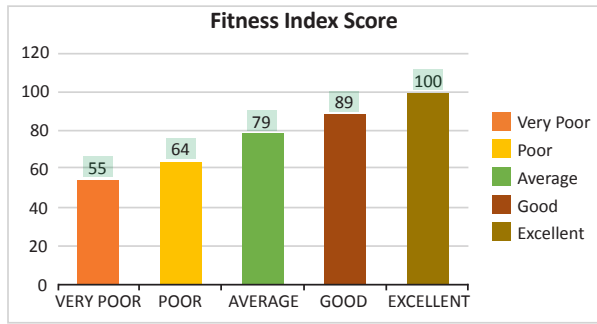
(c) (A) is true, but (R) is false.

(d) (A) is false, but (R) is true.

Ans. (d) (A) is false, but (R) is true.

IV. Data-Based Questions: CBQ

Given below is the chart that shows the fitness index score:



On the basis of the chart given above, answer the following questions:

1. What will be the lower limit of 'Poor' category?

(a) 56 (b) 65

(c) 55 (d) none of these

2. Which method is employed to determine the fitness index score?

(a) Motor Fitness Test

(b) Barrow Three Item Test

(c) Harvard Step Test

(d) Senior Citizen Fitness Test

3. What is the upper limit of good fitness index score?

(a) 80 (b) 79

(c) 98 (d) 89

Ans. 1. (a) 56; **2.** (c) Harvard Step Test; **3.** (d) 89

V. Picture-Based Questions: CBQ

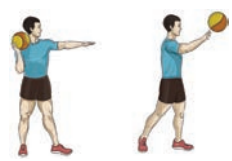
1. Identify the following fitness test items and name them:

(a) 

.....

(b) 

.....

(c) 

.....

(d) 

.....

Ans. 1. (a) Modified Push-ups; (b) Sit and Reach Test; (c) Medicine Ball Put; (d) Standing Broad Jump

2. Identify the odd one.

(a) 

(b) 

(c) 

(d) 

Ans. **1.** (a) Chair Stand Test; (b) Chair Sit and Reach Test; (c) Modified Push-ups; (d) Arm Curl Test

VI. Case-Based Questions: CBQ

Harvard Step Test was conducted on 5 individuals and the data collected indicated that 3 people fell in the below average category.

On the basis of the case given, answer the following questions:

1. What would have been their Fitness Index?
   (a) > 96 (b) 83 –96
   (c) 54 – 67 (d) <54
2. What is the advantage of this test?
   (a) Simplicity (b) Complexity
   (c) Ample rest (d) Several equipment requirement
3. How is the duration of exercise measured?
   (a) in minutes (b) in seconds
   (c) in hours (d) in months

Ans. **1.** (c) 54 – 67; **2.** (a) Simplicity; **3.** (b) in seconds

B. Short Answer Type-I Questions 3 marks

1. What is the procedure of modified push ups for girls?

Ans. **The procedure of modified push-ups for girls:** The push-up begins in a kneeling position, with the hands and knees touching ground. The knees are kept slightly apart; the arms are at shoulder width apart, extended and at a right angle to the body. Keeping the back straight and holding core tight, the student has to lower the body until there is a 90-degree angle at the elbows, then returns to the starting position with the arms extended. The action is repeated until exhaustion or until the time limit is reached. In case of timed tests, the maximum number of correct push-ups performed are noted.

2. Write the main difference between push ups for boys and modified push ups for girls.

Ans. In case of boys push-up begins with the hands and toes touching the ground, and the body and legs in a straight line. But in case of girl the push-up begins in a kneeling position, with the hands and knees touching ground. The knees are kept slightly apart; the arms are at shoulder width apart, extended and at a right angle to the body.

In boy push-ups, the back and knees are kept straight. The student has to lower the body until there is a 90-degree angle at the elbows, then returns to the starting position with the arms extended.

In girl push-ups, the back is kept straight and core tight. The student has to lower the body until there is a 90-degree angle at the elbows, then returns to the starting position with the arms extended.

3. Write on at least three tests included in Motor Fitness Test.

Ans. **The three tests included in Motor Fitness Test are:**

1. **600 m Run/Walk**

   Purpose: To measure endurance.

   Objective: To cover the set distance as fast as possible.

   Equipment: Marked track and two stopwatches for two officials.

   Procedure: The student is asked to run or walk for a distance of 600 m from a starting line and the time taken is recorded in minutes and seconds.

2. **Sit and Reach Test**

   Purpose: To measure flexibility.

   Objective: To monitor the forward bending of lower back of a student.

   Equipment: Sit and reach box, mat and ruler.

   Procedure: After warming-up, the students are asked to sit on a flat surface with their legs extended in front of them, toes pointing up and feet slightly apart. The soles of the feet should rest against the base of a flat vertical surface. A ruler is placed on the ground between the legs. Placing one hand on top of the other, students are asked to reach slowly forward. At the point of their greatest reach, they should hold this position for a couple of seconds, and the distance reached is measured.

3. **Standing Broad Jump**

Purpose: To measure explosive leg strength.

Objective: To perform horizontal jump as far as possible.

Equipment: Flat and clean long jump pit or mat and a measuring tape.

Procedure: A take-off line is marked on the ground and the student stands behind this line with both feet apart. The student then swings her/his arms and bends the knees, then jumps into the long jump pit. The distance from the take-off line to the heel or other part of body that touches the ground nearest to the take-off line is measured and noted in feet and inches. Three trials are given and the best score of the three is recorded as the final score.

4. How are the following tests carried out?

(a) Standing Broad Jump

(b) Zigzag Run

(c) Medicine Ball Put **(CBSE 2019)**

Ans. (a) **Standing broad jump:** In the original test, the starting line was marked by a piece of masking tape. Another piece of masking tape was placed perpendicular to it and was marked off in feet and inches. Each student was allowed to have one practice jump and then undergo three trials. The distance of the best trial was recorded and scores assigned. Measurements were taken from the toe of take-off line to the back of the heel. If the students touched the starting line on their take-off they were disqualified.

(b) **Zigzag run:** In the original test a 16 by 10 feet rectangular course was set-up. Bowling pins were placed in the centre and at each corner. The course had to be run in the form of the figure 8 three times. The amount of time the student took to complete the full cycle was recorded to the nearest tenth of a second. This test measures an individual's ability to rapidly change direction and manoeuvre, as well as to accelerate and decelerate with control.

(c) **Medical ball put:** In Barrow's original design, the course was 70 feet long and each half-foot interval was marked. Two lines starting line and finishing line – were marked perpendicular to the throwing area with a distance of 15 feet between them.

This was done to allow the student to run for the distance of 15 feet before throwing the ball at the finishing line. Stepping over the finishing line meant disqualification. In this case too, the students were allowed one practice put and three trials. The distance of the best trial was measured to the nearest half-foot and scores assigned. The ball used for this test weighed 2.7 kg. The test showed the upper body strength of the student. The same procedure is used for a medicine ball put even now. For boys, a 3 kg ball may be used and for girls, a 1 kg ball is recommended.

5. Explain in brief 'The Harvard Step Test.' **(CBSE 2015)**

Ans. In the Harvard step test, the participant is asked to step-up on the platform and down again at a rate of 30 steps per minute for 5 minutes continuously or until she/he gets exhausted. The total heartbeats are then counted for specific intervals.

6. Explain the Rockport test. **(CBSE 2017)**

Ans. Rockport fitness walking test is for individuals with low fitness level to evaluate their VO_2 max. Participants run 1 mile and then the amount of time taken and their heart rate are monitored.

7. What are the components of Rikli and Jones Test?

Ans. The components of Rikli and Jones Test Are:

- Chair stand test
- Arm curl test
- Chair sit and reach test
- Back scratch test
- Eight foot up and go test
- Six minute walk test

8. Write on at least two components included in the Rikli and Jones Test.

Ans. **CHAIR STAND TEST:**

Purpose: The purpose of this test is to test the strength of the lower body, especially the legs, which are very necessary for carrying out various daily activities like sitting down and getting up, kneeling, walking, etc.

Equipment required: A chair without arms and a straight back with seat of at least 44 cm and a stopwatch.

Procedure: The chair should be placed against a wall where it will be stable. The participant should sit in the middle of the chair with her/ his feet flat on the floor, shoulder width apart, and spine erect. She/ he should cross the arms

at the wrist and place them against the chest. The participant must stand up completely from the sitting position when the test partner starts the test by using the stopwatch. This process is repeated for 30 seconds. A complete chair stand is taken from the position of sitting to position of standing up. The test partner and participant should count the total number of complete chair stands.

Scoring: The total number of completed chair stands during 30 seconds is called score. The recommended ranges for this test is based on different age groups.

ARM CURL TEST:

Purpose: The main purpose of this test is to assess the strength of the upper. The upper body helps in performing various activities like carrying, washing, eating, stirring, writing, lifting and so on.

Equipment required: Five pound weight for women and 8 pound weight for men, a stopwatch and a straight-back chair with no arms are required for this test.

Procedure: The chair should be placed against a wall where it will be stable. The participant should sit in the middle of the chair. The dominant arm must do the arm curl. The participant holds the weight in the hand using a suitable grip. The palms should be facing towards the body. The position of the arm should be vertically downwards. It is the lower arm that has to move freely while keeping the upper arm immovable. The test partner will tell when to begin and will time for 30 seconds using a stopwatch or a watch with a seconds hand. The participant should do a full curl as many times as she/he can in the allotted 30 seconds time period moving in a controlled manner. The participant must squeeze her/his lower arm against the upper arm at the top of each curl, returning to a straight arm each time and should not swing the weight. Record the score on the scorecard.

Scoring: The total number of arm curls performed in 30 seconds of duration is called a score. The recommended ranges for this test is based on different age groups.

C. Short Answer Type-II Questions 5 marks

1. Discuss in detail about the Motor Fitness test specifically mentioning the various items in this test battery and its administration.

Ans. Initially known as AAPHER or American Alliance for Health, Physical Education and Recreation now called AAPHERD, i.e American Alliance for Health, Physical Education, Recreation and Dance. Its motor fitness tests have been the predominant parameters for measuring motor fitness in American school children for more than 50 years. The first version of this test was published in 1958 and has been revised a couple of times. In 1976 the final test manual was prepared. Motor fitness tests include the following items in the test battery:

- Push-ups for boys/modified push ups for girls
- Flexed leg sit-ups
- Sit and Reach
- Standing broad jump
- 50-m dash
- 600-m run/walk, etc.

2. Write in detail about 'Barrow's Motor Ability Test' to measure motor fitness components.

(CBSE 2018)

Ans. Dr Harold M Barrow, the then head of the Physical Education Department at Wake Forest College Winston–Salem, North Carolina developed several tests in 1953 to evaluate the motor abilities of his students. One of the batteries of tests consisted of three items like:

Standing Broad Jump, Zigzag Run and Medicine Ball Put to measure power agility and strength respectively. (Refer pages 118, 119.)

3. Discuss the origin, procedure, advantages and disadvantages of Harvard Step Test.

Ans. The origin, procedure, advantages and disadvantages of Harvard step test can be discussed as under:

Origin: In 1943, Belgian–American physiologist Lucien Brouha and his associates C W Health and A Graybiel developed a cardiovascular endurance test known as the Harvard step test at the Harvard Fatigue Laboratories during World War II. It is a simple test that uses a platform about 20 inches tall (for men), a stopwatch and a metronome.

Procedure: The participant stands in front of the bench or box or to step up on the platform and down again at a rate of 30 steps per minute for 5 minutes continuously or until she/he gets exhausted. In this context, exhaustion is the point at which the participant can no longer maintain the stepping rate for 15 seconds.

As soon as the participant completes the cycle, she / he is asked to sit-down and the total numbers of heartbeats are counted between 1 to 1.5 minutes, 2 to 2.5 minutes and 3 to 3.5 minutes.

Advantages: The advantage of the Harvard step test is its simplicity. Minimum equipment, time and cost are required and the test itself is easy to execute.

Disadvantages: The disadvantage lies in the failure to account for physiological differences between individuals especially in height and weight, while the height of the platform to be used is standardised.

4. How is the cardiovascular fitness measured with the help of 'Harvard Step Test'? Write in detail about its administrative procedure.

(CBSE 2016, 2019)

Ans. The cardiovascular fitness can be measured with the help of Harvard step test as under:

The participant is asked to step-up on the platform and down again at a rate of 30 steps per minute for 5 minutes continuously or until she / he gets exhausted. In this context, exhaustion is the point at which the participant can no longer maintain the stepping rate for 15 seconds. As soon as the participant completes the cycle, she / he is asked to sit-down and the total numbers of heartbeats are counted between 1 to 1.5 minutes, 2 to 2.5 minutes and 3 to 3.5 minutes.

The score is given on the following formula:

Physical efficiency index (PEI) = Duration of exercise in seconds × 100 / 2 × sum of three pulse counts in recovery.

V Skubic and J Hodgkins later modified the following for females:

- Height of the bench / platform to 18 inches
- Stepping cadence to 24 times per minute
- Recovery pulse counted only for 30 seconds after 1 minute of cessation of exercise.

5. Write about the Rockport Fitness Walking Test.

Ans. It was developed by exercise physiologists and cardiologists. It is mainly for individuals with low fitness level, such as those who follow a sedentary lifestyle, to evaluate their aerobic fitness through assessment of their VO_2 max. The equipment required for this test includes a 400 m well levelled track, a stopwatch and a weighing scale. A heart rate monitor may also be used if necessary. The test should be conducted in non-windy weather. Before the walk, the weight of the individual is measured and recorded. The starting point is marked and the individual has to run the track to cover a distance of one mile. One mile equals 1609 metres, so the individual may run the track four times to and fro to cover a comparable distance.

With the help of a stopwatch the amount of time is recorded. Immediately after completion of the run, the heart rate is checked manually or with a heart rate monitor.

The calculate VO_2 max, the following formula may be used:

VO_2 max = 132.853 – (0.0769 × Weight) – [(0.3877 × Age) + (6.315 × Gender) – (3.2649 × Time)] – (0.1565 × Heart rate)

Where:

- Weight is in pounds (lbs)
- Gender Male = 1 and female = 0
- Time is expressed in minutes and 100th of minutes.
- Heart rate is in beats/minutes
- Age is in years

Anyone interested in taking this test should first consult a doctor if she/ he has serious health complications. It also tends to be inaccurate for participants under the age of 30 or over the age of 79.

6. Describe the procedure for administering Rikli and Jones Sr Citizen Fitness Test.

(CBSE SP 2015)

Ans. Rikli and Jones test known as Fullerton functional fitness test is a tool to measure the functional fitness of senior citizens by using six parameters. It involves common activities like getting up from a chair, walking, lifting, bending and stretching. It is significant to plan safe and effective physical exercise programmes for senior citizens because individual's health and fitness level can be known better with the help of this test.

7. How can the minimum muscular strength for children be assessed? **(CBSE SP 2015)**

Ans. To assess minimum muscular strength for children between 9 and 12 years of age we can use tests like push ups, partial curl up, standing broad jump, medicinal ball put, etc. These tests are simple and can be administered using traditional tools (except medicinal ball put). Refer to pages 116, 117 and 119 for more details.

D. Value-Based Question

Every morning Akanksha goes to the park near her home. She noticed that many senior citizens have some or the other type of fitness problems in terms of flexibility and strength. She decided to check the fitness level of each person in the park.

Answer the following questions based on the above passage:

1. Explain the tests used by Akanksha for measuring the fitness of the people.
2. What values are depicted by Akankska in this question?

Ans.

