Sample Question Paper (TERM–I) 2021-22

Class X Science (086)

Time: 90 Minutes

General Instructions:

1. The Question Paper contains three sections.
2. Section A has 24 questions. Attempt any 20 questions.
3. Section B has 24 questions. Attempt any 20 questions.
4. Section C has 12 questions. Attempt any 10 questions.
5. All questions carry equal marks.
6. There is no negative marking.

SECTION – A

Section – A consists of 24 questions. Attempt any 20 questions from this section. The first attempted 20 questions would be evaluated.

1. When calcium carbonate is heated, the gas formed is allowed to pass through freshly prepared lime water. What change will be observed in the lime water?
   a. The lime water will turn milky.
   b. The lime water will turn black.
   c. A brown ring will be formed in the lime water.
   d. No change will be observed.

2. A zinc granule was added to a test tube containing dilute sulphuric acid. When a burning matchstick is brought near the mouth of the test tube, the gas produced will
   a. burn with a green flame.
   b. burn with a pop sound.
   c. burn with a crackling sound.
   d. not burn.

3. A student took four test tubes and labelled them as A, B, C and D. He added equal volume of freshly prepared copper sulphate to each test tube. Then, he added a clean iron nail, a zinc granule, a piece of clean magnesium ribbon and a piece of clean silver wire to test tubes A, B, C and D, respectively. In which test tube, the blue colour of the copper sulphate solution will not disappear?
   a. Test tube A
   b. Test tube B
   c. Test tube C
   d. Test tube D

4. Identify displacement reaction from the following chemical equations.
   a. $CaO + H_2O \longrightarrow Ca(OH)_2 + \text{Heat}$
   b. $2Pb(NO_3)_2 \xrightarrow{\text{heat}} 2PbO + 4NO_2 + O_2$
   c. $2H_2O \xrightarrow{\text{electricity}} 2H_2 + O_2$
   d. $Zn + CuSO_4 \longrightarrow ZnSO_4 + Cu$

5. Three test tubes were taken and they were labelled as I, II and III. Ethanoic acid was taken in the test tube I, an aqueous solution of sodium carbonate was taken in the test tube II, and an aqueous solution of sodium hydrogencarbonate was taken in the test tube III. On dipping a *p*H paper in each of the solution, the colour of the *p*H paper in the test tubes I, II and III, respectively becomes
   a. orange, green, green.
   b. green, blue, blue.
   c. blue, orange, orange.
   d. orange, blue, blue.

6. In the reaction, $2FeCl_3 + H_2S \rightarrow 2FeCl_2 + 2HCl + S$,
   a. $FeCl_3$ acts as an oxidising agent.
   b. both $FeCl_2$ and H_2S are oxidised.
   c. $FeCl_3$ is oxidised and H_2S is reduced.
   d. H_2S acts as an oxidising agent.

7. The following reaction is an example of

$4\,NH_3(g) + 5\,O_2(g) \rightarrow 4\,NO(g) + 6\,H_2O(g)$

i. neutralisation reaction.

ii. redox reaction.

iii. combination reaction.

iv. displacement reaction.

a. (i) and (ii) b. (ii) and (iv) c. (ii) and (iii) d. (i) and (iv)

8. Which of the given options correctly represents the parent acid and parent base of sodium carbonate?

Option	Parent acid	Parent base
a.	HNO_3	NaOH
b.	HCl	NH_4OH
c.	HCl	NaOH
d.	H_2CO_3	NaOH

9. What happens when a solution of an acid is mixed with a solution of a base in a test tube?

i. The temperature of the solution remains the same.

ii. The temperature of the solution decreases.

iii. The temperature of the solution increases.

iv. Salt formation takes place.

a. (iii) and (iv) b. (ii) and (iii) c. (i) and (iv) d. only (iv)

10. In the reaction, $2H_2S + SO_2 \rightarrow 3S + 2H_2O$, the substance which is oxidised is

a. H_2O. b. S. c. SO_2. d. H_2S.

