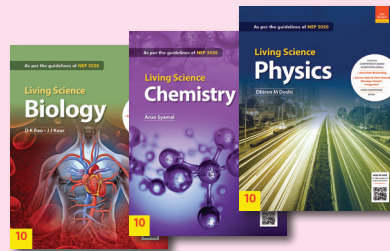


Sample Question Paper

2023–24



Class X SCIENCE (086)

Max Marks: 80

Time allowed: 3 hours

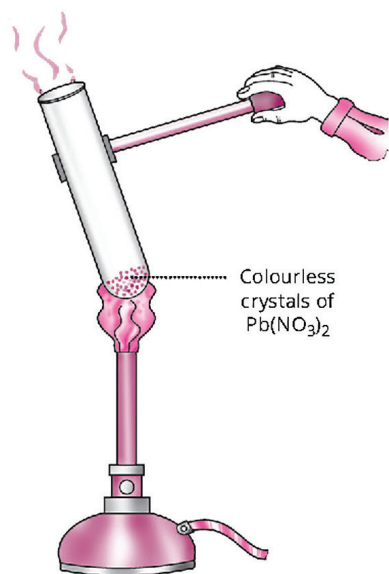
General Instructions:

- i. This question paper consists of **39 questions** in 5 sections.
- ii. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
- iii. **Section A** consists of 20 objective-type questions carrying 1 mark each.
- iv. **Section B** consists of 6 Very Short questions carrying 02 marks each. Answers to these questions should be in the range of 30 to 50 words.
- v. **Section C** consists of 7 Short Answer type questions carrying 03 marks each. Answers to these questions should be in the range of 50 to 80 words.
- vi. **Section D** consists of 3 Long Answer type questions carrying 05 marks each. Answers to these questions should be in the range of 80 to 120 words.
- vii. **Section E** consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.

SECTION – A

Select and write the most appropriate option out of the four options given for each of the questions 1 – 20. 1 mark each.

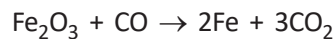
1.



Identify the product which evolved during the above reaction.

- | | |
|------------------------------|-----------------------------------|
| a. Colourless carbon dioxide | b. Reddish–brown nitrogen dioxide |
| c. Light yellow oxygen | d. Colourless nitrogen |

2. In the following redox reaction:



- a. Fe_2O_3 is oxidised to Fe, and CO is reduced to CO_2 .
 - b. Both Fe_2O_3 and CO are oxidised to Fe and CO_2 , respectively.
 - c. Fe_2O_3 is reduced to Fe, and CO is oxidised to CO_2 .
 - d. Both Fe_2O_3 and CO are reduced to Fe and CO_2 , respectively.
3. Why do silver and gold not corrode in moist air?
- a. Both silver and gold are very reactive metals.
 - b. Both silver and gold readily react with oxygen in the air.
 - c. Both gold and silver are least reactive metals.
 - d. Silver and gold can bond easily with oxygen in the air in presence of water.
4. The alloy which is used for making aeroplanes is
- a. brass.
 - b. bronze.
 - c. duralumin.
 - d. stainless steel.
5. Which of the following does not belong to the same homologous series?
- a. C_3H_8
 - b. C_2H_6
 - c. CH_4
 - d. C_4H_8
6. In acid rain, the pH of rainwater is
- a. 12.5.
 - b. more than 10.5.
 - c. 8.3.
 - d. less than 5.6.
7. The number of covalent bonds in ethane are
- a. 6
 - b. 2
 - c. 7
 - d. 5
8. All green plants are considered as producers. Producers always show
- a. heterotrophic nutrition.
 - b. autotrophic nutrition.
 - c. both heterotrophic and autotrophic nutrition.
 - d. neither autotrophic nor heterotrophic nutrition.
9. Motor nerve carries the message to
- a. sensory organ.
 - b. spinal cord.
 - c. effector organ.
 - d. brain.
10. Rajib has to select an organism from the following list that reproduces through budding. He correctly selects
- a. *Amoeba*.
 - b. Yeast.
 - c. *Plasmodium*.
 - d. *Leishmania*.
11. In a Mendelian experiment, tall pea plant having violet-coloured flowers were bred with short pea plant having white flowers. The progeny bore violet flowers but half of them were short. The genetic make-up of tall parent can be
- a. TTWW.
 - b. TTww.
 - c. TtWw.
 - d. TtWW.
12. Internal respiration/cellular respiration is
- a. the oxidation of food to release energy.
 - b. breathing in and releasing oxygen in the tissue.
 - c. the synthesis of complex substances.
 - d. transporting out CO_2 from tissues.