1. The tests used by Akanksha for measuring the fitness of the people are:
   - Chair stand test: testing lower body strength.
   - Arm curl test: testing upper body test.
   - Chair sit and reach test: lower body flexibility test.
   - 8 Foot up and go test: agility test.
   - Walk test (6 min) or step in place test (2 min)

   This test is used to assess fitness.
2. The values shown by Akanksha that she is very caring and concerned for the health of others.

CHAPTER 7

PHYSIOLOGY AND INJURIES IN SPORTS

P. 153–158

A. Objective Type/Multiple-Choice Questions **(1 mark)**

I. Multiple-Choice Questions

1. What is the possible range of movement in a joint or a series of joints called?

(a) Flexibility

(b) Explosive strength

(c) Mobility

(d) Muscle composition

Ans. (a) Flexibility

2. Which of these acids gets accumulated in the muscles during intense physical activity?

(a) Citric acid

(b) Lactic acid

(c) Nitric acid

(d) Acetic acid

Ans. (b) Lactic acid

3. Which of these terms refers to the air that moves in and out of the lungs with each breath in a normal restive mode?

(a) Second wind

(b) Vital air

(c) Tidal air

(d) Residual wind

Ans. (c) Tidal air

4. Increase in size of lungs and chest is one of the process of adaptions that our ..... system undergoes when we exercise regularly for a long-time.

(a) respiratory

(b) cardiovascular

(c) cardio-respiratory

(d) none of these

Ans. (c) cardio-respiratory

5. Tinnitus, a persistent abnormality prevalent among older adults, is associated with which part of the human body?

(a) Eyes (b) Lungs

(c) Liver (d) Ears

Ans. (d) Ears

6. Joint structure, age and gender, internal environment and previous injury are the physiological factors that determine .....

(a) endurance.

(b) speed.

(c) flexibility.

(d) strength.

Ans. (b) speed.

7. Which of the categories fall under classification of sports injuries?

(a) Direct and Indirect Injury

(b) Overuse Injury

(c) Underuse Injury

(d) Only (a) and (b)

Ans. (d) Only (a) and (b)

8. In what type of fracture do bones break into three or more pieces, seen often in cycling and motorcycling?

(a) Oblique fracture

(b) Green stick fracture

(c) Comminuted fracture

(d) Compound fracture

Ans. (c) Comminuted fracture

9. How many types of fractures are classified under bone injuries?

(a) Seven (b) Nine

(c) Six (d) Four

Ans. (b) Nine

10. Which of these is not one of the three Ps that form the objectives of First Aid?

(a) Preserve (b) Practice

(c) Prevent (d) Promote

Ans. (b) Practice

II. Match the following:

1. Match list – I with list – II and select the correct answer from the code given below:

List I – Component of Physical Fitness	**List II – Physiological Factor**
(a) Strength	(1) Nervous System Mobility
(b) Speed	(2) Point of Tendon Insertion
(c) Endurance	(3) Oxygen Intake
(d) Flexibility	(4) Age and Gender

Select the correct set of options:

Code				
	(i)	(ii)	(iii)	(iv)
(a)	3	2	1	4
(b)	4	1	3	3
(c)	2	3	4	2
(d)	1	4	2	1

Ans. (ii): (a) – 2; (b) – 1; (c) – 3; (d) – 4

2. Match List 1 and List 2, selecting the correct option:

Sr. No.	List 1	List 2
1.	Abrasion	Joint Injury
2.	Green Stick Fracture	Soft Tissue Injury
3.	Shoulder Dislocation	Cause of Sports Injury
4.	Lack of Fitness	Bone Injury

(a) 2, 4, 1, 3 (b) 3, 2, 4, 1

(c) 4, 3, 1, 2 (d) 1, 3, 2, 4 **(CBSE 2020)**

Ans. (a) 2, 4, 1, 3

III. Assertion-Reason Type Questions: CBQ

Given below are the two statements labelled Assertion (A) and Reason (R).

A: The cardio-respiratory system regulates the vital processes of supplying our body with nutrients, cellular waste, hormones and O_2 for its smooth functioning.

R: When we exercise, the body demands more O_2 and nutrients. So, the heart operates harder to pump more blood throughout the body to meet the increased demands.

In the context of the two statements given above, which one of the following is correct?

(a) Both (A) and (R) are true and (R) is the correct explanation of (A).

(b) Both (A) and (R) are true but (R) is not the correct explanation of (A).

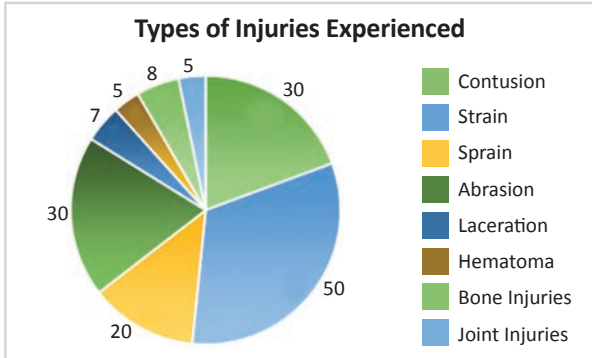
(c) (A) is true, but (R) is false.

(d) (A) is false, but (R) is true.

Ans. (b) Both (A) and (R) are true but (R) is not the correct explanation of (A).

IV. Data-Based Questions: CBQ

A survey was conducted in a sports academy on the kind of injuries that the athletes/sports persons experienced:



On the basis of the chart given above, answer the following questions:

1. Strain being the most common type of injury; how is it classified further?

(a) Into three degrees

(b) Into five sub-categories

(c) Into seven styles

(d) Into four types

2. The sports persons who experienced laceration could possibly be training in .....

(a) wicket keeping (b) boxing

(c) skating (d) tennis

3. What do bone injuries include?

(a) Fractures

(b) Dislocation of jaw and wrist

(c) Tissue damages

(d) Dislocation of hip and shoulder

Ans. 1. (a) Into three categories; **2.** (c) Skating; **3.** (a) Fractures

V. Picture-Based Questions: CBQ

Identify the following types of fractures and name them:

1. 

.....

2. 

.....

3. 

.....

4. 

.....

Ans. 1. Transverse Fracture; **2.** Comminuted Fracture; **3.** Oblique Displaced Fracture; **4.** Greenstick Fracture

VI. Case-Based Questions: CBQ

A 22-year-old, female athlete sprained her foot while training and was thus barred from the competition.

On the basis of the case given, answer the following questions:

1. What sort of first aid should be given to her?
   (a) Pressing ice-bags against the injury
   (b) Pressing hot-bags against the injury
   (c) Tying a steel rod to her foot
   (d) Applying an antiseptic lotion
2. What are the two treatment methods in such a situation?
   (a) DICE and SKIES (b) PRICE and MICE
   (c) FLIES and DYES (d) RISE and FRIES
3. What should be done to reduce swelling and its recurrence?
   (a) Frequently move the injured part in reverse direction.
   (b) Wrap the injured part tightly to stop blood flow.
   (c) Soak the injured part in warm water.
   (d) Elevate the injured part above heart level.

Ans. **1.** (a) Pressing ice-bags against the injury;
2. (b) PRICE and MICE;
3. (d) Elevate the injured part above heart level

B. Short Answer Type–I Questions 3 marks

1. How does the higher concentration of testosterone set males apart from females? Give two examples.

Ans. Males have a higher concentration of androgens such as testosterone, while females have a concentration of oestrogens. Therefore, the greater amount of testosterone gives males their deeper voice. Higher levels of testosterone helps in producing more RBCs.

2. Explain any three components of physical fitness. **(CBSE 2012)**

Ans. The three factors or components which determine physical fitness are as under:

- **Size of the muscle:** Size is an important determinant of strength. Larger muscles can exert greater amount of force than smaller ones. It has been noted that while the same amount of force is produced by the male and female muscles of the same type, males are stronger because their muscles are larger, and thus more powerful. Weight training increases the size of muscles and is used as an effective method of strength training.
- **Intensity of nerve impulse:** Muscles have several motor units. These units contract whenever a nerve impulse from the central nervous system stimulates them. Intense nerve impulse stimulates more number of motor units, which raises the strength of the muscular contraction. Hence, impulse also determines strength.
- **Muscle composition:** Muscles are composed of two types of fibres, fast twitch fibres and which can contract swiftly and produce more force, and slow-twitch fibres, which contract at a slower speed but which can sustain the contraction for a longer duration of time. Muscles with higher percentage of fast-twitch fibres are superior in strength. Therefore, strength is also determined by muscle composition. However, genetics determine the proportion of fast-twitch fibres and slow-twitch fibres in the muscles and training cannot alter it.

3. Briefly discuss at least three physiological factors that determine strength.

Ans. The three physiological factors that determine the strength are:

- **Size of the muscle:** Size is an important determinant of strength. Larger muscles can exert greater amount of force than smaller ones. It has been noted that while the same amount of force is produced by the male and female muscles of the same type, males are stronger because their muscles are larger, and thus more powerful. Weight training increases the size of muscles and is used as an effective method of strength training.
- **Point of tendon insertion:** Muscles strength can also vary with difference in the point of tendon insertion.
- **Bodyweight:** We often see that participants in the heavyweight category lift greater weight than those in the lightweight category. Therefore, heavier persons are stronger than those who are lighter.

4. Discuss at least three physiological determinants of speed.

Ans. The three physiological determinants of speed are:

- **Mobility of the nervous system:** The nervous system excites and inhibits the motor centres associated with contraction and relaxation of the related muscles at the highest possible speed. This process is

called mobility of the nervous system. After the limited few seconds during which the nervous system enables these excitations and inhibitions, tension spreads all over the body due to the activity. Consequently, the speed decreases. This mobility is greatly affected by genetics and can be trained only to a certain degree.

- **Muscle composition:** Muscles with higher percentage of fast-twitch fibres contract with greater speed than those with a low percentage. Genetics determine their percentage and so it cannot be altered by any amount of training. Also, fast-twitch fibres exist in varying quantities in different types of muscles. That is why, different parts of the body react with different speeds.
- **Flexibility:** It is the possible range of movement in a joint or a series of joints. Increase in flexibility assists the performance of the highest range of movement with the least internal resistance. Therefore, flexibility has a mild influence on speed. It also helps to maximise the implementation of explosive strength.

5. Discuss at least three physiological determinants of flexibility.

Ans. The three physiological determinants of flexibility are:

- **Extensibility of muscles:** Different ranges of movements are aided by muscles, their extensibility is another factor limiting flexibility. Muscles contract to make movements at the joints. Without proper and consistent stretching, muscles become stiff and lose their extensibility, and therefore, cause reduced flexibility. It can be trained to a certain degree to improve flexibility.
- **Previous injury:** Flexibility is adversely affected by injuries to connective tissues and muscles. Deposition of excess fibrous tissue takes place in the affected area, making them thick and resistant. These tissues are less elastic and cause limb shortening. As a result flexibility is decreased.
- **Age and gender:** Flexibility naturally decreases with age. It is partly due to degradation of the fibrous connective tissues that support, surround and bind muscle fibres, decrease in cartilage and the lubricant synovial fluid. Because of longer and more elastic muscles, women are more flexible than men.

6. Write about physiological factors determining endurance. **(CBSE 2019)**

Ans. The three physiological determinants of endurance are:

- **Lactic acid tolerance:** This is an efficient predictor of endurance capacity. It is the ability to tolerate accumulation of lactic acid, especially during activities spanning 40 seconds or more. This accumulation is due to imbalance in formation and removal of lactic acid in the body. Endurance can be improved by enhancing lactic acid tolerance with proper training.
- **Movement economy:** Saving energy is always advantageous in endurance sports, to maintain the level of performance throughout the whole activity. Economical movements minimise energy consumption. This enables one to make precise movements and reduce unnecessary movements.
- **Muscle composition:** Muscles have two types of fibres, namely, fast-twitch and slow twitch fibres. Slow-twitch fibres exert a small force and maintain it for a long time. That is why, higher percentage of slow-twitch fibres is ideal for endurance activities. However, this percentage is determined by genetic factors.

7. Briefly explain the effects of exercise on cardio-respiratory system.

Ans. By doing exercise regularly for a long time the cardiovascular system undergoes a certain process of adaptations known as long-term effects of exercise. These are listed below:

- Increase in the size of heart
- Decrease in resting heart rate
- Stroke volume increases at rest
- Increased blood flow
- Decrease in blood pressure
- Increase in blood volume
- Quick recovery rate
- Reduced risk of heart diseases.

8. Explain the role of exercise on the ageing process.

OR

Regular physical activities cannot stop the clock of ageing; but definitely it can slow the process. Justify. **(CBSE SP 2015)**

Ans. The role of exercises on the ageing process is to maintain the functionality of their body in many ways. Healthy ageing should be the

goal of exercise. An efficient and consistent technique of exercise helps us to stay fit and prevents diseases associated with advancing age. However, some effects of exercise on ageing are as follows:

- reduces the loss of muscle weight,
- helps to maintain bone density,
- slows down brain ageing,
- reduces risk of age related diseases,
- improves muscular strength,
- enhances the capacity of lungs,
- improves flexibility and
- reduces stress and tension, etc.

OR

Regular exercise can delay the ageing process. As by regular exercise, all the body functions work properly and blood supply to all the organs improves the efficiency of an individual. Regular exercise also makes body strong. Regular exercise delays the ageing process by:

- increasing the heart rate and stroke volume.
- increasing the cardiac output.
- increasing in the size of lungs and the heart.

9. How does ageing affect the respiratory and cardiovascular systems?

Ans. The ageing affects the respiratory system and the cardiovascular system as under:

- **Changes in respiratory system:** Ageing affects the respiratory system adversely. Respiratory muscles become stiff and lose efficiency. The tissues and muscles around the airways are unable to keep the airways completely open causing the airways to shut easily. Chest muscles grow weak and as a result the rib cage is unable to expand and contract as usual while breathing. The diaphragm gets weak, which causes insufficient inflow and outflow of air.
- **Changes in cardiovascular system:** Due to ageing, the structures of cardiac muscles lose elasticity and flexibility. The left ventricle wall thickens; and cardiac output, stroke volume and blood flow decline. Walls of arterial vessels become tough and stiff which causes high blood pressure. Valves inside the heart harden with age.

10. What effects does ageing have on muscles and bones?

Ans. Due to ageing, muscle mass decreases. As the muscles diminish in size, they lose strength and ultimately become weak. Same as the process of ageing changes the structures of bones also.

Mineral deposit in bones, such as, calcium and phosphate, start depleting in the early 40's.

Consequently, bones become less dense and more permeable, which is why people over 40 years are prone to bone injury in comparison to younger ones. Because of the weakening of bones, the capacity to support weight decreases and the risk of fracture increases. Low bone density can cause osteoporosis. An individual's vertebrae may also wear off and cause a decrease in height with age.

11. What changes are brought to the urinary and gastrointestinal systems due to ageing?

Ans.

- **Changes in the gastrointestinal system:** Age-related changes affect the liver significantly. The capacity of the liver to clear drugs from the system and to repair damaged cells is reduced along with the blood flow. Secretion of saliva, hydrochloric acid and digestive enzymes decreases; mastication of food becomes inefficient due to loss and decay of teeth; swallowing, breaking down and absorption of food becomes difficult, and the movement of food from the stomach and along the digestive tract also slows down.
- **Changes in urinary system:** With increasing age, tissues and filtering units of the kidneys reduce and kidneys-related blood vessels become hard. The kidney begins to take a longer time to remove waste products. The bladder muscles get weak and the tissues lose their elasticity. Therefore, bladder capacity reduces. This causes urinary retention, bladder control problems and increased risk of urinary infection.