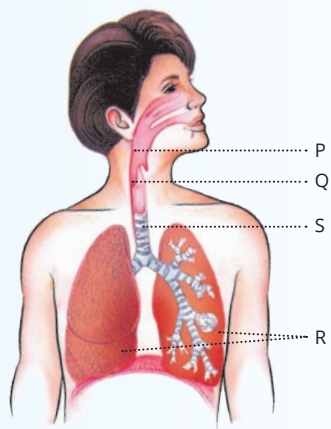
11. In which of the following parts of the given figure does gaseous exchange take place?

a. P

b. Q

c. R

d. S



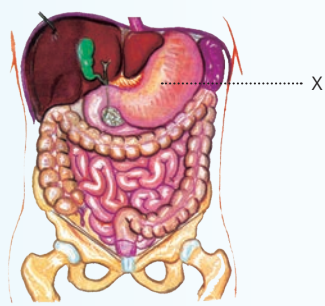
12. The organ 'X', as shown in the given figure, contains acid. This acid has certain functions. Select the incorrect one from the following.

a. It kills bacteria entering through food.

b. During acidity, backflow of acid may occur in esophagus and cause heartburn.

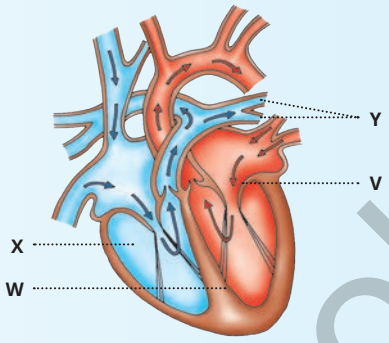
c. It maintains the environment of 'X' at pH 2.5–5.5.

d. It activates pepsinogen.



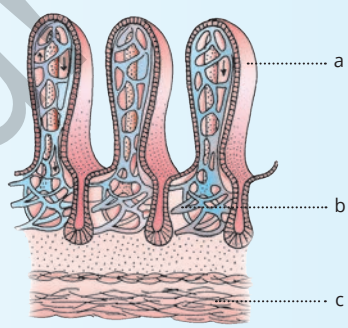
13. Internal respiration/cellular respiration is
    a. the oxidation of food to release energy.
    b. breathing in and releasing oxygen in the tissue.
    c. the synthesis of complex substances.
    d. transporting out CO_2 from tissues.

14. Identify the correct option for the given figure.
    a. X receives oxygenated blood from right atrium.
    b. Y carry blood to the lungs for oxygenation.
    c. V prevents blood from the lungs mixing with blood from the tissues.
    d. W is atrio-ventricular valve.



15. A cross section of artery is shown in the given figure. Arteries can be blocked and impaired difficulty in blood flow.
    This may occur due to the deposition of
    a. collagen fibres.
    b. low density lipids.
    c. mucus layer.
    d. proteins.

16. Study the given figure and select the correct option from the following.
    a. a—villus, found in stomach lining
    b. b—blood capillaries, absorb polysaccharide and polypeptide
    c. c—muscles, present under stomach lining
    d. a—villus, found in intestinal lining

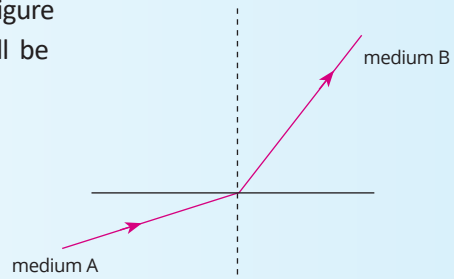


17. Nature of the image is not affected by the position of object in a
    a. plane mirror.
    b. concave mirror.
    c. convex mirror.
    d. none of these.

18. An object is placed between F_1 and $2F_1$ of a convex lens. Which of the following statements correctly describes its image?
    a. Enlarged, virtual and erect
    b. Enlarged, real and inverted
    c. Diminished, virtual and erect
    d. Diminished, real and inverted

19. The image formed by a convex lens will be real and inverted unless the object is
    a. between F and O.
    b. at F.
    c. between F and 2F.
    d. cannot say.

20. A light ray enters from medium A to medium B as shown in the figure given alongside. The refractive index of medium B relative to A will be
    a. greater than unity.
    b. less than unity.
    c. equal to unity.
    d. zero.



