Sample Paper 27

Class X 2026-27

Science (086)

Time: 3 Hours **Max. Marks: 80**

General Instructions:

1. This question paper consists of 39 questions in 3 sections. Section A is Biology, Section B is Chemistry and Section C is Physics.
2. All questions are compulsory. However, an internal choice is provided in some-questions. A student is expected to attempt only one of these questions.

SECTION-A

1. What are the two main chemical products of photosynthesis?
(a) Carbon dioxide and Water
(b) Glucose and Oxygen
(c) Starch and Water
(d) Oxygen and Carbon dioxide

2. A deficiency in the secretion of which hormone leads to diabetes mellitus, a condition characterized by high blood glucose levels?
(a) Thyroxine
(b) Adrenaline
(c) Growth Hormone
(d) Insulin

3. If a flatworm like Planaria is cut into multiple pieces, each piece has the ability to grow into a complete new organism. This form of asexual reproduction is called:
(a) Budding
(b) Fragmentation
(c) Regeneration
(d) Spore formation

4. How are hereditary traits transmitted from parents to their offspring?
(a) Through the mixing of blood.
(b) Through genes located on chromosomes.
(c) Through learned behaviours and skills.
(d) Through the nutritional status of the mother.

5. In a food chain, what is the role of animals that feed exclusively on plants?
(a) They are producers.
(b) They are primary consumers.
(c) They are secondary consumers.
(d) They are decomposers.

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6. Consider the following statements about the human respiratory tract:
(i) The trachea, or windpipe, connects the larynx to the bronchi.
(ii) The walls of the trachea are supported by cartilaginous rings that prevent it from collapsing.
(iii) The bronchi branch into smaller tubes called bronchioles, which terminate in alveoli.
(iv) The diaphragm is a large muscle that separates the chest cavity from the abdominal cavity.
Which of the above statements are correct?
(a) (i) and (iii) only
(b) (ii) and (iv) only
(c) (i), (ii), and (iv) only
(d) All are correct.

7. Which part of the human brain is responsible for controlling most of the body's vital involuntary functions, such as heartbeat, breathing, and blood pressure?
(a) Cerebrum
(b) Cerebellum
(c) Medulla
(d) Pons

8. **Assertion (A) :** The testes in human males are located in the scrotum, outside the main body cavity.
Reason (R) : Sperm production requires a temperature slightly lower than the core body temperature.
(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.

9. **Assertion (A) :** The forelimbs of a human and the wings of a bird are considered homologous organs.
Reason (R) : They have different basic structures but perform similar functions.
(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.

10. The blood circulatory system in humans is known as a 'double circulation' system. What does this term mean, and what is its primary advantage?

11. Student to attempt either option A or B.
A. What is the role of acid in our stomach? What would happen if it were not produced?

OR

B. Explain the process of water transportation in plants.

12. What is a food chain? In a four-level food chain, if the energy available at the producer level is 20,000 J, how much energy will be transferred to the tertiary consumer?

13. Name the three main regions of the human brain. Write one important function of the cerebellum.

14. A tall pea plant (TT) is crossed with a dwarf pea plant (tt).
(i) What will be the genotype and phenotype of the F1 generation?
(ii) If the F1 plants are self-pollinated, what will be the ratio of tall to dwarf plants in the F2 generation?

15. A person is having difficulty breathing. A doctor examines their respiratory system. The following questions.

A. What is the primary function of the alveoli in the lungs?

OR

B. Explain the mechanism of breathing in humans, detailing the roles of the rib muscles and diaphragm.

C. Why does the breathing rate increase during strenuous physical exercise?

16. Student to attempt either option A or B.

A. (i) How does Hydra reproduce asexually? Name and describe the process.
(ii) Draw a diagram illustrating this process.
(iii) Why is this method not suitable for complex multicellular organisms?

OR

B. (i) What is meant by ovulation?
(ii) What is the function of the fallopian tubes in the female reproductive system?
(iii) Describe the changes that take place in the uterus if fertilization does not occur.

SECTION-B

17. In the reaction $Zn + FeSO_4 \rightarrow ZnSO_4 + Fe$, which substance is oxidized?

(a) Fe (b) Zn
(c) $FeSO_4$ (d) $ZnSO_4$

18. Which of the following is not a characteristic property of a base?

(a) It feels soapy to the touch.
(b) It turns red litmus paper blue.
(c) It has a sour taste.
(d) It reacts with acids to form salt and water.

19. The property of malleability is most pronounced in which of the following metals?

(a) Iron (b) Aluminium
(c) Gold (d) Zinc

20. The functional group present in the compound Butanal is:

(a) –OH (Alcohol) (b) –COOH (Carboxylic Acid)
(c) –CHO (Aldehyde) (d) C=O (Ketone)

21. A white powder 'P' is used by doctors to set fractured bones. It should be stored in a moisture-proof container to prevent it from hardening. 'P' is chemically:

(a) Calcium Carbonate ($CaCO_3$)
(b) Calcium Sulphate dihydrate ($CaSO_4 \cdot 2H_2O$)
(c) Calcium Oxide (CaO)
(d) Calcium Sulphate hemihydrate ($CaSO_4 \cdot \frac{1}{2}H_2O$)

22. In the thermite reaction, which is used for welding railway tracks, iron(III) oxide is reacted with which highly reactive metal powder?