12. Define the five types of soft tissue injuries.

Ans. Contusion, strain, sprain, abrasion, laceration, incision, hematoma are the types of soft tissue injury.

Contusion is a muscle injury caused by a blow to the skin, such as getting hit or bumping against something which leads to ruptured blood vessels. The affected area becomes red, then blue and then purple.

Laceration is the tearing of skin which results in an irregular cut. It is caused of injury with a sharp sports equipment. Incision is a smoothly–cut skin wound made by a sharp sport equipment , spike, etc.

Abrasion is a superficial injury to the skin when something rubs against it. It does not penetrate deeper than the epidermal layer of the skin. Friction between skin and hard or rough surface leads to abrasion.

Strains are caused by excessive use or forced stretching of the muscles or tendons. There may be complete tearing of muscles or tendons. Strains are common in contact sports such as boxing, football, hockey, wrestling, etc.

Sprain is the result of injury to the ligaments because of overstretching or tearing. The extent of injury and the number of injured ligaments determine the severity of the sprain. Ligaments in knees, ankles, and wrists are more susceptible to sprain. Sprain may be due to falling, twisting or getting hit during training and competitions.

13. Define any three types of fractures.

Ans. Bone injuries are fractures caused by forces or pressures greater than the strength of the osseous tissue. The different types of bone injuries are:

(i) Simple fracture

(ii) Compound fracture

(iii) Complicated fracture

(iv) Stress fracture

(v) Green stick fracture

(vi) Comminuted fracture

(vii) Impacted fracture

(viii) Transverse fracture

(ix) Oblique fracture

- **Simple Fracture:** A broken bone in a single part of the body in the absence of of a wound is called simple fracture.
- **Compound fracture:** In this type of fracture the skin and muscles are damaged and the bone usually protrudes out of the torn skin.
- **Green stick fracture:** Bending of bones or a slight crack is called green stick fracture. Children are more vulnerable to this type of fracture due to underdeveloped bones.

14. Define the types of dislocation.

Ans. The types of dislocation are:

- **Dislocation of the jaw:** This injury impacts one or both of the joints connecting the lower jaw to the skull. These joints, also called the temporomandibular joint (TMJ) may break, crack or even become entirely separated from the skull. It may be caused when the chin forcefully strikes another object, or when the face is hit by a strong external force.
- **Dislocation of shoulder joint:** In this type of dislocation, the ball of the humerus comes out of the socket. This may be caused by extreme rotation of the shoulder joint, or when the joint is hit by a sudden blow or is impacted by a fall against a hard surface.
- **Dislocation of hip joint:** A hip dislocation occurs when the head of the thigh bone (femur) is forced out of its socket in the hip bone (pelvis). This happens only in cases where the body comes into contact with a powerful force, such as falling from a significant height onto a hard surface.
- **Dislocation of the wrist:** It is dislocation of any of the eight carpal bones making up the wrist. This may happen when the carpal bones, which are small bones, are hit or come into contact with another force which is too great.

15. Describe four causes of sports injuries.

Ans. The four causes of sports injuries are:

- **Poor training methods and duration:** One of the leading causes of injury is poor training. Unhealthy methods, long period of training sessions without rest lead to injuries during training and competitions. Undertraining is as harmful as overtraining.
- **Lack of preparation:** If players do not prepare themselves properly, they are liable to get injured. They are not conditioned to face the challenges and to use the right techniques while performing. Therefore, they get easily hurt if both their body and mind are not prepared well in advance.
- **Improper warming-up:** Without a proper warming-up routine, players are likely to injure themselves because their bodies are less flexible in the beginning after a period of inactivity. So, warming-up is absolutely necessary before a training session and competitions.
- **Lack of good sports facilities:** Insufficient and poor sports facilities increase the risk of injuries among players. Hazardous sports environment leads to many injuries such as abrasion, sprain, fractures and so on.

16. Give five tips for preventing sports injuries.

Ans. The five tips for preventing sports injuries are as follows:

- Do not train if you are feeling fatigued.

- During heavy training, include more carbohydrates in your diet.
- The more you train, the more you should rest.
- Stop any exercise or activity if you feel pain.
- Take proper time for warming-up and cooling down.

17. How can abrasion be treated?

Ans. **Abrasion:**

- The first step is to wash the injured area with cold water, followed by application of an antiseptic.
- In case of a serious abrasion light dressing should be done to speed-up the process of recovery.
- Anti-tetanus injection should be given. Painkillers may also be given if patient experiences severe pain.

18. How can sprain be treated?

Ans. **Sprain**

- First the injured part should be kept in a comfortable and elevated position and cold compression applied for 10 to 20 minutes. This should be repeated 6 to 8 times a day.
- Warm water can be applied after 2 or 3 days at least 3 to 4 times a day, and a light massage given to the affected area.
- If it is ankle sprain then a bandage should be tightly applied in the shape of the figure '8'.

19. How are contusions treated?

Ans. **Contusions**

- The first step is to apply cold compression on the injured area for a duration of not less than 40 minutes. This should be repeated 5 to 6 times daily.
- Anti-inflammatory medicine should be given in case of swelling. If swelling persists expert medical help should be sought.
- Flexibility exercises will help during rehabilitation.

20. How are lacerations treated?

Ans. **Lacerations**

- The first and foremost step is to stop the bleeding by applying pressure on the laceration and holding it above the heart level for 15 minutes. Pressure points also may be used if bleeding persists.
- After the bleeding stops, wash the area with lukewarm water and mild soap or antibacterial cleansers. Repeat step 1 if it bleeds again.
- In minor cases, stitches are not required and it can be treated by applying an antibiotic ointment and covering it up with a bandage.
- In deep laceration, stitches are necessary to close the wound and join the torn skin, muscle, and tissue, again.
- A surgical drape or sterile gauze should be placed over the wound and taped.
- Change the dressing regularly and clean the wound each time.
- Give antibiotic medicines and painkillers if prescribed by the doctor.

21. How are incisions treated?

Ans. **Incisions:**

- If the wound is shallow, let the blood come out because this removes germs from the wound as well.
- Clean the wound and surrounding areas with iodine tincture or spirit.
- Place a piece of cotton on the area and wrap it with a bandage to keep away dirt and germs.
- Keep the bandage tight if there is excessive bleeding.
- Get medical help immediately.

22. How are strains treated?

Ans. Treatment of strain should be done using the PRICE method. It is important to take precautions to avoid heat during the first 72 hours after the injury, such as hot baths, sauna baths or heat packs, etc. Running or exercising should be avoided

23. How can dislocation be treated?

Ans. Initial care and treatment for any dislocation involves PRICE (Rest, Ice, Compression and Elevation). After this treatment, sometimes the dislocated joint might naturally go back into place. The application of ice immediately after injury to the injured area checks internal haemorrhage aiding in keeping the clot organization as small as possible. This helps in fast repair and healing.

24. What do you understand by 'First Aid'? How will you manage joint injuries? Explain. **(CBSE 2018)**

Ans. First aid can be defined as the initial assistance given to an individual who has fallen ill or who has suffered an injury. It consists of simple techniques and measures that can be performed with basic equipment and medication by anyone before professional medical assistance can be given to the injured or unwell person.

An example of first aid is applying firm pressure with a pad or bandage on a wound to stop bleeding.

Management of Joint Injuries

Initial care and treatment for any dislocation involves RICE (Rest, Ice, Compression and Elevation). After this treatment, sometimes, the dislocated joint might naturally go back into place. The application of ice immediately after injury to the injured area checks internal haemorrhage aiding in keeping the clot organisation as small as possible. This helps in fast repair and healing. For small joints, compression and cold must be maintained for at least an hour and for larger joints up to 24 hours. Depending on the extent of injury, fixation and support should be for a duration of 2 days to 3 weeks. Massage should be avoided for 2 days to ensure proper haemorrhage control. While taking the patient to the physician for evaluation, the injury should be properly splinted and supported to prevent any further damage to the area.

25. How do you administer first aid in case of:

(a) abrasion (b) contusion

(c) dislocation (d) fractures

(e) strain (f) sprain?

Ans. (a) **Abrasion:**

- The first step is to wash the injured area with cold water, followed by application of an antiseptic.
- In case of a serious abrasion light dressing should be done to speed-up the process of recovery.
- Anti-tetanus injection should be given. Painkillers may also be given if patient experiences severe pain.

(b) **Contusions**

- The first step is to apply cold compression on the injured area for a duration of not less than 40 minutes. This should be repeated 5 to 6 times daily.
- Anti-inflammatory medicine should be given in case of swelling. If swelling persists expert medical help should be sought.
- Flexibility exercises will help during rehabilitation.

(c) **Dislocation:**

- Immobilising bandage should be used on the affected limb since it is dangerous to attempt to move the limb without expert supervision. In case of dislocation of joints it is best to move the patient to a hospital or clinic where she / he can get immediate medical help.

(d) **Fractures:**

- First to identify the location of the fracture.
- Keep the fractured limb in a stable position with the use of splints and bandage.
- Do not use antiseptic on the fractured area or wash it.
- In case of fractured vertebrae, the patient should be lifted in such a way that the injured area is not bent, twisted or displaced.
- In case of fracture of the ribs immobilizing bandage should be used to avoid additional tissue damage.

(e) **Strain:**

- Cold water should be poured on the strained area for 30 minutes. If ice is available it should be wrapped in a piece of cloth before application.
- If the patient experience intense pain then a painkiller may be given and the patient advised to rest for at least one week. Warm water can be applied to the affected area after 5 days.
- In case of multiple serious strains, it is better to rush the patient to a doctor.

(f) **Sprain:**

- First the injured part should be kept in a comfortable and elevated position and cold compression applied for 10 to 20 minutes. This should be repeated 6 to 8 times a day.
- Warm water can be applied after 2 or 3 days at least 3 to 4 times a day, and a light massage given to the affected area.
- If it is ankle sprain then a bandage should be tightly applied in the shape of the figure '8'.

C. Short Answer Type-II Questions 5 marks

1. Explain the physiological factors determining speed. **(CBSE 2017)**

Ans. The physiological factors determining speed are:

- Mobility of the nervous system
- Muscle composition
- Explosive strength
- Flexibility
- Biochemical reserves and metabolism.

(For brief explanation, refer page 133 of the textbook.)

2. What is the effect of exercise on cardiorespiratory and muscular system? **(CBSE 2020)**

Ans. The effects of exercise on the cardiorespiratory system are as follows:

- Increase in heart rate;
- Increase in stroke volume;
- Increase in cardiac output;
- Increase in blood flow;
- Increase in blood pressure.

(For brief description of each point, refer pages 136–137 of the textbook.)

The effects of exercise on the muscular system are that it:

- Changes in anatomy of the muscles;
- Increases in number of capillaries;
- Improves the strength of connective tissues;
- Improves the efficiency;
- Delaying fatigue;
- Activation of the non-functioning fibres;
- Correct body posture;
- Improvement of reaction time.

(For brief explanation, refer page 138-139 of the textbook.)

3. What is endurance? Explain the various methods for its development. **(CBSE 2014)**

Ans. Endurance is the ability to resist fatigue and sustain an activity for a long duration of time. It is determined by the physiological factors like aerobic capacity which means oxygen intake, oxygen transport, oxygen uptake, energy reserves, and secondly lactic acid tolerance, thirdly movement economy and finally muscle composition.

(Refer pages 125-126 of the textbook.)

4. Write in detail about the physiological changes taking place due to ageing. **(CBSE 2018)**

Ans. (Refer pages 139 to 140 of the textbook).

5. Regular physical activity can delay our ageing process.' Justify your answer in light of the effect of activities on physiological changes.

(CBSE 2015)

Ans. (Refer pages 139 to 140 of the textbook.)

6. Participation in physical activity for a long duration maintains functional fitness among aged population. Justify. **(CBSE 2016)**

OR

How participation in physical activities helps in slowing down the ageing process? Justify.

(CBSE 2016)

Ans. Physical activity can play a very significant role in maintaining functional fitness in aged population. Physical activity is the most powerful tool in the hands of aged people that it can improve, as well as, maintain functional fitness of older people very effectively. It is because of the physical activity that they can perform daily routine work more efficiently. It makes the person more energetic and removes the signs of ageing. It is also a fact that physical activities can reverse the common signs of old age like muscle and bone loss, increases body fat, memory and cognitive decline, decreases metabolism, decreases flexibility, etc.

OR

(Refer pages 139–141 of the textbook.)

7. Discuss the types of soft tissue injuries in detail.

Ans. **Soft tissue injuries include:**

- **Contusion:** it is a muscle injury caused by a blow to the skin, such as getting hit or bumping against something, which leads to ruptured blood vessel. Such an injury can occur with or without the involvement of sports equipment.
- **Strain:** Strains are caused by excessive use or forced stretching of the muscles or tendons. They can be minor or severe depending on the nature of the injury. Strains are also known as 'torn muscle', 'muscle pull' and 'ruptured tendon'. These can be classified as:

  – Acute strain/Overstress and

  – Chronic strain/Overuse.

  It can be of varying degrees like:

  – First degree,

  – Second degree and

  – Third degree.

- **Sprain:** It is the result of injury to the ligaments because of overstretching or tearing. The extent of injury and the number of injured ligaments determine the severity of the sprain. It can due to falling, twisting or getting hit during training and competitions. It can be accompanied by a fracture causing swelling, inflammation, severe pain and tenderness in the affected area.

- **Abrasion:** It is a superficial injury to the skin when something rubs against it. It can be of various degrees like First degree, Second degree and finally of Third degree.
- **Laceration:** It is the tearing of skin which results in an irregular cut. It is caused by injury with a sharp sports equipment. Lacerations are generally seen in skating, basketball, fencing, etc.
- **Incision:** It is a smoothly-cut skin wound made by a sharp sport equipment, spikes, etc. In this type of cut, usually blood comes out freely.
- **Hematoma:** It is caused due to internal tissue rupture where there is a large collection of blood. It is also known or internal blood clotting.

8. Contusion and dislocation are common sports injuries. Write in detail about the symptoms and management of these injuries. **(CBSE 2019)**

Ans. **Contusion:** it is a muscle injury caused by a blow to the skin, such as getting hit or bumping against something, which leads to ruptured blood vessel. Such an injury can occur with or without the involvement of sports equipment.

Management of Contusion:

- The first step is to apply cold compression on the injured area for a duration of not less than 40 minutes. This should be repeated 5 to 6 times daily.
- Anti-inflammatory medicine should be given in case of swelling. If swelling persists expert medical help should be sought.
- Flexibility exercises will help during rehabilitation.

Dislocation: Dislocation of joints is mainly caused by sudden trauma causing the joint to go beyond its limits. Forceful impact between the body and another player or equipment, a hard surface may cause dislocation of joints and associated bones. Dislocation can occur at any major joint like shoulders, knees, or minor joint like toes, fingers, etc.

Management of Dislocation: In bone injuries, initial care and treatment for dislocation involves RICE (Rest, Ice, Compression and Elevation). After this treatment, sometimes, the dislocated joint might naturally go back into place. The application of ice immediately after injury to the injured area checks internal haemorrhage aiding in keeping the clot organization as small as possible. This helps in fast repair and healing. For small joints, compression and cold must be maintained for at least an hour and for larger joints up to 24 hours. Depending on the extent of injury, fixation and support should be for a duration of 2 days to 3 weeks. Massage should be avoided for 2 days to ensure proper haemorrhage control. While taking the patient to the physician for evaluation, the injury should be properly splinted and supported to prevent any further damage to the area.