21. Which one of the following colours of white light bends the most on passing through a glass prism?

a. Red b. Violet c. Indigo d. Orange

22. Look at the given figure and choose the correct option.

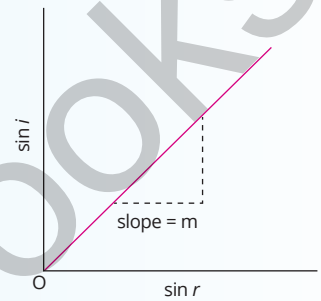
a. The mirror is a concave mirror used to as rear-view mirrors in vehicles.

b. The mirror is a convex mirror used to as rear-view mirrors in vehicles.

c. The mirror is a plane mirror used to as rear-view mirrors in vehicles.

d. All of the above.

23. The graph shown alongside is a straight line passing through the origin. The value of the ratio of sin *i* and sin *r* is constant. This verifies which law of refraction?



I. First Law of Refraction

II. Second Law of Refraction

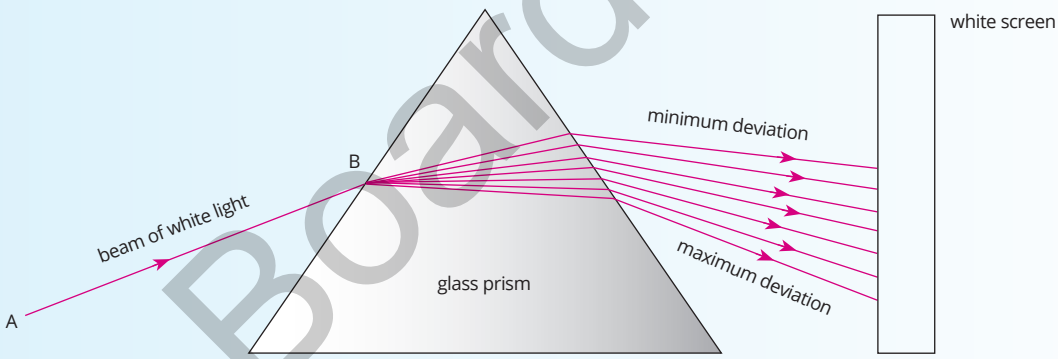
III. Snell's Law

Now choose the correct option.

a. Only I b. Only II

c. Both I and II d. Both II and III

24. Look at the picture shown below. A narrow beam of white light is incident on the prism. After dispersion of light, what would be the third colour from the top of the spectrum?

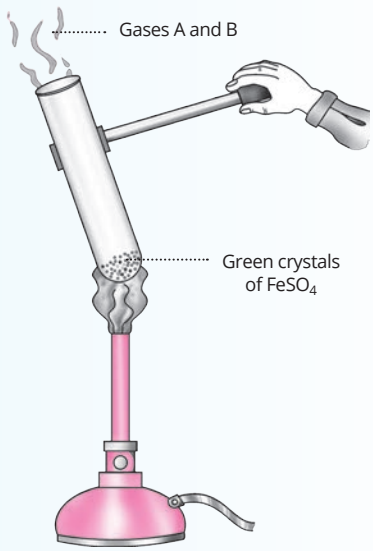


a. Red b. Green c. Yellow d. Orange

SECTION – B

Section – B consists of 24 questions (Sl. No. 25 to 48). Attempt any 20 questions from this section. The first attempted 20 questions would be evaluated.

25. The thermal decomposition of iron(II) sulphate crystals is shown in the figure given alongside. Identify gases A and B.



a. CO_2 and NO_2

b. H_2 and NO_2

c. SO_2 and SO_3

d. CO_2 and SO_2

26. When a strip of *p*H paper was dipped in the aqueous solution of a substance X, the colour of the *p*H paper changed to orange-yellow. This substance is most likely to be

a. lemon juice. b. baking soda. c. rainwater. d. milk of magnesia.