13. A ray of light is incident on a concave mirror. If it is parallel to the principal axis, the reflected ray will
- pass through the focus.
 - pass through the centre of curvature.
 - pass through the pole.
 - retrace its path.
14. When a ray of light travels obliquely from a rarer to a denser medium,
- it bends towards the normal.
 - it bends away from the normal.
 - it goes undeviated.
 - it is reflected back.
15. In the atmosphere, oxygen is converted into ozone by the action of
- ultraviolet radiations.
 - gamma radiations.
 - infrared radiations.
 - cosmic radiations.
16. In a food chain of plants, frog, snake and vulture, there are pesticides sprayed on plants. Then, which of the following will have the maximum concentration of pesticides in the body?
- Plants
 - Frog
 - Snake
 - Vulture

Question No. 17 to 20 consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:

- Both A and R are true, and R is the correct explanation of A.
 - Both A and R are true, and R is not the correct explanation of A.
 - A is true but R is false.
 - A is false but R is true.
17. **Assertion:** In a redox reaction, the oxidising agent gets oxidised and the reducing agent gets reduced.
Reason: The substance which gets reduced acts as an oxidising agent and the substance which gets oxidised acts as a reducing agent.
18. **Assertion:** A true-breeding tall pea plant when crossed with a true-breeding dwarf pea plant, it is called a monohybrid cross.
Reason: Monohybrid cross is a cross between two parents having contrasting forms of a single trait.
19. **Assertion:** The direction of magnetic field lines, outside the magnet, is from the north pole to the south pole.
Reason: The north pole of a magnet always has a stronger magnetic field around it than the south pole.
20. **Assertion:** Ozone hole indicates a region of ozone layer that has become thinner.
Reason: Destruction of ozone layer is mainly due to fluorine atoms present in chlorofluorocarbons.

SECTION – B

Q. No. 21 to 26 are very short answer questions.

2 marks each.

- In whitewashing of walls, water-soluble slaked lime $[\text{Ca}(\text{OH})_2]$ is used. But the product on the walls is insoluble in water. Can you suggest the chemical change which occurs on the walls? Name the type of reaction.
- Why reproduction is essential for living organisms?
- What is the purpose of pericardial fluid? State four functions of blood in the circulatory system.

OR

What happens to the glucose which enters the nephron tubule along with the filtrate?

24. Following table gives the values of refractive indices of a few media.

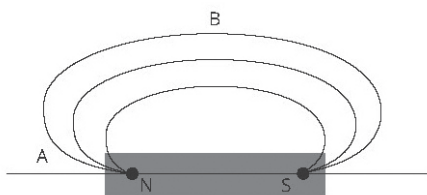
S. No.	MEDIUM	REFRACTIVE INDEX
A	Water	1.33
B	Crown glass	1.52
C	Rock salt	1.54
D	Diamond	2.42

Use this table to give an example of

- a pair of media such that light speeds up when it goes from one of these media to another.
 - a pair of media such that light slows down when it goes from one of these media to another.
25. A piece of wire of resistance R is cut into five equal parts. These parts are then connected in parallel. If the equivalent resistance of this combination is R' , what is the value of the ratio $R : R'$?

OR

Magnetic field lines are shown in the given diagram. A student makes a statement that the magnetic field at 'A' is stronger than at 'B'. Justify this statement. Also redraw the diagram and mark the direction of magnetic field lines.