9. Classify sports injuries. Explain PRICE procedure as a treatment of soft tissue injuries. **(CBSE 2017)**

Ans. Sports injuries can be classified into the following depending upon their cause and locations.

Depending on their causes:

- Direct injury is an injury incurred where the body makes contact with an external force.
- Indirect injury is an injury caused by force inside the body like excess strain on muscles and ligaments.
- An overuse injury occurs when specific parts of our body are used over a period of time, especially when the movements are repetitive.

Depending upon the location:

- Soft tissue includes all muscles, ligaments, tendons, skin, organs, etc.
- Bone injuries are fractures caused by forces or pressure greater than the strength of the osseous tissue.
- Joint Injuries to any point in the body is joint injury and dislocation is one of the most common joint injuries.

(For PRICE procedure as a treatment of soft tissues injuries, refer to page 139 of the textbook).

10. What do you understand by fracture? How can fracture be classified? Explain. **(CBSE 2019)**

Ans. Bone injuries are fractures caused by forces or pressures greater than the strength of the osseous tissue. The different types of bone injuries are:

- **Simple fracture:** A broken bone in a single part of the body in the absence of a wound is called simple fracture.
- **Compound fracture:** This type of fracture is accompanied by damage to the muscles and skin and the bone usually protrudes out of the torn skin.

- **Complicated fracture:** Along with the bones, other parts of the body also get damaged in a complicated fracture. It is a serious and dangerous type of injury.
- **Green stick fracture:** Bending of bones or a slight crack called green stick fracture.
- **Comminuted fracture:** It is a type of fracture in which bones break into or more pieces.
- **Impacted fracture:** In this type of fracture, shattered or fragmented pieces of a broken bone enters into another bone under the influence of an impact.

11. Write in detail about the dislocation and fractures among the bones and joint injuries. **(CBSE 2016)**

Ans.
- **Dislocation of the jaw:** This injury impacts one or both of the joints connecting the lower jaw to the skull. It may be caused when the chin forcefully strikes another object, or when the face is hit by a strong external force.
- **Dislocation of shoulder joint:** In this type of dislocation, the ball of the humerus comes out of the socket. This may be caused by extreme rotation of the shoulder joint or when the joint is hit by a sudden blow or is impacted by a fall against a hard surface.
- **Dislocation of hip joint:** A hip dislocation occurs when the head of the high bone is forced out of its socket in the hip bone.
- **Dislocation of the wrist:** It is dislocation of any of the eight carpal bones making up the wrist. This may happen when the carpal bones, which are small bones, are hit or come into contact with another force which is too great.

12. Describe in detail the causes of sports injuries.

Ans. The causes of sports injuries are:
- Poor training methods and duration
- Lack of preparation
- Improper warming-up
- Lack of scientific knowledge
- Lack of fitness
- Nutritional deficiency
- Lack of good sports facilities
- Injudicious officiating
- Improper warming up
- Lack of scientific knowledge
- Lack of fitness
- Nutritional deficiency
- Lack of good sports facilities
- Injudicious officiating
- No use of protective equipment
- Lack of proper rest
- Pressure of competition
- Carelessness during sporting activities
- Recurrence of injury and overuse of muscles

(For detailed description of each point, refer to pages 141–142 of the textbook.)

13. What are the preventive measures that can be taken in case of sports injuries? **(CBSE 2013)**

Ans. One can take the following preventive measures in sports injuries:
- Proper warming-up
- Proper conditioning and preparation
- Balanced diet
- Proper knowledge of sports skills
- Use of protective equipment
- Proper sports facilities
- Impartial/Unbiased officiating
- Avoiding overtraining
- Use of proper technique
- Obeying the rules
- Proper cooling down

(For detailed description of above points, refer pages 145–146 of the textbook.)

14. Write a detailed note on the treatment of soft tissue injuries.

Ans. **Treatment of soft tissue injuries:** The soft tissue injuries include like managements of abrasion, contusion, laceration, incision, sprain, and strain. (The management of all these soft tissues have already been discussed previously).

However we can refer a few of them again here:

Abrasion: Firstly rinse and cleaned the area with cool or lukewarm freshwater and antibacterial cleaners. Gently, remove dead tissues, dirt or debris with sterile gauze. The further process of holding under the running water, drying and dressing it.

Contusion: Cold compression is applied on the affected area, if swelling is more than usual, anti-inflammatory medicines are given and the rehabilitation process is done with light flexibility.

Laceration: It is the first and foremost duty to stop the bleeding by applying pressure tactics holding it above the heart level, to wash the bleeding when it stops.

Incision: Let the blood come out if the wound is shallow, clean the wound and surrounding areas, place a piece of cotton on the wounded area and wrap it with a bandage, keep the bandage tight and get medical help immediately if the incision is too deep.

Sprain: PRICE which includes Protection, Rest, Ice, Compression Elevation is crucial in every injury, and the MICE method which includes Mobilisation, Ice, Compression, Elevation, etc. be applied for soft tissue injuries as per their locations.

Strain: It should be managed by doing the PRICE method.

15. How are bone injuries treated?

Ans. In bone injuries, initial care and treatment for dislocation involves RICE (Rest, Ice, Compression and Elevation). After this treatment, sometimes, the dislocated joint might naturally go back into place. The application of ice immediately after injury to the injured area checks internal haemorrhage aiding in keeping the clot organization as small as possible. This helps in fast repair and healing. For small joints, compression and cold must be maintained for at least an hour and for larger joints up to 24 hours. Depending on the extent of injury, fixation and support should be for a duration of 2 days to 3 weeks. Massage should be avoided for 2 days to ensure proper haemorrhage control. While taking the patient to the physician for evaluation, the injury should be properly splinted and supported to prevent any further damage to the area.

16. Sprains and strains are most common sports injuries. Write in detail about these soft tissue injuries and their treatment.

Ans. **Sprain:**

- **Price:** Stands for Protection, Rest, Ice, Compression and Elevation.
  - **Protection:** The injured area should be protected from further damage immediately using splint and supporting or protecting the feet with shoes or lace-ups.
  - **Rest:** One should avoid the practice of moving the injured part constantly and should not start doing exercise or other activities before the injury is completely healed.
  - **Ice:** Apply ice as early as possible. Packed in plastic bags or a clean cloth on the injury for 15–20 minutes. It reduces bleeding, swelling and pain by decreasing blood circulations.
  - **Compression:** Wrap the injury starting from the furthest injured part to the main injured part by using an elastic bandage or compression strap.
  - **Elevation:** Elevate the injured part to reduce the swelling by using pillows above the heart level. These are based on the cause.
- MICE After the symptoms of inflammation subside, the procedure of MICE should be followed until the injury is healed.
  - **Mobilization:** It should be started with moderate and light exercises to restore the normal range of movement of the injured part and avoid wasting of muscles.
  - **Ice:** Ice application should be continued for about a week depending on the severity of the injury. Heat treatment may be applied for increasing blood circulation.
  - **Compression:** It should be continued for a few days on the nature of injury.
  - **Elevation:** This should be continued until swelling and inflammation subside.

Strain: Management of strain should be done using the PRICE method. It is important to take precautions to avoid heat during the first 72 hours after the injury, such as hot baths, sauna baths or heat packs, etc. Running and exercising should be avoided as well during this period. In severe cases, physiotherapy should be included to restore muscular strength and range of movement to their normal state.

D. Value-Based Questions

1. Vikas is a student of class 12 who lives with his grandparents. He is very active and physically fit. One day in Physical Education class, the PE teacher was explaining the physiological changes due to ageing. Being concerned about his grandparents health, he talked to his teacher about physiological problems in the old age. His teacher suggested to him to encourage them to walk for an hour daily and engage themselves in some or other physical activities.

Answer the following questions based on the above passage:

(a) What is the meaning of ageing?

(b) Write about the physiological changes due to ageing.

(c) What are the values shown by Vikas towards his grandparents?

Ans. (a) Ageing means a multifaceted and natural phenomenon of gradual decrease in the body's functional capacity and degeneration of its physical structures. It is marked by deterioration of organs and tissues that affect all human beings in degrees after a certain age.

(b) Some of the physiological changes due to ageing are as follows:

- Changes in muscle size and strength
- Changes in bone density
- Changes in metabolism and body composition
- Changes in respiratory system
- Changes in cardiovascular system
- Changes in nervous system
- Changes in urinary system
- Changes in flexibility, etc.

(c) The values shown by Vikas are care for his grandparents and family-bonding ability.

2. A famous cricket star Phillip Hughes was struck behind the ear by a ball while batting and died two days after the injury. He was wearing a helmet but the possible reason mentioned was that even when using a helmet, possibly a significant part of the neck remained exposed and the ball hit him there. And now most of the top cricketers across the world use deeper protection.

Answer the following questions based on the above passage:

(a) Do you feel protective gears are important? Lay stress on your views.

(b) What first aid should be provided during injury at the superficial layer of the skin?

(CBSE 2017)

Ans. (a) Yes, the protective gears are very important for the reason that it might injure any of the body part most significantly the head, face jaws neck. Therefore, one needs to have protective measures to be on the safer side.

(b) The first aid should be provided during injury at the superficial layer of the skin.

CHAPTER 8
BIOMECHANICS AND SPORTS

P. 166–169

A. Objective Type/Multiple-Choice Questions **(1 mark)**

I. Multiple-Choice Questions

1. Which of the following outlines the importance of biomechanics in sports?

(a) Improvement of training

(b) Understanding the human body

(c) Development of new methods

(d) All of these

Ans. (d) All of these

2. Biomechanics helps in which of the following?

(a) In improving technique

(b) In improving designs of sports equipment

(c) In improving performance

(d) All of these **(CBSE 2020)**

Ans. (d) All of these

3. Which of the following planes passes through the human body?

(a) Sagittal (b) Coronal/frontal

(c) Transverse or horizontal (d) All of these

Ans. (d) All of these

4. A decrease in the angle between the femur and the tibia because of the movement of the knee is an example of which type of movement?

(a) Flexion (b) Extension

(c) Abduction (d) Adduction

Ans. (a) Flexion

5. Movements possible in Ball and Socket joint is/ are :

(a) Rotation (b) Flexion

(c) Extension (d) All of these **(CBSE 2020)**

Ans. (a) Rotation

6. In cricket, the greater the force exerted by the bat on the ball, the higher is the speed with which the ball moves towards the boundary. This is an application of which law of motion given by Newton?

(a) First law (b) Second law

(c) Third law (d) None of these

Ans. (b) Second law

7. The Law of Acceleration is also known as

(a) Law of Inertia

(b) Law of Action and Reaction

(c) Law of Momentum

(d) Boyle's law **(CBSE 2020)**

Ans. (c) Law of Momentum

8. In swimming, a swimmer gets propelled faster in the forward direction if she pushes the water faster in the backward direction. This is an application of which law of motion given by Newton?

(a) First law (b) Second law

(c) Third law (d) None of these

Ans. (c) Third law

9. Which of these types of friction is stronger than the others given below?

(a) Rolling friction (b) Sliding friction

(c) Static friction (d) All are equally strong

Ans. (c) Static friction

10. What are the three types of dynamic friction?

(a) Sliding friction, Rolling friction and Fluid friction

(b) Rolling friction, Static friction and Solid friction

(c) Fluid friction, Solid friction and Passive friction

(d) Active friction, Fluid friction and Static friction

Ans. (a) Sliding friction, Rolling friction and Fluid friction

11. Which of the following is known as a necessary evil?

(a) Inertia (b) Friction

(c) Counterforce (d) Acceleration

Ans. (b) Friction

12. Where do the frictional forces come from in skiing?

(a) Snow (b) Air

(c) Surface of ski (d) All of these

Ans. (d) All of these

13. Which of these measures is a way to decrease friction?

(a) Presence of spikes on the soles of football shoes

(b) Application of chalk powder on the hands and feet by gymnasts

(c) Use of rough tyres in racing bikes

(d) Use of narrow boats in rowing

Ans. (d) Use of narrow boats in rowing

14. The force of friction depends upon .....

(a) nature of surface of contact.

(b) material of objects in contact.

(c) both (a) and (b).

(d) none of these. **(CBSE 2020)**

Ans. (c) both (a) and (b).

II. Match the following:

Match list – I with list – II and select the correct answer from the code given below:

List I – Motion	List II – Gross Movements
(a) Flexion	(1) Throwing
(b) Abduction	(2) Star jump
(c) Internal Rotation	(3) Walking
(d) Horizontal flexion	(4) Baseball swing

Select the correct set of options:

Code				
	(i)	(ii)	(iii)	(iv)
(a)	3	2	1	3
(b)	4	1	3	2
(c)	2	3	4	1
(d)	1	4	2	4

Ans. (iv): (a) – 3; (b) – 2; (c) – 1; (d) – 4

III. Assertion-Reason Type Questions: CBQ

Given below are the two statements labelled Assertion (A) and Reason (R).

A: In sports, biomechanics has a crucial role both in injury prevention and enhancement of performance.

R: The laws of mechanics are applied to understand the activities and techniques of the players and the implications that mechanics have for human movements using quantitative data for its analysis, obtained through mathematical modelling, measurement, computer simulation, etc.

In the context of the two statements given above, which one of the following is correct?

(a) Both (A) and (R) are true and (R) is the correct explanation of (A).

(b) Both (A) and (R) are true but (R) is not the correct explanation of (A).

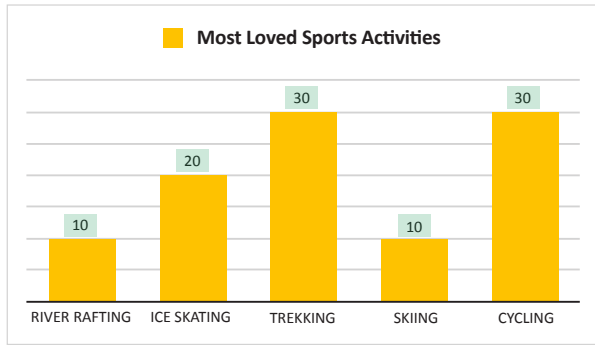
(c) (A) is true, but (R) is false.

(d) (A) is false, but (R) is true.

Ans. (a) Both (A) and (R) are true and (R) is the correct explanation of (A).

IV. Data-Based Questions: CBQ

Most loved sports activities data was collected from three cities:



On the basis of the chart given above, answer the following questions:

1. What sort of friction will be experienced by the people who prefer rafting?

(a) Static friction (b) Sliding friction

(c) Rolling friction (d) Liquid friction

2. A group of trekkers or skiers standing on a hill will be experiencing which friction?

(a) Static friction (b) Sliding friction

(c) Rolling friction (d) Liquid friction

3. Which of the following activities' alternative form would make one experience rolling friction?

(a) Trekking (b) Rafting

(c) Skating (d) Skiing

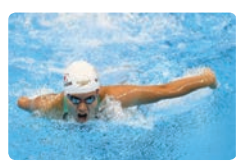
Ans. 1. (d) Liquid friction; **2.** (a) Static friction; **3.** (c) Skating

V. Picture-Based Questions: CBQ

Identify the following types of frictions and name them:

1. 

.....

2. 

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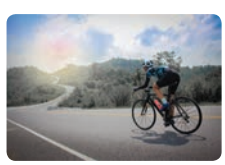
3. 

.....

4. 

.....

Ans. 1. Sliding Friction; **2.** Fluid Friction; **3.** Rolling Friction; **4.** Static Friction

VI. Case-Based Questions: CBQ

Every sports person does at least one of the four types of body movements at a time when she/he engages in a game.