27. The following observations were made by a student while doing an experiment for displacement reactions between metals and aqueous solutions of other metal salts. Four metals A, B, C and D are added to the following aqueous solutions one by one. The observations made are tabulated below:

Metal	Iron(II) sulphate	Copper(II) sulphate	Zinc sulphate	Silver nitrate
A	No reaction	Reddish-brown deposit	—	—
B	Grey deposit	—	No reaction	—
C	No reaction	No reaction	No reaction	White shining deposit
D	No reaction	No reaction	No reaction	No reaction

Which of the following correctly represents the increasing order of reactivity of the metals A, B, C and D on the basis of above observations?

a. A < B < C < D b. B < C < A < D c. D < C < A < B d. C < B < A < D

28. A solid compound, which has high melting and boiling points, is highly soluble in water but shows poor solubility in non-polar solvents. This compound is formed by the transfer of electrons between the constituent atoms. Which of the following characteristic will be shown by this compound?

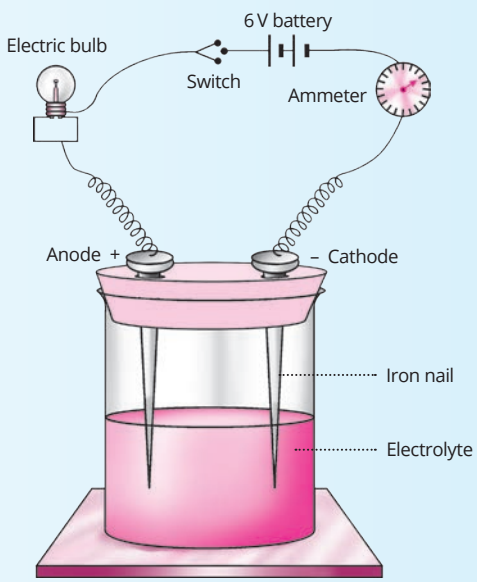
a. The compound will conduct electricity in the solid state.
b. The compound will conduct electricity in the aqueous state.
c. The compound will not conduct electricity in the molten form.
d. The compound will conduct electricity due to the presence of free electrons.

29. Four solutions A, B, C and D when tested with universal indicator show *p*H as 5, 1, 12 and 7, respectively. Which of the following observation is correct?

a. Solution A is strongly basic and solution B is weakly acidic.
b. Solution C is strongly basic and solution D is weakly acidic.
c. Solution A is strongly basic and solution C is weakly acidic.
d. Solution B is strongly basic and solution D is weakly acidic.

30. An apparatus is set up, as shown in the figure given alongside. The bulb would glow when

a. an aqueous solution of glucose is used as the electrolyte.
b. dilute hydrochloric acid is used as the electrolyte.
c. an aqueous solution of alcohol is used as the electrolyte.
d. sugar solution is used as the electrolyte.



Question No. 31 to 34 consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below.

a. Both A and R are true and R is the correct explanation of A.
b. Both A and R are true and R is not the correct explanation of A.
c. A is true but R is false.
d. A is False but R is true.

31. **Assertion:** The *p*H of an aqueous solution of sodium bicarbonate is greater than 7.
Reason: Sodium bicarbonate is obtained by the action of a strong base and a weak acid.

32. **Assertion:** When barium hydroxide and ammonium chloride are mixed together in a test tube, the bottom of the test tube becomes hot.
Reason: The reaction of barium hydroxide and ammonium chloride is endothermic in nature.

33. **Assertion:** Transpiration is called a necessary evil for plants.
Reason: Transpiration leads to loss of water but helps in the upward movement of water against the force of gravity.

34. **Assertion:** Advance sunrise and delayed sunset are caused because of atmospheric refraction.
Reason: When light rays from the sun enter the earth's atmosphere, they bend away from the normal.

35. Identify the correct statement about metal oxides.
a. Metal oxides are acidic in nature.
b. Metal oxides are only basic in nature.
c. Metal oxides are either basic or amphoteric in nature.
d. Metal oxides are either acidic or amphoteric in nature.

36. The correct pathway of blood in the circulatory system is
a. ventricles → atria → veins → arteries.
b. atria → veins → arteries → ventricles.
c. atria → ventricles → arteries → veins.
d. ventricles → veins → arteries → atria.