26. Consider the following food chain:



If the tiger has 30 J of energy available in this food chain, how much energy was originally available from grass? Explain.

SECTION – C

Q. No. 27 to 33 are short answer questions.

3 marks each.

27. Identify the types of reaction mentioned below in (a), (b) and (c). Give one example for each type in the form of a balanced chemical equation.
- $A + B \rightarrow AB$
 - $AB \rightarrow A + B$
 - $A + BC \rightarrow AC + B$
28. Which compounds will you use to get relief from a bee-sting? Give reason for your choice of material.

OR

Chayanika added dil. H_2SO_4 to four metals and recorded her observations as shown in the table given below:

METAL	GAS EVOLVED
Zinc	Yes
Copper	No
Silver	Yes
Gold	No

Select the correct observation(s) and give chemical equations(s) of the reaction involved.

29. What is the importance of hindbrain in controlling the actions of our body?
30. What are autosomes? How do they differ from sex chromosomes?
31. We wish to obtain an equal sized inverted image of a candle flame on a screen kept at distance of 4 m from the candle flame.
- Name the type of lens that should be used.
 - What should be the focal length of the lens and at what distance from the candle flame should the lens be placed?
 - Draw a labelled diagram to show the image formation in this case.
32. a. State Ohm's law. Draw a schematic diagram of the circuit for studying Ohm's law.
b. States Joule's law of heating.
33. Reema visited her ancestral house in a small town. One day, all the lights got switched off in the evening. Her grandfather immediately checked the fuse and changed the fuse wire. The lights were on again. Reema suggested to her grandfather to use a miniature circuit breaker (MCB) in place of an electric fuse.
- Why are MCBs being used in houses nowadays?
 - What values are associated with Reema's suggestion?

SECTION – D

Q. No. 34 to 36 are long answer questions.

5 marks each.

34. An organic compound A is widely used as a preservative in pickles and has a molecular formula $C_2H_4O_2$. This compound reacts with ethanol to form a sweet-smelling compound B.
- Identify the compound A.
 - Write the chemical equation for its reaction with ethanol to form the compound B.
 - How can you get back compound A from compound B?
 - Name the process and write the corresponding chemical equation.
 - Which gas is produced when compound A reacts with washing soda?

OR

The formulae of five organic compounds are given below:

A	B	C	D	E
C_2H_4	CH_3COOH	C_2H_5OH	C_2H_6	C_6H_6

- Which one of these compounds A, B, C, D or E is a saturated hydrocarbon?
 - Which one of these compounds A, B, C, D or E is an unsaturated cyclic compound?
 - Identify the organic acid and give its structural formula.
 - Which of the above compounds when heated at 443 K in the presence of concentrated H_2SO_4 forms ethene as the major product? What is the role played by concentrated H_2SO_4 in this reaction? Also write the chemical equation involved.
 - Give the chemical equation when B reacts with C in the presence of concentrated H_2SO_4 . Name the major product formed and mention one of its important use.
35. In human males, the structures 'X' in the reproductive system are cut surgically and ligated at both ends to prevent the passage of gamete 'A' from the organ 'B' where they are made. Since 'A' cannot come out, they cannot fuse with the gamete 'D' in the body of female and pregnancy is prevented.
- Name the surgical method described above in males. What is the surgical method in females for birth control on the similar lines? Are these methods reversible?

- b. Name the structures 'X' and organ 'B'.
c. Name the cells 'A' and 'D'.

OR

- a. Pradeep is caught in a tough situation. His heartbeat has increased, mouth has become dry and the pupils of his eyes are dilated. Name the hormone causing these changes. Which gland is responsible for releasing this hormone? Name any other hormone(s) released by this gland and explain its/their functions.
b. Name the hormone produced by the thyroid gland and state its function in the body.
36. a. What is a lens? Distinguish between a convex and a concave lens.
b. Draw a ray diagram to show the refraction of light through a rectangular glass slab.
c. If the power of a lens is +5 dioptre, what is its focal length?