On the basis of the situation given, answer the following questions:

1. Which body part falls in the exception zone of flexion?

(a) Thumb (b) Wrist

(c) Knee (d) Elbow

2. When the sports person squats, which of the following movement will she/he be performing?

(a) Internal rotation (b) Extension

(c) Side flexion (d) Adduction

3. If a sports person flaps her/his arms to warm up, what sort of movement(s) is she/he performing?

(a) Extension and Flexion

(b) Extension and Adduction

(c) Flexion and Abduction

(d) Abduction and Adduction

Ans. **1.** (a) Thumb; **2.** (b) Extension; **3.** (d) Abduction and Adduction

B. Short Answer Type-I Questions 3 marks

1. Enumerate the broad aims of biomechanics.

Ans. The broad aims of biomechanics in sports are:

- Finding and perfecting new techniques for athletes for through quantification of motor abilities
- Establishing techniques and strategies that allow the athletes to give maximum results with minimum physical exertion.
- Evaluation of existing trends and assessing their pros and cons.
- Minimisation and prevention of injury

2. What are the differences and similarities between:

(a) flexion and extension

(b) abduction and adduction?

Ans. (a) **Differences between flexion and extension:**

- Flexion is a movement that decreases the angle between two body parts while the extension increases the angle between two party parts.
- In flexion, when the elbow flexes, the angle between the ulna and the humerus decreases while in extension, the elbow extends, the angle between the ulna and the humerus increases.

Similarity between flexion and extension:

Flexion normally occurs in a sagittal plane on a frontal axis while as extension also occurs in a sagittal plane on a frontal axis.

(b) **Differences between abduction and adduction:**

- Abduction is a movement in the frontal plane that takes the body part away from midline or towards an imaginary centre line while as the adduction is a movement in the frontal plane that returns the body part to the midline or takes it away from the imaginary center line.
- Abduction of the forefinger and ring finger takes them away from the midline which is the middle finger to opposite sides while adducting the fingers brings them together.

Similarity between abduction and adduction: Both the abduction and adduction occur at the same sagittal axis in the frontal plane. Friction plays a large role in the field of games and sports. Without the help of friction, one won't be able to give a better performance. For example, we include the use of spiked shoes by athletics, lime on the palms of gymnasts to successfully perform horizontal bar and roman rings; rubbing of the soles with lime before going to a wooden court by badminton players, etc.

3. What are the three laws of motion as proposed by Newton?

Ans. **Newton's first law of motion:** "A body at rest will continue in its state of rest and a body in motion will remain in its state of uniform motion in the same direction, unless an external force acts on them."

Newton's second law of motion (Law of acceleration): "A change in acceleration of a body is directly proportional to the force acting on it and inversely proportional to the mass of the body."

Newton's third law of motion (Law of reaction or Law of counter force): "For every action there is an equal and opposite reaction".

4. Write about the Newton's Laws of Motion and briefly discuss about their application in sports.

(CBSE 2019)

Ans. Newton proposed three laws of motion that help us in understanding the biomechanics involved in sports.

According to the first law of motion, a body at rest will continue in its state of rest and a body in motion will remain in its state of uniform motion in the same direction unless an external force acts on them. This law is used in the starting techniques of sports such as rowing, sprinting, hammer throw, etc. and landing in gymnastics.

According to the second law of motion, a change in acceleration of a body is directly proportional to the force acting on it and inversely proportional to the mass of the body. An example of batting in cricket will clear it. When a ball is hit, the change in speed depends on the force with which it has been hit, or in hammer throw, the physically stronger player will throw it harder than her/his opponents of lesser strength.

Similarly third law motion states that for every action, there is always an equal and opposite reaction. It means that if an object A applies force F_A to object B, then the object also exerts an equal and opposite force F_B to object A. For example, A is pushed forward by the reaction of a force equal and opposite in strength to its thrusts.

5. What is the relationship between friction and sports?

Ans. Friction plays a large role in the field of games and sports. Without the help of friction, a player won't be able to give a better performance. In skiing, the frictional forces that come into play are friction from snow, air friction and friction from the surface of the ski. A perfect control of all the frictional forces acting is required for winning. In the game of soccer, frictional forces acting between the shoes and the ground allows the players to run. In the same way, the friction between the shoes and the ball allows them to take control of the ball.

6. 'Friction is a necessary evil'. Justify your answer with suitable examples from sports.

(CBSE SP 2015)

Ans. Friction is a necessary evil which means that it is essential in sports/games. Without friction one cannot perform better in the field of sports. For example,

- The use of spiked shoes by athletes..
- Football players use studs to have appropriate friction while they run fast.
- Lime on the palms of gymnasts to successfully perform horizontal bar, uneven bars and roman rings
- Rubbing of the soles with lime before going a wooden court badminton players.

C. Short Answer Type-II Questions 5 marks

1. Discuss in detail the importance of biomechanics in sports.

Ans. A common mistake made by coaches and trainers is the failure to examine the underlying causes of wrong techniques. This is where biomechanics comes in. With detailed analysis and physical movements in sports biomechanics, the flaw can be rooted out from the source from within the source itself. Sports biomechanics constantly try to upgrade and refine sporting trends and techniques for all types of sports. A coach with good knowledge of the subject is able to guide an athlete achieve correct mechanical technique. The importance of biometrics in sports can be outlined as follows:

(i) Improvement of sports technique

(ii) Improvement of equipment and facilities

(iii) Minimisation of injury

(iv) Development of new methods

(v) Improvement of training

(vi) Understanding the human body (For detailed description refer to p–160 of the book)

2. Discuss the four major movements accomplished by the human body.

Ans. The four major movements accomplished by the human body are:

- **Flexion:** It decreases the angle between two body parts.
- **Extension:** It increases the angle between two body parts.
- **Abduction:** It is a movement in the frontal plane that takes the body part away the midline or towards the imaginary centre line. Abduction of the forefinger and ring finger takes the away from the midline which is the middle finger to opposite sides.
- **Adduction:** It is a movement in the frontal plane that returns the body to the midline or takes it away from the imaginary centre line. Adducting the fingers bring them together.

3. Discuss Newton's laws of motions and their application in sports.

Ans. Newton's laws of motion and their applications in sports are:

- **The first law (Law of inertia):** A body at rest will continue in its state of rest and a body in motion will remain in its state of uniform motion in the same direction unless an external force acts on them. That means that only an external force can change the uniform motion in a body. For example, a sprinter running a track will tend to retain that motion until she/he uses her/ his muscular force to overcome the state. The force may also be gravitational force, the surface of the field, brakes caused by an opponent, etc. This law is used in the starting techniques of sports such as rowing, sprinting, hammer throw, etc. and landing in gymnastics.
- **The second law (Law of acceleration):** A change in acceleration of a body is directly proportional to the force acting on it and inversely proportional to the mass of the body. It means, if two unequal forces are applied to objects of similar mass, the object on which the greater force is applied will move faster. If the masses of the two objects are different, then the object with the lighter mass will move faster. This can be shown as under:

  $$F = m\,a$$

  An example of batting in cricket will clear it. When a ball is hit, the change in speed depends on the force with which it has been hit, or when an athlete with mass m improves the strength of her/his legs the acceleration will be greater. In hammer throw, the physically stronger player will throw it harder than her/his opponents of lesser strength.
- **A The third law (Law of reaction or Law of counterforce):** For every action, there is always an equal and opposite reaction. It means that if an object A applies force F_A to object B, then the object also exerts an equal and opposite force F_B to object A. For example, A is pushed forward by the reaction of a force equal and opposite in strength to its thrusts.

4. What are various types of friction? How is friction advantageous or disadvantageous in the field of games and sports? Explain with suitable examples. **(CBSE 2017)**

Ans. The various types of frictions are:

- Static Friction
- Dynamic Friction

The Dynamic Friction is further divided into:

- Sliding Friction
- Rolling Friction
- Fluid Friction

Friction has its disadvantages in some of the games and sports. It plays a large role in the field of games and sports. Without the help of friction, a player won't be able to give a better performance. In skiing, the frictional forces that come into play are friction from snow, air friction and friction from the surface of the ski. A perfect control of all the frictional forces acting is required for winning. In the game of soccer, frictional forces acting between the shoes and the ground allows the players to run. In the same way, the friction between the shoes and the ball allows them to take control of the ball.

Friction has its disadvantages, too. In cycling, every cyclist has to overcome the resistance provided by air. The friction between the tyres and the road should be should be small so that lesser energy is utilised in overcoming the friction. A stronger friction is a disadvantage in cycling. The same goes for skating; lesser friction is required for a better performance.

D. Value-Based Question

During practice sessions for an athletic meet to be held on Sports Day, Drishti performed well. But sometimes she felt that there was some problem with balancing the body during the run. Hashima, one of her friends, advised her to use spiked shoes in place of normal shoes during practice. It helped Drishti a lot and she overcame the problem of being unbalanced on the track.

Answer the following questions based on the above passage:

1. What is friction?

2. What are the advantages of friction?

3. What are the values shown by Hashima?

Ans. 1. Friction is a force developing on the surface of contact of two bodies and which opposes their relative motion.

2. The friction plays a large role in the field of games and sports. Use of spiked shoes help the athlete to achieve a perfect balance during the race. Also, in the game soccer, frictional forces acting between the shoes and the ground allows the players to run.

3. Caring, friendlyness and sympathy are the values shown by Hashima.

CHAPTER 9
PSYCHOLOGY IN SPORTS

P. 182–186

A. Objective Type/Multiple-Choice Questions **(1 mark)**

I. Multiple-Choice Questions

1. Emotionally unstable, anxiety, sadness are attributes of which personality dimension?

(a) Extroversion
(b) Neuroticism
(c) Agreebleness
(d) Openness **(CBSE 2020)**

Ans. (b) Neuroticism

2. As per the classification of personality by William Herbert Sheldon, which of these temperaments is associated with mesomorphs?

(a) Cerebrotonia (b) Catatonia
(c) Somatotonia (d) Viscerotonia

Ans. (c) Somatotonia

3. Who argued that traits will direct the individual to act same way in a variety of situations, and that they are acquired and not inherited, and hence could be unlearned?

(a) Meyer Friedman (b) Ray Rosenman
(c) Gordon Allport (d) W H Sheldon

Ans. (c) Gordon Allport

4. Big Five is also known as .....

(a) OCEAN. (b) BEACH.
(c) BEAR. (d) POND.

Ans. (a) OCEAN.

5. According to the Five Factor Model, which component of personality is associated with irritability, nervousness and emotional instability?

(a) Extraversion
(b) Neuroticism
(c) Conscientiousness
(d) Openness

Ans. (b) Neuroticism

6. Goal setting and self-endorsement are types of .....

(a) endurance. (b) motivation.
(c) skill. (d) strength.

Ans. (b) motivation.

7. The body structure of mesomorphic people is like .....

(a) fatty. (b) large muscles and bones.
(c) solid. (d) obese. **(CBSE 2020)**

Ans. (c) solid.

8. Which of these is not one of the strategies to enhance adherence to exercise?

(a) Introducing exercise in a playful manner to children
(b) Introducing an aspect of competition
(c) Allowing people to exercise whenever they are in the mood to do it
(d) Using social media to create awareness about the benefits of exercise

Ans. (c) Allowing people to exercise whenever they are in the mood to do it

9. In which of the following cases is an extrinsic source of motivation not involved?

(a) A young swimmer being made to practice everyday by her swimming coach.
(b) A wrestler training harder because he wants to win the Arjuna Award.
(c) A tired marathon runner continuing to run because the crowd is cheering for him.
(d) A sportsman maintaining strict control on his diet.

Ans. (d) A sportsman maintaining strict control on his diet.

10. Which of the following does not help in increasing adherence to exercise?

(a) Exercise should be a part of everyday school activities.
(b) Exercise should be introduced as a subject to kids.
(c) Regularity must be maintained to develop a healthy habit.
(d) Benefits of exercise should be made clear.

Ans. (b) Exercise should be introduced as a subject to kids.

11. Aggressive behaviour of a sportsperson is influenced by .....

(a) emotional identification with the team.
(b) tactical ability.
(c) goal orientation.
(d) all of these.

Ans. (d) all of these.

12. Which one of the following is a correct statement in relation to aggression according to the Instinct Theory?

(a) Aggression is learned through copying the behaviour of others.

(b) Aggression is an inbuilt emotion.

(c) Aggression is a result of prevention from achieving a goal.

(d) Aggression is a result of certain external stimuli.

Ans. (b) Aggression is an inbuilt emotion.

13. Instrumental and hostile are the types of .....

(a) injuries. (b) exercise.

(c) aggression. (d) none of these.

Ans. (c) aggression.

II. Match the following:

Match list – I with list – II and select the correct answer from the code given below:

List I – Components of Factor Model	List II – Traits
(a) Conscientiousness	(1) Assertive
(b) Extraversion	(2) Dependability
(c) Agreeableness	(3) Compassionate
(d) Neuroticism	(4) Anxious

Select the correct set of options:

Code				
	(i)	(ii)	(iii)	(iv)
(a)	3	2	1	3
(b)	4	1	3	2
(c)	2	3	4	1
(d)	1	4	2	4

Ans. (ii): (a) – 2; (b) – 1; (c) – 3; (d) – 4

III. Assertion-Reason Type Questions: CBQ

Given below are the two statements labelled Assertion (A) and Reason (R).

A: We, each of us, are unique individuals.

R: No two persons will behave the same way, have the same preferences, the same mannerisms.

In the context of the two statements given above, which one of the following is correct?

(a) Both (A) and (R) are true and (R) is the correct explanation of (A).

(b) Both (A) and (R) are true but (R) is not the correct explanation of (A).

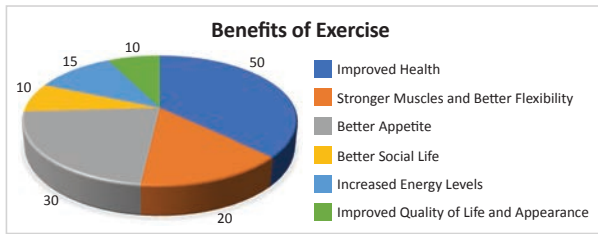
(c) (A) is true, but (R) is false.

(d) (A) is false, but (R) is true.

Ans. (a) Both (A) and (R) are true and (R) is the correct explanation of (A).

IV. Data-Based Questions: CBQ

A survey conducted recorded the common benefits experienced by people:



On the basis of the pie-chart given above, answer the following questions:

1. What was the most common benefit experienced by people?

(a) Improved quality of life and appearance

(b) Increased energy levels

(c) Improved health

(d) Better appetite

2. Which of the two benefits went hand-in-hand?

(a) Increased energy levels and better social life

(b) Stronger muscles and better flexibility

(c) Improved health and better appetite

(d) Better appetite and increased energy levels

3. Which of the following benefits would indicate decreasing number of diseases?

(a) Better appetite

(b) Increased energy levels

(c) Better social life

(d) Improved health

Ans. **1.** (c) Improved health; **2.** (b) Stronger muscles and better flexibility; **3.** (d) Improved health

V. Picture-Based Questions: CBQ

Identify the following types of personalities and name them:

1. 

.....

2. 

.....

3. 

4. 

....

Ans. **1.** Ectomorph; **2.** Mesomorph; **3.** Introvert; **4.** Extrovert

VI. Case-Based Questions: CBQ

Character sketch: A boy named Hari is kind and sociable. He exercises daily and has an athletic physique. He loves to go on treks with his friends and is confident of his looks

On the basis of the description given, answer the following questions:

1. The boy can be called an .....

(a) extrovert. (b) introvert.