37. Transpiration helps in
a. translocation. b. transport of water. c. photosynthesis. d. root pressure.

38. The process of removing nitrogenous waste artificially from the blood of a person is known as
a. hydrolysis. b. haemolysis. c. haemodialysis. d. electrolysis.

39. A lens has a power of +0.5 D. It is
a. a concave lens of focal length 5 m.
b. a convex lens of focal length 5 m.
c. a convex lens of focal length 2 m.
d. a concave lens of focal length 2 m.

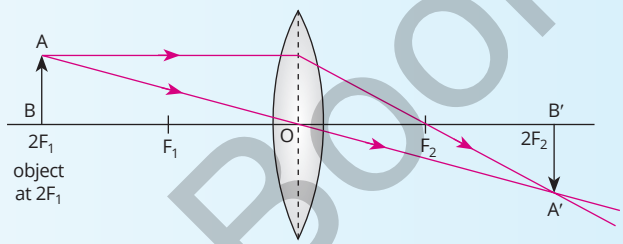
40. A ray of light is incident on a concave mirror. If it is parallel to the principal axis, the reflected ray will
a. pass through the focus.
b. pass through the centre of curvature.
c. pass through the pole.
d. retrace its path.

41. While carrying the starch test on leaf, it is essential to boil the leaf in a water bath with alcohol to
a. remove chlorophyll from the leaves.
b. remove starch from the leaf.
c. make the cell more permeable to iodine.
d. stop all chemical reactions in the cell.

42. The amount of water reabsorbed from nephric tubule depends upon
    a. the amount of soluble waste to be removed from blood.
    b. the amount of water present in blood.
    c. the length of the nephron.
    d. both (a) and (b).

43. A concave lens has a focal length of 20 cm. At what distance from the lens should the object be placed so that it forms an image at 15 cm from the lens?
    a. –30 cm b. –60 cm c. 60 cm d. 40 cm

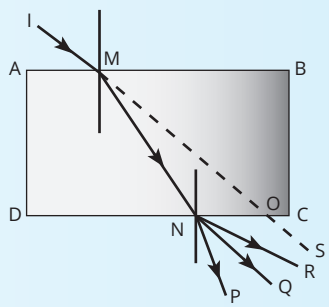
44. Look at the given ray diagram. An object is placed at $2F_1$. Read the following statements related to the characteristics of image thus formed.



    I. The image is real.
    II. The image is virtual.
    III. The image is inverted.
    IV. The image is of the same size as the object.

    Which one of the above statements is correct?
    a. Only I b. Only II
    c. I, II and III d. I, III and IV

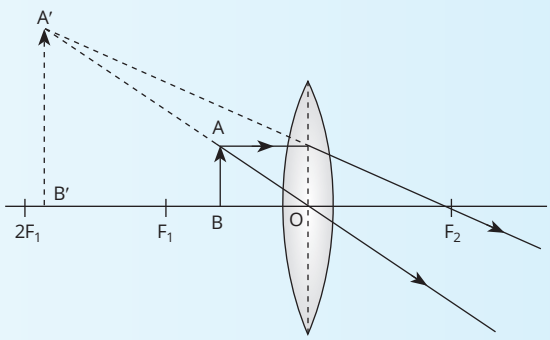
45. If a light ray IM is incident on the surface AB of a glass slab ABCD as shown in the given figure. Which one is the correct emergent ray?



    a. Ray NP b. Ray NQ
    c. Ray NR d. None of these

46. Amongst air, water, glass and diamond, the highest refractive index is of
    a. air. b. glass.
    c. diamond. d. water.

47. The lens shown alongside has a focal length of 10 cm. An object is placed at a distance of 5 cm from the lens. What would be the magnification of the image?



    a. 1 b. –1
    c. 2 d. –2

48. Match the items in column I with the items in column II.

Column I	Column II
1. Platinum	i. Poor conductor of heat
2. Sodium	ii. Used to make utensils
3. Lead	iii. Used to make jewellery
4. Aluminium	iv. Can be easily cut with a knife

    a. 1. - i., 2. - ii., 3. - iii., 4. - iv. b. 1. - iii., 2. - iv., 3. - i., 4. - ii.
    c. 1. - ii., 2. - iii., 3. - i., 4. - iv. d. 1. - iv., 2. - i., 3. - ii., 4. - iii.