OR

- a. Explain two characteristics of concave lenses.
b. Define the focal length of a concave lens and discuss its significance in terms of image formation.
c. Describe two common applications of concave lenses in optical devices, providing examples for each.

SECTION – E

Q. No. 37 to 39 are case-based/data-based questions with 2 to 3 short sub-parts. Internal choice is provided in one of these sub-parts. 4 marks each

37. The table given below shows the hints given by the quiz master in a quiz.

S. No.	HINT
(i)	A compound 'A' ($C_2H_4O_2$) reacts with Na metal to form a compound 'B'.
(ii)	It evolves a gas which burns with a pop sound.
(iii)	Compound 'A' on treatment with an alcohol 'C', in the presence of an acid, forms a sweet smelling compound 'D' ($C_3H_6O_2$).
(iv)	Addition of NaOH to 'D' gives back 'B' and 'C'.

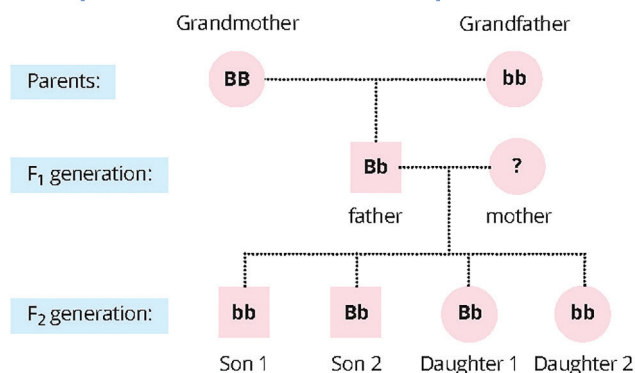
Based on the above hints answer the following questions.

- a. Identify 'A', 'B', 'C' and 'D'.
b. Give the IUPAC names of 'A', 'B', 'C' and 'D'.

OR

Write the chemical reactions for the changes taking place

38. Rina has to solve a pedigree chart question provided in her class test. In human beings, the gene for blue eyes (b) is recessive to the gene for brown eyes (B). The diagram below represents part of the pedigree chart in which some have brown eyes and some have blue eyes.

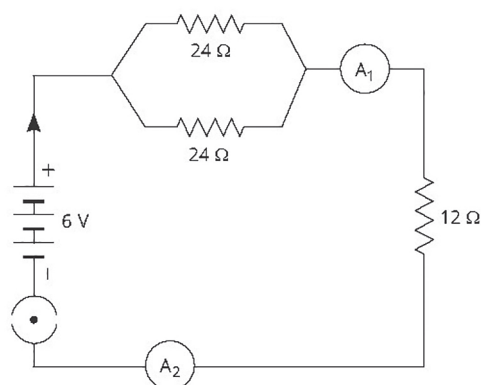


- Using the symbols given above, write the genotype of mother in the space provided.
- What is the phenotype of the grandfather?
- What is the ratio of individuals with brown eyes to those with blue eyes in the F_2 generation?

OR

If a boy has brown eyes and his mother is blue eyed, what would be the genotype of his father and mother? Why do you think blue eye colour trait is recessive in nature? Data from how many generations are needed to identify a dominant or recessive trait?

- How will you infer with the help of an experiment that the same current flows through every part of the circuit containing three resistors R_1 , R_2 and R_3 connected in series to a battery of V volts?
 - Study the following circuit and find out:
 - current in $12\ \Omega$ resistor.
 - difference in the readings of ammeters A_1 and A_2 , if any.



OR

- Define electric power. An electrical device of resistance R is connected across of voltage V and draws a current I . Derive an expression for power in terms of current and resistance.
- Two electric bulbs rated $100\text{ W}; 220\text{ V}$ and $60\text{ W}; 220\text{ V}$ are connected in parallel to an electric mains of 220 V . Find the current drawn by the bulbs from the mains.