(c) ectomorph. (d) endomorph.

2. Which of the following benefits of exercise does he seem to enjoy?

(a) Improved appearance (b) Better social life

(c) Stronger muscles (d) All of these

3. Which of the following components' trait of the five factor model is he not likely to possess or experience?

(a) Commitment (b) Assertiveness

(c) Warmth (d) Irritability

Ans. **1.** (a) extrovert; **2.** (d) All of these; **3.** (d) Irritability

C. Short Answer Type-I Questions 3 marks

1. Personality and posture are the two opposite sides of the same coin. Comment. **(CBSE SP 2016)**

Ans. Posture is the position in which we hold our body upright against gravity while standing, sitting, walking, running or lying down. The force of gravity acts upon our body constantly. If the muscles of our body are weak, we may suffer from postural deformities such as kyphosis, lordosis, scoliosis, bow legs, knock knee, flatfoot, etc. It is because of these deformities, our working efficiency usually gets reduced.

Personality refers to an individual's characteristic patterns of thought, emotion and behaviour together with the psychological mechanism hidden or not behind those patterns. Based on these differences, it is wrong to say that posture and the personality are the same. Personality is a psychological system that shape her /his mind and influences her/his behavioural expression while the posture is static and dynamic. It is a homeostatic mechanism that can be voluntary controlled to a significant extent by bone adjustments. Hence, the proverb can be justified.

2. What are the different dimensions of personality? Write in brief about two. **(CBSE 2017)**

Ans. Personality is a complete unit in itself and are composed of:

- Physical dimension
- Mental dimension
- Social dimension and
- Emotional dimension.

(i) **Emotional dimension:** Every person has various emotions like pleasure, hope, hate, anger, luster, etc. If an individual does not have appropriate control over these emotions, he may become abnormal and uncontrollable. There are many situations in sports where sports persons show their emotional status. Emotional stability plays a very important part of one's personality. Therefore, sports and games do help in developing these emotions and tend to enable them to have proper control over these emotions.

(ii) **Mental dimension:** Sports and games provide ample opportunities for individual to participate in creative experience. There is no doubt that individuals learn to make judgements, utilize reflective and creative thinking and obtain knowledge about the rules and regulations of games and sports.

3. Define trait. What are the three main types of traits?

Ans. Traits are human characteristics that define the personality of a person.

The three main traits are:

- **Cardinal traits:** These traits are dominant traits. They are the most visible traits of an individual, shaping her / his personality and driving her / his actions.
- **Central traits:** These traits are found in every person to some degree and unlike cardinal traits do not have a lasting or overwhelming influence on an individual's personality.
- **Secondary traits:** Associated with preferences and attitudes, these traits will manifest only in specific circumstances.

4. Explain goal setting as a technique of motivation, in brief. **(CBSE 2012)**

Ans. It is a known fact that motivation is the cause of our actions, desires and needs and, therefore,

it drives our goal-oriented behaviour. Once the student is able to accomplish small targets, she/he can move on to bigger goals, such as getting into the school or local sports teams, for which she/he will have to carve extra time from her/his daily schedule. To be a successful person, even at this stage, commitment is necessary. Focus can be maintained by keeping the ultimate destination in mind and envisioning the feeling of satisfaction and pride that will come along with victory. 'Goal-oriented' applies to all kind of activities not just missions and long-term visions.

5. Write down Sheldon's and Jung's classification of human personalities.

Ans. **Classification of personality by William Herbert Sheldon:**

- **Ectomorphy with cerebrotonia:** Ectomorphs have narrow shoulders, thin arms and legs, a narrow face and a flat chest. They are slim and slender, their diet notwithstanding. They are socially awkward and tend to prefer solitude to company, but are also creative and intellectual. Medically, this pattern of temperament is termed cerebrotonia.
- **Mesomorphy with somatotonia:** Mesomorphs are likely to have an athletic physique. Their shoulders are broad, chest narrow, arms and legs strong. They have more muscle than fat. Somatotonia is the name of the temperament associated with mesomorphs. It consists of traits such as adventurousness, courageousness, assertiveness, and competitiveness.
- **Endomorphy with viscerotonia:** Endomorphs have a round body characterised by wide hips, narrow shoulders and skinny ankles and wrists. They have a heavier build and will have extra fat on body parts such as the arms and thighs. Their temperament, called viscerotonia, shows a relaxed, easy- going, fun-loving and sociable nature. They like to hang-out with people, eat good food and are tolerant and affectionate.

Classification of personality by Carl Jung:

(i) **Introvert:** An introvert is associated with introversion. They are motivated or energised by the internal world of thoughts, feelings and reflections. They focus on the effect the outside world has on them. Introverts prefer their own company to that of others. They do not feel comfortable socialising or being around new people.

(ii) **Extrovert:** An extrovert is associated with extraversion by the external world of objects and other people. They are just opposite to introverts. They thrive in social settings. They like to be around people and interact with them. Introverts are thought-oriented and extroverts are action-oriented.

(iii) **Ambivert:** No one is completely introverted or extroverted, and it would be dangerous to become so. An introvert needs to channel the extraversion in her/him to stay connected to the outside world, while an extrovert should do the same with their introverted sight to keep in touch with their inner self. The persons who possess both the traits of introverts and extroverts are called ambiverts.

6. What are the components of personalities as categorised by the Big Five Theory?

Ans. The components of personality as characterised by Big Five Theory are as follows:

- **Openness:** It means more than being frank and expressive. It refers to a high level of receptivity towards new ideas and challenges. Open individuals have an adventurous and curious spirit, immense imagination and the ability to examine abstract ideas.
- **Conscientiousness:** These features traits like thoughtfulness, discipline, focus, commitment, strong impulse control and dependability. Individuals who are strong on this dimension are well-organised, dedicated and reliable.
- **Extraversion:** People in whom extraversion is the dominant trait are outgoing, sociable, assertive, friendly and enjoy the attention of others. They make a lot of friends and speak freely.
- **Agreeableness:** Agreeable people are kind, compassionate, helpful, warm and trusting of others. They are interested in other people, show a healthy level of empathy and enjoy being good friends. The people who are low in agreeableness have little empathy and cooperativeness.
- **Neuroticism:** Neurotics are emotionally unstable; they are irritable, nervous, anxious, quick to worry even over the smallest matters, and often fall into depression.

7. Briefly describe intrinsic motivation.

Ans. Intrinsic motivation is one that seeks internal rewards and rises from within the individual.

It does not depend on external pressures or considerations. Rather, it arises naturally and provides the individual enjoyment in the execution of the task. It is crucial for cognitive, social and physical development.

8. Briefly describe extrinsic motivation.

Ans. Extrinsic motivation is more goal-oriented and seeks a desired outcome. It arises from external influences, and is used as a substitute in the absence of intrinsic motivation. Extrinsic motivation is often associated with rewards and punishments.

9. Discuss in detail any three techniques of motivation. **(CBSE 2020)**

Ans. Three techniques of motivation are as follows:

(i) **Setting a Daily Activity Schedule:** This is the most basic sequence of activities a student can have. It can be modified so that the student has a well-defined and active daily routine: waking up early, exercising (walking/jogging/ yoga), helping with housework, starting a hobby and maintaining it, etc. with each activity completed at specified timings of the day. By cultivating such a habit, the student will also begin to realise she/he is capable of setting goals and achieving them.

(ii) **Goal Setting:** Once the student is able to accomplish small targets, she/he can move on to bigger goals, such as getting into the school or local sports teams, for which she/ he will have to carve extra time from her/ his daily schedule. Goal setting technique is widely used as a cognitive approach of motivation.

(iii) **Self-endorsement:** It is no use trying to achieve any goal if the student's mind lingers on setbacks and shortcomings. While being aware of all that needs to be improved, she/ he should also endorse herself/himself and underline her/his own progress. The student can make a list of the negative points she/ he believes she/he has and follow each of them up with a positive point. If she/he is unable to do it on her/ his own, she/he can enlist the help of her/his well-wishers and good friends. Preoccupation with one's failures brings down self-confidence and washes out the accomplishments, which subsequently eliminates motivation.

10. 'Exercise adherence is a healthy habit.' Comment.

Ans. Exercise adherence is a habit of doing exercise regularly. If someone does regular physical activity in the form of sports or specific exercise related to fun or fitness, it becomes a good habit. And when this habit becomes automatic and one feels addicted, this concept is called exercise adherence. In such a case, one will certainly follow all the necessary steps to exercise regularly and will also follow a systematic routine for a prolonged period of time. One will have no reason to say 'no' to an exercise session. Exercise adherence is a very healthy habit where a person is benefited for her/ his lifetime. It you want to add years to your life, then exercise adherence is the best addiction.

11. Give five reasons to exercise daily.

Ans. Five reasons to exercise daily are as follows:

- If you want to stay young and fit, you need to exercise regularly.
- Regular exercise improves the body metabolism which in turn enhances the growth and development process of the body.
- It improves the defense mechanism of our body and keeps us disease free.
- It helps to attain a good posture which in turn helps in developing a better personality.
- If one wants to experience the psychological and social benefits of exercise, then one should exercise regularly.

12. Explain the behavioural benefits of exercise.

Ans. The behavioural benefits of exercise are – better ethical conduct, better discipline, effective sleep, cooperation and friendly behaviour, sportsmanship.

13. How do you think exercise can help in better academic performance?

Ans. Studies have also shown that exercise has many indirect benefits on the intellectual front.

Academic performance gets better, logical power, quick interpretation, reasoning and problem-solving capacity enhances.

14. What causes aggression in sports? Briefly discuss.

Ans. There are different theories to explain what induces aggression in sports. These are as under:

- **Instinct theory:** This theory states that aggression is an inbuilt emotion in human beings, and that sports provides a medium for releasing it in a safe and controlled manner.

- **Social learning theory:** This theory claims that aggression is learned through observing and copying the behaviour of others.
- **Frustration – Aggression theory:** It states that the aggression is a result of prevention from achieving a goal.
- **Revised frustration – Aggression theory:** Frustration does not by default cause aggressive behaviour but prepares an individual for it. For aggressive behaviour to occur, certain stimuli have to act first, such as events or objects that have an aggressive meaning to the players, an aggressive temperature, etc.

15. How does hostile aggression differ from instrumental aggression?

Ans. A person showing hostile behaviour intends to solely harm the opponent while a person with instrumental aggression desires to win the competition or to establish some sort of an external goal. A person with hostile aggression is driven by anger and their act is impulsive while a person with instrumental aggression is accompanied not by anger.

C. Short Answer Type –II Questions 5 marks

1. What is personality? Explain its different dimensions. **(CBSE 2017)**

Ans. Personality is a psychological system that shapes the mind and influences the behavioural expression. The different dimensions of personality are:

- **Physical dimension:** It is considered the most important dimension of personality. All individuals are impressed by persons who have good physique. We know that physical structure of an individual is related to the heredity but certain traits of one's personality can be improved in certain environment.
- **Social dimension:** It also plays a very important role is personality dimensions. A good personality is one which is sociable. There are some important and essential traits of personality which includes character, etiquettes, work ethics, attitude, cooperation, sympathy, kindness, etc. These traits are developed in the surroundings where he brought up.
- **Emotional dimension:** Every person has various emotions like pleasure, hope, hate, anger, luster, etc. If an individual does not have appropriate control over these emotions, he may become abnormal and uncontrollable. There are many situations in sports where sports-persons show their emotional status. Emotional stability plays a very important part of one's personality. Therefore, sports and games do help in developing these emotions and tend to enable them to have proper control over these emotions.
- **Mental dimension:** Sports and games provide ample opportunities for individual to participate in creative experience. There is no doubt that individuals learn to make judgements, utilize reflective and creative thinking and obtain knowledge about the rules and regulations of games and sports.

2. Describe how Sheldon and Jung classified human personalities.

Ans. Refer answer 5 of Section 'B' – Short Answer Type Question.

3. Write a note on the Big Five Theory.

Ans. Big Five Theory or Five Factor Model, was the culmination of decades of exploration on the subject of personality. It was the culmination of decades of exploration on the subject of personality. The Big Five Theory states five components of human personality as follows.

- **Openness:** In this context openness means more than being frank and expressive. It refers to a high level of receptivity towards new ideas and challenges. Open individuals have an adventurous and curious spirit, immense imagination and the ability to examine abstract ideas.
- **Conscientiousness:** Conscientiousness features traits such as thoughtfulness, discipline, focus, commitment, strong impulse control and dependability. Individuals who are strong on this dimension are well organised, dedicated to plans and schedules, meticulous with details and reliable.
- **Extraversion:** People in whom extraversion is the dominant trait are outgoing, sociable, assertive, friendly and enjoy the attention of others.
- **Agreeableness:** Agreeable people are kind, compassionate, helpful, warm and trusting of others.
- **Neuroticism:** Neurotics are emotionally unstable. They are irritable, nervous, anxious, quick to worry even over the smallest matters, and often fall into depression.

4. Participation in sport results in all-round development of personality. Justify. **(CBSE SP 2015)**

Ans. Sports play an important role in the development of personality of an individual. They are as significant as that of a balanced diet. At an individual level, sports and games act as an indispensible vehicle which leads to physical, mental, social, emotional and moral development of that individual. Sports play a vital role in the harmonious development or all round development of personality of an individual. Hence, we justify that sports and games contribute towards all round development like physically, mentally, intellectually, socially and emotionally.

5. Differentiate between intrinsic and extrinsic motivation. Explain in detail goal setting and reinforcement as technique of motivation.

(CBSE 2016)

Ans. Intrinsic motivation is one that seeks internal rewards and rises from within the individual.

It does not depend on external pressures or considerations. Rather, it arises naturally and provides the individual enjoyment in the execution of the task. Intrinsic motivation is crucial for cognitive, social and physical development while if we discuss about extrinsic motivation, it is opposite to intrinsic motivation as more goal-oriented and seeks a desired outcome. It arises from external influence and is used as a substitute in the absence of intrinsic motivation. This is always associated with rewards and punishments.

Techniques of motivations are described below:

- **Goal setting:** It says that people will be motivated to the extent to which they accept specific challenging goals and receive feedback that indicates their progress towards goal achievement.
- **Reinforcement theory:** Reinforcement theory is based on "law of effect", which is the idea that behaviours are selected by their consequences. This theory overlooks the internal state of an individual.

6. Discuss eight techniques of motivation.

Ans. The eight techniques of the motivation are:

- Setting a daily activity schedule
- Goal setting
- Self-endorsement
- Test your cant's
- Visualise success
- External source of motivation
- Constant feedback and evaluation
- Rewards and awards
- Motivational music and talks.

(For description of each point, refer pages 175–177 of the textbook.)

7. Explain the concept of exercise adherence.

Ans. Exercise adherence means inclination towards exercise. It is something like sticking to a habit of doing exercise regularly. If someone does regular physical activity in the form of sports or specific exercise related to fun or fitness, it becomes a good habit. And when this habit becomes automatic and one feels addicted, this concept is called exercise adherence. In such a case, one will certainly follow all the necessary steps to exercise regularly and will also follow a systematic routine for a prolonged period of time. One will have no reason to say 'no' to an exercise session. Exercise adherence is a very healthy habit where a person is benefited for her/ his lifetime. It you want to add years to your life, then exercise adherence is the best addiction.