SECTION – C

Section – C consists of three Cases followed by questions. There are a total of 12 questions in this section. Attempt any 10 questions from this section.

The first attempted 10 questions would be evaluated.

In a swimming pool, the *p*H of the water should ideally be 7.2. A *p*H range of 7.0 –7.6 is workable, however, any *p*H value above or below this range is undesirable. If the swimming pool water is too acidic, it causes burning sensation in the eyes and makes the skin dry and itchy. It also causes the corrosion of metal parts in the pool. In highly alkaline water, the swimmer experiences a similar discomfort. Thus, it is important to maintain the *p*H of swimming pool water.

49. *p*H refers to the
    a. logarithm of the hydrogen ion concentration of a solution.
    b. negative logarithm of the hydrogen ion concentration of a solution.
    c. logarithm of the hydroxyl ion concentration of a solution.
    d. negative logarithm of the hydroxyl ion concentration of a solution.

50. The *p*H of acidic, basic and neutral solutions vary on the *p*H scale from
    a. 0 to 7. b. 0 to 10. c. 0 to 14. d. 0 to 5.

51. In acid rain, the *p*H of rainwater is less than
    a. 12.5. b. 10.5. c. 8.3. d. 5.6.

52. What will be the *p*H of a solution which has equal concentrations of H^+ and OH^- ions?
    a. 5.6 b. 6.3 c. 7.0 d. 9.0

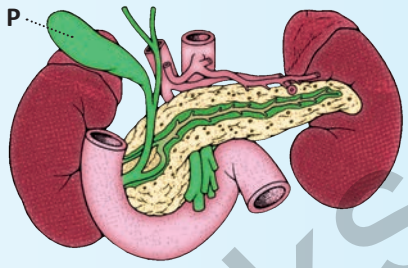
The gall bladder is a small sac-like organ located on the underside of the liver and is a part of biliary system. Rajeev's grandmother had stones in her gall bladder because of which it had to be removed. After the surgery, she has been put on a very simple diet including steamed food which consists of low fat.

53. Bile helps in fat digestion by converting
    a. fat to emulsified fat. b. emulsified fat to fatty acid.
    c. emulsified fat to glycerol. d. all of these

54. Acidic chime is converted to alkaline chime in duodenum through the action of
    a. rennin. b. trypsin.
    c. bile. d. lipase.

55. Emulsification is
    a. converting fat into fatty acid.
    b. breaking down of oil into smaller droplets.
    c. breaking down of fat into glycerol.
    d. breaking down of protein.

56. A person is found with some complications of organ 'P' as shown in the given figure. On examination, doctor found the reason.



Select the incorrect option from the following regarding the condition of the patient.

a. He is suffering from gall stones.
b. Gall stones are majorly made of magnesium.
c. He may be cured by surgery.
d. Gall stones may also obstruct his bile duct.

Focal length, usually given in mm, is the fundamental description of a camera lens. The focal length is not the actual length of the lens but the optimal distance of the lens from the point where light rays converge to form a sharp image of an object on the digital sensor or 35 mm film at the focal plane of the camera. The focal length of a lens is determined when the lens is focused at infinity. There are two types of lenses, prime and zoom. While the zoom lens allows the benefit of a range of focal lengths, prime lenses have fixed focal lengths and higher apertures, which is an advantage in certain conditions.

57. The maximum portion of the spherical surfaces from which refraction takes place is called the
a. focal length of the lens.
b. aperture of the lens.
c. focus of the lens.
d. optical centre of the lens.

58. Which lens is used in a camera?
a. Concave lens
b. Convex lens
c. Plano-concave lens
d. None of these

59. Where is the object placed to get an image from a camera?
a. Between infinity and 2F
b. At focus
c. At 2F
d. Between F and optical centre

60. Which type of image is formed by a photographic camera?
a. Small in size
b. Real
c. Inverted
d. All of these