8. What are the benefits of regular exercise?

Ans. Some of the benefits are direct and some are indirect. Some of them are discussed below:

- Some of the physical benefits can be referred to as the direct benefits of exercise. Example: size and shape of the muscles gets better with exercise.
- The strength, flexibility, muscle endurance and coordination of the muscles improve with exercise. This can be understood as direct physiological benefits of exercise.
- Some other direct physiological benefits of exercise are – improves haemoglobin concentration, body metabolism, improves circulation and bone density, better pain tolerance, etc.
- Other indirect physical benefits are – improves posture and physical personality traits, etc.
- Some of the indirect psychological benefits are – improves willpower, memory and determination, reduces stress and anxiety, improves self-motivation and self-esteem, etc.
- Some of the indirect behavioural benefits of exercise are – better ethical conduct, better discipline, effective sleep, cooperation and friendly behaviour, sportsmanship.

- Studies have also shown that exercise has many indirect benefits on the intellectual front. Academic performance gets better, logical power, quick interpretation, reasoning and problem-solving capacity enhances.
- Habit of exercise and participation in sports increases the social circle and social contacts. People who exercise regularly forms a healthy group and tends to discuss constructive ideas. They usually stay away from unhealthy habits and anti-social acts.
- Exercise spreads positive thoughts and encourages positive lifestyle because it helps in regenerating new cells in our body which means fresh energy in our body.
- Exercise also improves the spiritual conduct of an individual because it helps to develop a strong connection between mind, body and soul.

9. Write down any five strategies for enhancing adherence to exercise.

Ans. Five strategies for enhancing adherence to exercise are discussed below:

- Exercise should be introduced in a playful manner to the kids.
- It should be a part of everyday school activities.
- Regularity should be maintained to develop a healthy habit.
- Benefits of exercise should be made clear so that those exercising know the reasons for doing exercise.
- A culture should be developed in every family to promote adherence to exercise to the next generation.

10. 'Exercise adds life to years and years to life.' Justify the statement.

Ans. Exercise adds life to years and years to life. This statement is true. There are many benefits of exercise. Habit of exercise and participation in sports increases the social circle and social contacts.

People who exercise regularly forms a healthy group and tends to discuss constructive ideas. They usually stay away from unhealthy habits and anti-social acts. Exercise spreads positive thoughts and encourages positive lifestyle because it helps in regenerating new cells in our body which means fresh energy in our body. Exercise also improves the spiritual conduct of an individual because it helps to develop a strong connection between mind, body and soul. Social media, nowadays, is a very fast and important source to spread any concept. So, the concepts should be floated in the social media so as to reach to the masses. Some examples of a message can be: 'Exercise can replace medicine', 'Exercise is an important medium to prevent disease', 'Exercise promotes intellectuality', 'Exercise adds life to years and years to life' and so on.

11. What are the psychological, physiological and behavioural benefits of exercise?

Ans. The physiological benefits of exercise are – improves haemoglobin concentration, body metabolism, improves circulation and bone density, better pain tolerance, etc.

Some of the psychological benefits are – improves willpower, memory and determination, reduces stress and anxiety, improves self-motivation and self-esteem, etc.

The indirect behavioural benefits of exercise are – better ethical conduct, better discipline, effective sleep, cooperation and friendly behaviour, sportsmanship.

12. What do you mean by aggression? What causes it in sports? Describe the types of aggressions observed in sports.

Ans. According to Baron and Richardson, aggression "Any form of behaviour towards the goal of harming or injuring another living being who is motivated to avoid such treatment" is called aggression.

Causing of aggression: The following are the causes of the aggression:

- **Instinct theory:** This theory states that aggression is an inbuilt emotion in human beings and that sports provides a medium for releasing it in a safe and controlled manner.
- **Social learning theory:** Aggression is learned through observing and copying the behaviour of others.
- **Frustration – aggression theory:** Aggression is a result of prevention from achieving a goal. Frustration is the sole cause of aggression.
- **Revised frustration – aggression theory:** For aggressive behaviour to occur, certain stimuli have to act first, such as events or objects that have an aggressive meaning to the player an aggressive temperament.

Types of aggression: The following are the types of aggression:

- Hostile aggression.

- Instrumental aggression.
- Assertion.

13. Discuss the role of psychologist for a team preparing to participate in competition.

(CBSE SP 2016)

Ans. The roles of sports psychologists varies depending their nature of qualifications or other qualities. However, the main role of psychologist for preparing a team to participate in competition can be listed as under to help athletes cope with performance:

- Help athletes to improve mental skills for performance.
- Help athletes to prepare for competition.
- Help athletes come back after injury.
- Help athletes to improve practice efficiently.
- Help athletes cope with performance fears.

14. Explain Sheldon's classification of personality and explain its importance in physical education and sports. **(CBSE 2015)**

Ans. For Sheldon's classification of personality, refer answer 5 of Short Answer Type-I Questions.

Importance of Sheldon's classification of personality in physical education and sports.

Sports play an important role in the development of personality of a person. They are as significant as that of a balanced diet. At an individual level sports and games play a vital role in the harmonious development or all round development of personality of an individual. We can in other words say that sports and games contribute a lot towards the development of personality like: physical development, mental development, social development and emotional development (As discussed earlier).

D. Value-Based Question

Radhika is a student of 11 standard. She is a quiet person and never gets involved much with her friends, while her friends are outgoing and fun loving. She is a good student but never goes out to play with her friends. One day she meets Anne, a girl who lives in her neighbourhood. They both become friends. Anne told her about the benefits of regular exercise. Radhika realised her mistake and started doing exercise regularly. She thanked her friend for this suggestion and motivation.

Answer the following questions based on the above passage:

1. What do you mean by the term 'motivation'?

2. What are the benefits of exercise?

3. What kind of values does Anne possess?

Ans.

1. Motivation is defined as the cause of people's actions, desires and needs, the primary driver of goal-oriented behaviour.

2. Some of the physical benefits can be referred to as the direct benefits of exercise.

Example: size and shape of the muscles gets better with exercise. The strength, flexibility, muscle endurance and coordination of the muscles improve with exercise. This can be understood as direct physiological benefits of exercise.

3. Sharing knowledge, friendship, helping others, etc.

CHAPTER 10
TRAINING IN SPORTS

P. 203–207

A. Objective Type/Multiple-Choice Questions **(1 mark)**

I. Multiple-Choice Questions

1. What is the ability of a muscle to overcome resistance for as long as possible known as?

(a) Strength endurance (b) Explosive strength
(c) Maximum strength (d) Isometric strength

Ans. (a) Strength endurance

2. In which form of exercise resistance is accommodated throughout the range of motion and the contractions are performed at a dynamic preset fixed speed?

(a) Isokinetic exercises (b) Isometric exercises
(c) Isotonic exercises (d) All of these

Ans. (a) Isokinetic exercises

3. Which of these is an example of an isometric exercise?

(a) Plank hold (b) Push up
(c) Running (d) Weightlifting

Ans. (a) Plank hold

4. The principal of 'effort and recovery' is the foundation of which training method?

(a) Continuous training (b) Interval training
(c) Periodic training (d) Fartlek method

Ans. (b) Interval training

5. Which of the following factors does not influence flexibility?

(a) The anatomical structure of a joint
(b) Proper warming-up
(c) Body temperature
(d) None of these

Ans. (d) None of these

6. Which of the following is not a categorisation of endurance using nature of the activity as a parameter?

(a) Basic endurance (b) General endurance
(c) Specific endurance (d) Speed endurance

Ans. (d) Speed endurance

7. Milind is preparing for an upcoming marathon by running 400 m distances 15 times every day. Which method for developing endurance is he following?

(a) Continuous training method
(b) Interval training method
(c) Fartlek method
(d) Pace constant method

Ans. (b) Interval training method

8. Fartlek training was developed in

(a) Sweden. (b) The USA.
(c) India. (d) The UK. **(CBSE 2020)**

Ans. (a) Sweden.

9. Which of the following is not a characteristic and significance of coordinative abilities?

(a) Be a source of recreation and recovery
(b) Decide the lifestyle and physical ailments
(c) Determine the pace of learning and modification of skills
(d) Decide the quality of a performance

Ans. (b) Decide the lifestyle and physical ailments

10. What type of speed is defined as the ability to maintain maximal speed for maximal distance and maximal duration?

(a) Acceleration ability (b) Locomotor ability
(c) Movement ability (d) Reaction ability

Ans. (b) Locomotor ability

11. What kind of coordinative ability is defined as the ability to determine the position of the body and its parts in time and space with respect to gravity and moving objects?

(a) Combinatory ability (b) Balance ability
(c) Orientation ability (d) Differentiation ability

Ans. (c) Orientation ability

12. If a muscle contracts and changes its length to produce force, the contraction type is .....

(a) isotonic. (b) isometric.
(c) isokinetic. (d) none of these.
(CBSE 2020)

Ans. (a) isotonic.

13. Which of these components of circuit training is meant to strengthen the upper body?

(a) Bench squats (b) Skipping
(c) Pull-ups (d) Bench lift

Ans. (d) Bench lift

14. Who designed Circuit Training Method?

(a) Adamson and Morgan
(b) Morgan and Morgan
(c) Adamson and Adamson
(d) None of these

Ans. (a) Adamson and Morgan

II. Match the following:

Match list – I with list – II and select the correct answer from the code given below:

List I – Type of Endurance	List II – Example
(a) Speed	(1) 1,500 m race
(b) Short-term	(2) 800 m race
(c) Middle-term	(3) 5,000 m race
(d) Long-term	(4) 400 m sprint

Select the correct set of options:

Code				
	(i)	(ii)	(iii)	(iv)
(a)	4	2	1	3
(b)	2	1	3	2
(c)	1	3	4	1
(d)	3	4	2	4

Ans. (i): (a) – 4; (b) – 2; (c) – 1; (d) – 3

III. Assertion-Reason Type Questions: CBQ

Given below are the two statements labelled Assertion (A) and Reason (R).

A: Strength is the ability of a muscle or a group of muscles to exert maximum force against a resistance in a single contraction.

R: For someone to remain physically fit, it is important to have muscular strength.

In the context of the two statements given above, which one of the following is correct?

(a) Both (A) and (R) are true and (R) is the correct explanation of (A).

(b) Both (A) and (R) are true but (R) is not the correct explanation of (A).

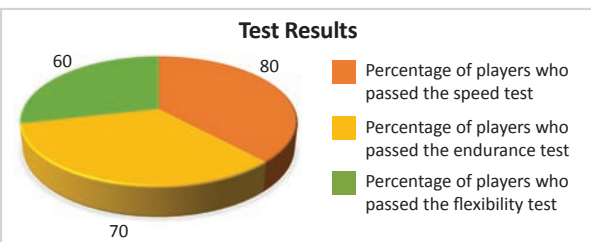
(c) (A) is true, but (R) is false.

(d) (A) is false, but (R) is true.

Ans. (b) Both (A) and (R) are true but (R) is not the correct explanation of (A).

IV. Data-Based Questions: CBQ

A random test conducted on a state cricket team gave the following results:



On the basis of the pie-chart given above, answer the following questions:

1. The players who could not pass the endurance test, they should train using .....
   (a) specific endurance training method.
   (b) continuous or interval training method.
   (c) general endurance training method.
   (d) none of these.
2. Acceleration Run and Pace Run can be the two methods of improving .....
   (a) speed. (b) flexibility.
   (c) endurance. (d) consistency.
3. What are the necessary steps in improving flexibility?
   (a) Warming up
   (b) Breathing deep and slow
   (c) Repetition of exercise
   (d) All of these

Ans. **1.** (b) Continuous or interval training method; **2.** (a) Speed; **3.** (d) All of these

V. Picture-Based Questions: CBQ

Identify the following types of personalities and name them:

1.

.....

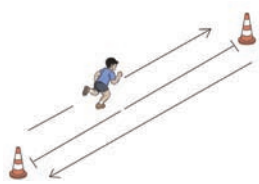
2.

.....

3.

.....

4.



.....

Ans. **1.** Burpees; **2.** Squat-jumps; **3.** Push-ups; **4.** Shuttle run

VI. Case-Based Questions: CBQ

An athlete is preparing to represent his country in the Olympics and is undergoing circuit training.

On the basis of the description given, answer the following questions:

1. Which of the following exercises will he perform to exercise his lower body?
   (a) Squat jumps shuttle runs
   (b) Front plank and crunches

(c) Skipping and jogging

(d) All of these

2. Which of the following exercises will he perform to exercise his core and trunk?

(a) Squat jumps shuttle runs

(b) Front plank and crunches

(c) Skipping and jogging

(d) None of these

3. Which of the following exercises will he perform to exercise his whole body?

(a) Squat jumps shuttle runs

(b) Front plank and crunches

(c) Skipping and jogging

(d) Only (a) and (c)

Ans. 1. (a) Squat jumps shuttle runs; **2.** (b) Front plank and crunches; **3.** (c) Skipping and jogging

B. Short Answer Type-I Questions 3 marks

1. Make a list of factors that determine muscular strength.

Ans. Muscular strength is determined by several factors:

- *the cross-sectional area of muscle fibres recruited to generate force*, as a larger diameter of the muscle translates to bigger muscular strength.
- *the volume of fast-twitch (phasic) muscle fibres*, as these muscles contract faster.
- *the volume of phosphagen storage*, as these high-energy phosphate compounds can supply energy to the muscles in the absence of the main sources of energy.
- *body weight*, as being overweight means having more weight to move.
- *limb length*, as persons with shorter limbs have better leverage.
- *muscle length*, as those with longer muscles have the advantage of developing the size and strength of their muscles to a greater degree.

2. Briefly discuss the three types of isotonic strength.

Ans. The three types of Isotonic strength are:

- **Maximum strength:** It is the ability of a muscle to overcome resistance of a maximum intensity of stimulus in a single contraction. Applying this strength demands an efficient neuromuscular coordination. It activates type II fast-twitch muscle fibres. It increases the levels of muscle-building hormones and enhances bone density and strength.
- **Explosive strength:** It is the ability of a muscle when exerting force against a strong stimulus within a short period of time, that is the ability to overcome resistance at high speed. Like maximum strength, explosive strength also stimulates type II fast-twitch muscle fibres. It improves intramuscular coordination and reaction time, in addition to making the connective tissues and muscles more elastic and sturdy.
- **Strength endurance:** It is the ability of a muscle to overcome resistance for as long as possible. Usually displayed in activities that require a relatively long duration of muscle tension with minimal decrease in efficiency, it is most effective in sports.

3. Explain how isometric and isotonic exercises differ from each other.

Ans. In isometric exercise, a group of muscles develops tension against another group of muscles without any changes in the length of the muscles, while in isotonic exercises, the muscles visibily contract with varying tension while working against a constant load. Due to the resistance of the external force exceeding the internal force produced by the muscles the isometric exercises cannot shorten during contraction, while the resistance changes with the angle of point while remaining constant in terms of force. In it the tension produced in the muscle during contraction shifts according to the initial length of the muscle fibres, angle of the pull of the muscle and the speed of the contraction. In isometric exercises, the joint angle remains unchanged and after continuing the exercise for some more time, the muscles involved will start to tremble. Unlike isometric exercises, isotonic exercises accomplish work, as both muscles and joints move and change their direction.

4. What are the two types of contractions involved in isotonic exercises?

Ans. There are two stages of isotonic exercises based on the type of contraction: *concentric* and *eccentric*. In concentric contraction, the muscle is shortened to produce force. An example can be studied in the use of biceps curl, which involves curling the arm to bring the weight up to chest level. In eccentric contraction, the muscle under tension is lengthened, as observed during lowering weights. When performed at high intensity, it is far more effective at increasing muscle mass and strength than concentric contraction.

5. What is endurance? Explain its types.

(CBSE 2017)

Ans. Endurance is the ability to resist fatigue for a prolonged duration of time.

The types of endurance are:

- **Basic endurance:** It is an individual's ability to resist fatigue when applied to loads of medium intensity stimulus and aerobic muscular metabolism.
- **General endurance:** It is the ability to tolerate endurance exercise and resist fatigue caused by various kinds of activities.
- **Specific endurance:** It is the ability to resist fatigue caused by a specific or particular sports activity.

6. What is Fartlek training? Write in brief.

(CBSE 2017)

Ans. It is the method used for developing endurance. In this method self-discipline plays a vital role.

The duration of training depends upon the experience of athlete but it last as envisaged for 45 minutes but varies from aerobic walking to anaerobic sprinting. 'fartlek' word is a Swedish word which means 'speed play'. It is a training method that blends continuous training with interval training. It lays emphasis on both aerobic and anaerobic system. In this method pace or speed is not pre-planned and, therefore, it is left to the discretion of individual.

7. What do you mean by interval training and how endurance can be developed by this method?

(CBSE 2016)

Ans. The interval training method is executed with repeated efforts at a fast pace, with intervals of incomplete recovery in between. It involves a series of low-intensity workouts intercepted with rest or relif periods. The aim is to increase the heartbeat to 170–180 beats per minute. For this reason the heart rate is monitored and it is often referred to as training of the heart. Since, endurance is the ability to sustain an activity, therefore, the method of interval training is a well designed method to develop the endurance. We know that the interval method is executed with repeated efforts so are the endurance.

8. Define flexibility and its types. **(CBSE 2020)**

Ans. Flexibility is the ability to exhibit a wide range and amplitude of movements by an individual's joints. With greater flexibility, the individual can efficiently perform various motions, whether they are complicated or ordinary. Moreover, flexibility reduces the amount of time required by an athlete to perfect targeted moves, reduces fatigue and risk of injuries, as well as increases strength, speed and endurance.

Flexibility can be divided into two types:

(i) **Passive Flexibility:** Passive flexibility is the ability to perform a range of movements with greater ease through external help. It enables the individual to assume and hold a position without her/his own muscular power. For example, doing stretches with the help of a partner. It is influenced by factors like the anatomical structure of joints and the extensibility of the ligaments.

(ii) **Active Flexibility:** In active flexibility, no external help is required. The range of motions is performed using the individual's own muscular force. It is lesser in force than passive flexibility.

9. Discuss in detail about slow stretching and holding as method for developing flexibility.

(CBSE 2016)

Ans. **Static Stretching Method:** In static stretching, the muscle is stretched to its maximum limit and then released gradually to return to its original position. The duration of stretching varies according to the requirement of the individual. For cooling down, 10 seconds can be applied, and for flexibility stretches, 30 seconds will suffice. This method is considered better and safer as there are fewer chances of getting injured.

Stretching and holding as method for developing flexibility is the extension of slow stretching method. In this method, the muscle is stretched to its maximum limit and then the position is held for few seconds before returning to the original position.

10. List factors that determine speed.

Ans. The following factors determine speed:

- The personal attitude and work ethic of the athlete.
- The amount of energy stores – both the main and supplementary.
- The flexibility and durability of the muscles.
- The explosive strength of the individual's muscles.
- The successful coordination between motor and sensory nerves.
- The structure of the muscle fibres.

11. What is the importance of circuit training?

Ans. Circuit training is the most time-efficient way to develop strength and endurance of the muscles.

This means it is ideal for even those people who don't have much time to spare for regular exercises.

12. There are two sets of exercises. One set involves five stations targeting the upper body. The other involves two stations for the upper body, and one each for the core, lower body and total body. Which of these sets is more likely to be part of a circuit training programme?

Ans. Set two is more likely to be part of circuit training programme as it focuses on the exercise of the whole body.

13. What would be your chosen exercises for circuit training?

Ans. I would like to choose 'whole body' exercise which includes treadmills, squat thrusts, skipping, jogging for circuit training.

C. Short Answer Type-II Questions 5 marks

1. Discuss in detail the methods of improving muscular strength.

Ans. Development of strength brings about a holistic improvement to the body. It upgrades speed, agility and flexibility-qualities that are advantageous for all individuals in general, but sportspersons in particular. The latter group of specialists have to overcome one or more of the four types of resistance with their strength:

- Resistance of the implements to be used, such as javelin in javelin throw, weight in weight lifting and so on.
- Resistance of their own body, in jumping, sprinting, etc.
- Resistance of their opponent, in combative sports.
- Frictional resistance of external forces, as experienced in swimming, rowing, cycling, etc.

2. What are the types of strength? Explain isotonic method to improve strength.

OR

Write in detail about the strength improving method – isometric, isotonic and isokinetic.

(CBSE 2019)

Ans. Muscular strength broadly classified as:

I. Isotonic strength: There are three types of isotonic strength:

(i) Maximum strength

(ii) Explosive strength

(iii) Strength endurance

II. Isometric strength

(For detailed description refer to p189–190)

OR

Isometric or Static Exercise: In isometric exercises , a group of muscles develops tension against another group of muscles without any changes in the length of the muscles. There are two variations of isometric exercises: overcoming and yielding. In the first type the joints and muscles apply force to an immovable object, and in the second, they are held in a static position while opposed by resistance. The main advantage of isometric exercises is the strengthening of the muscles due to longer duration of the systematic contraction with relatively little loss of energy. They can be performed anywhere as they do not need any equipment.

Isotonic Exercises: In isotonic exercises, the muscles visibly contact with varying tension while working against a constant load. Unlike isometric exercises, isotonic exercises accomplish work, as both muscles and joints move and change their direction. There are two stages of isotonic exercises based on the type of contraction: concentric and eccentric. In concentric contraction, the muscle is shortened to produce force. In eccentric contraction, the muscle under tension is lengthened, as observed during lowering weights. When performed at higher intensity, it is far more effective at increasing muscle mass and strength than concentric contraction. The advantages of isotonic exercises are enhancement of coordination and strength, development of speed and endurance and increase in length and flexibility of the muscles.

Isokinetic Exercises: In Isokinetic exercises, the muscles contract with maximum force through every point in the range of motion. In isokinetic exercises resistance is accommodated throughout the range of motion and the and the contractions are performed at a dynamic pre-set fixed speed. The speed therefore remains constant even if the amount of force exerted varies as per the strength and ability of the individual performing the exercise. Isokinetic exercises are considered the best method for improving explosive strength and strength endurance. The one disadvantage is that they can be performed with the use designated machines.

3. Discuss types of endurance.

Ans. The types of endurance are:

- **Basic endurance:** It is an individual's

ability to resist fatigue when applied to loads of medium intensity stimulus and aerobic muscular metabolism. In this type of endurance, a large number of muscles are involved and the movements are performed at a slow and steady pace for a longer duration of time.

- **General endurance:** It is the ability to tolerate endurance exercises and resist fatigue caused by various kinds of activities. Activities involved general endurance can be either aerobic or anaerobic. The duration is shorter in comparison to basic endurance but it enables an athlete to undergo various kind of activity within getting tired.
- **Specific endurance:** Specific endurance can be defined as the ability to resist fatigue caused by a specific or particular sports activity. Different sports trigger different levels of fatigue; consequently, specific endurance can show variations.

4. Discuss the methods of improving endurance.

Ans. The methods that can improve the endurance are:

- **Continuous training method:** In this method a load is applied for a long duration without any break. Its intensity is kept low and the time frame restricted to half an hour.
- **Interval training method:** It is executed with repeated efforts at a fast pace, with intervals of incomplete recovery in between. The aim is to increase the heartbeat to 170–180 beats per minute.
- **Fartlek method:** In this method the change is decided by the surface of running, the surroundings, the athlete's physical strength and limitations, the climate, etc. For instance, terrains can switch from woody areas to riversides and hills. It accounts for both the aerobic and anaerobic systems of the body. The pulse rate should remain within 140 to 180 beats per minute, with duration of training lasting 45 minutes on an average.

5. What does the word 'training' mean in sports? Explain any two methods of speed development in detail. **(CBSE 2012)**

Ans. Sport performance training simply put is a type of training that is designed to improve your fitness level for the purpose of improving sense of improving your ability to perform a given sport.

The two methods of speed development are:

- **Acceleration run:** We have learnt that this run of an object is the rate at which its speed changes. When an athlete sprints, she/he does not simply start running at maximal speed; it is attained through gradual increment. This principle is used in acceleration run mode of developing speed.
- **Pace run:** Unlike acceleration runs, paced runs are characterised by uniform speed. This means that the athlete runs the course of the race at a steady and definite speed.

6. Explain the methods of flexibility development in detail. **(CBSE 2014)**

Ans. The following methods are used to improve flexibility:

- **Ballistic method:** In this method, the movement is performed with rhythmic swinging in the maximum range that can be obtained. The involved joint is stretched with a swing, keeping the count in mind. At each count, the joint is stretched to the maximum limit and then flexed. To avoid overstretching the joint, the individual should warm-up.
- **Static stretching method:** In static stretching, the muscle is stretched to its maximum limit and then released gradually to return to its original position. The duration of stretching varies according to the requirement of the individual. For cooling down, 10 seconds can be applied, and for flexibility stretches, 30 seconds will suffice. This method is considered better and safer as there are fewer chances of getting injured.
- **Dynamic stretching method:** Dynamic stretching method uses active muscular movement that brings about stretching but is not held in the end position. This takes soft tissues to their full length and then after a brief pause of 3 to 5 seconds, the stretched muscle contracts and the tendons and muscles exert a force in the lengthened position. The movement should start at half speed repetitively for a couple of times, and be followed by full speed after that.
- **Post-isometric stretch:** This method is based on Proprioceptive Neuromuscular Facilitation (PNF) technique, which raises the active and passive range of motion and improves motor performance. The muscle is first contracted maximally for 6–8 seconds using the isomeric method, and then stretched to its maximum limit. This final position is held for 8 to 10 seconds. For best results, this exercise may be repeated 4 to 8 times.

7. Define coordinative abilities and discuss their characteristics and significance.

Ans. Coordinative abilities are abilities that enable an individual to do various related activities properly and efficiently. Its definition can be:

"Coordinative abilities are understood as relatively stabilised and generalized patterns of motor control and regulation processes." These enable the sportsman to do a group of movements with better quality and effect".

Characteristics and significance of coordinative abilities are:

- Coordinative abilities are directly linked to the technical aspects and skills of sports.
- The central nervous system and the various sense organs should work in tandem.
- It determines the pace of learning and modification of skills.
- It can be a source of recreation and recovery.
- If development of coordinative abilities is initiated from an early stage, then the individual will have an easier time acquiring complex skills in later years.

8. What are the different types of coordinative abilities? **(CBSE 2019)**

Ans. The different kinds of coordinative abilities are:

- Combinatory ability
- Orientation ability
- Reaction ability
- Balance ability
- Adaptation ability
- Differentiation
- Rhythm ability

(For detailed description, refer pages 198–199 of the textbook.)

9. Define circuit training. What is its importance?

Ans. Circuit training is a type of resistance training that uses high-intensity aerobics in order to augment muscular strength and endurance. It consists of a set of exercises repeated after the completion of a circuit.

Importance of Circuit Training

- It is considered the most time-efficient way to develop strength and endurance of the muscles. This means it is ideal for even those people who don't have much time to spare for regular exercises.
- In one circuit, a variety of exercises can be incorporated, targeting different muscle groups of the body.
- Within a circuit, there is the flexibility to set the total number and type of stations according to the level, age group, gender and other characteristics of the trainee.
- The intensity of the training programme can also be set and modified according to the various work stations.
- Incorporation of different types of stations breaks the monotony of exercise.
- It is generally a group training programme, where one can seek motivation from other trainees in the group.
- It improves muscle tone and is the best training to lose excess body fat. It is ideal for building a lean look rather than bulking out.
- It is a whole body workout where aerobic and anaerobic conditioning can be done at the same time and all the muscle groups can also be trained at the same time.

10. Elaborate the concept of circuit training.

Ans. As is evident in the name itself, circuit training consists of a set of exercises, which is to be repeated after completion of a circuit. It was developed by R E Morgan and G T Adamson in England's University of Leeds in 1957, and is a tough regime normally used for getting lean as opposed to increasing muscle mass. During circuit training, fat loss occurs as high expenditure of energy and raised production of growth hormone leads to burning of fat. It is considered a better option compared to cardio training by experts since the latter lowers testosterone, increases cortisol and diminishes muscle mass. Each circuit may be made up of 8 to 10 exercise sets with little or no rest in between, with different sets focusing on different muscle groups, so that the whole body gets a proper workout. The entire routine should last at least 30 minutes. An individual may create her/his own circuit based on her/his specific needs. That said, it is advisable to build the circuit with the help of a trainer who can suggest the most suitable exercises.

11. 'Circuit training provides maximum results in minimum time.' Justify this statement.

Ans. Circuit training provides maximum results in minimum time. Circuit training may also be done by alternating the exercises like treadmills, squat thrusts, skipping, jogging with brisk walking or cycling. The point is to develop a circuit that can

achieve a full body workout. So , this statement is correct as there are a lot of benefits one can get by circuit training in minimum time. These are as follows:

- Circuit training is flexible and can be performed at the gym or at home, depending on the availability of equipment and time.
- It promotes muscle power, flexibility and endurance.
- It consumes fat and can be used to fight obesity and related physical disabilities.
- It builds and conserves lean mass, thereby improving functional fitness and reducing risk of diseases.
- It boosts cardiovascular fitness and enables an individual to exercise longer.

12. Define circuit training. Draw a diagram of 8 (Eight) stations and explain its advantages. **(CBSE 2019)**

OR

What is circuit training? Draw a diagram of circuit training with 12 stations and explain its importance in sports. **(CBSE 2020)**

Ans. Circuit training is a type of resistance training that uses high-intensity aerobics in order to augment muscular strength and endurance. As is evident from the name itself, it consists of a set of exercises which is to be repeated after completion of a circuit. It was developed by E R Morgan and G T Adamson in England's University of Leeds in 1957.

Refer to Diagram in

Fig. 10.16 only 8 circuit stations

CIRCUIT TRAINING STATIONS

(Students can draw 12 stations as their own)

Circuit training consisting of a number of exercises performed in rotation

The Advantages of Circuit Training

1. It is the most time-efficient way to develop strength and endurance of the muscles.
2. In one circuit a variety of exercise can be incorporated, targeting different muscle groups of the body.
3. Within a circuit, there is flexibility to set the total number and type of stations according to the level, age group, gender and other characteristics of the trainee.
4. The intensity of the training programme van be set according to the work stations.
5. Different types of stations breaks the monotony of the exercise.
6. It is a group training programme where one can take motivation from the other trainee.
7. It is a whole body workout where aerobic and anaerobic conditioning can be done at the same time.

D. Value-Based Question

Deepti wanted to be a good athlete. So, she tried her best to reduce her time in 800 m race, but in vain. She is very keen to win a state level championship in 800 m race for her school. She started regular practice and worked hard for it. Soumya, her friend, suggested to her to take help of PE teacher Mr Harish.

The PE teacher advised her to increase strength, flexibility and coordinative abilities like balance, rhythm, etc. He suggested different exercises to improve strength, flexibility and endurance. After six months of training, she won gold medal in 800 m race for her school, thus her dream came true.

Answer the following questions based on the above passage:

1. What is the importance of coordinative abilities?
2. What is endurance?
3. Write the values shown by the PE teacher.

Ans.

1. Coordinative abilities help to execute and control movements.
2. It is the ability to sustain an activity.
3. The values shown by the PE teacher that he is caring and concerned.