(a) Zinc (b) Copper
(c) Aluminium (d) Magnesium

23. The reaction of hydrogen gas with oxygen gas to form liquid water, $2H_2(g) + O_2(g) \rightarrow 2H_2O(l)$, is an example of a:

(a) Decomposition reaction
(b) Combination reaction
(c) Double displacement reaction
(d) Endothermic reaction

24. **Assertion (A) :** Propane burns with a clean, non-sooty flame.
Reason (R) : Propane is a saturated hydrocarbon, and the percentage of carbon is low, allowing for complete combustion.

(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.

25. Balance the following chemical equation and identify the type of reaction:

$$Fe(s) + H_2O(g) \rightarrow Fe_3O_4(s) + H_2(g)$$

26. Attempt either option A or B.

A. You are given three test tubes containing aqueous solutions of Zinc Sulphate, Copper Sulphate, and Iron Sulphate. You are also provided with pieces of zinc, copper, and iron metals. Describe a procedure to arrange these three metals in the correct order of decreasing reactivity.

OR

B. (i) What is corrosion?
(ii) Name the chemical substance that constitutes the coating formed on (a) Silver and (b) Copper articles when they corrode.

27. What are saturated and unsaturated hydrocarbons? How can you chemically distinguish between them using a laboratory test?

28. A student tests three unknown solutions A, B, and C with a universal indicator. Solution 'A' turns the indicator red, solution 'B' turns it blue, and solution 'C' turns it green.

(a) Arrange the solutions A, B, and C in the increasing order of their pH values.
(b) Which of these solutions would react with a magnesium ribbon to produce hydrogen gas?
(c) If a few drops of solution B are added to solution A, what change in the pH of solution A would you expect? Name the type of reaction occurring.

OR

(d) Give one common real-life example of a substance that could be solution A and one that could be solution (b).

29. Attempt either option A or B.

A. (a) Draw the electron-dot structure for a molecule of carbon dioxide (CO_2).
(b) What is the IUPAC name of the next homologue of propanol (C_3H_7OH)?
(c) Explain the formation of scum when soap is used to wash clothes in hard water.

OR

B. (a) What is an esterification reaction?
(b) Write a balanced chemical equation for the preparation of a sweet-smelling ester.
(c) State one important use of esters.
(d) How can an ester be converted back into its parent alcohol and carboxylic acid? Name the reaction and write the equation.

SECTION-C

30. A student is analyzing the types of images formed by a convex mirror and makes the following statements:
I. The image is always diminished.
II. The image is always virtual and erect.
III. The image is always formed behind the mirror, between the pole and the principal focus.
Choose from the following the correct option that lists the correct statements.
(a) I and II (b) I and III
(c) I, II and III (d) II and III

31. What is the cause of presbyopia in humans?
(a) Shortening of the eyeball
(b) Elongation of the eyeball
(c) Weakening of the ciliary muscles and reduced flexibility of the eye lens
(d) Change in the refractive index of the eye lens

32. **Assertion (A) :** The power of a convex lens is positive.
Reason (R) : A convex lens is a converging lens and its focal length is positive.
(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.

33. Describe image formation by convex lens when object is at infinity.
A. Where is image formed?
B. What is nature and size of image?
C. Draw the ray diagram.

34. Attempt either option A or B.
A. Suppose your parents have constructed a two room house and you want that in the living room there should be a provision of one electric bulb, one electric fan, a refrigerator and a plug point for appliances of power up to 2 kilowatt. Draw a circuit diagram showing electric fuse and earthing as safety devices.

OR

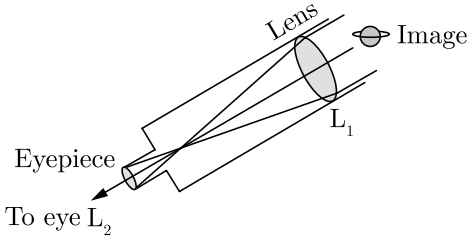
B. How much will an electric iron draw from a 220 V source if the resistance of its elements when hot is 55 ohms ? Calculate the wattage of the electric iron when it operates on 220 volts.

35. (i) Least distance of distinct vision of a long-sighted person is 40 cm. He wishes to reduce it to 25 cm by using spectacles. Find the power and nature of the lens used by him.
(ii) Draw a ray diagram to show the correction of the defect by using an appropriate lens.

36. (a) Write the mathematical expression for Joule's law of heating.
(b) Compute the heat generated while transferring 96000 coulomb of charge in two hours through a potential difference of 40 V.

37. A coil of insulated copper wire is connected to a galvanometer. What would happen if a bar magnet is :
(i) Pushed into the coil ?
(ii) Withdrawn from inside the coil ?
(iii) Held stationary inside the coil ?

38. Sumati wanted to see the stars of the night sky. She knows that she needs a telescope to see those distant stars. She finds out that the telescopes, which are made of lenses, are called refracting telescopes and the ones which are made of mirrors are called reflecting telescopes.



So, she decided to make a refracting telescope. She bought two lenses, L_1 and L_2, out of which L_1 was bigger and L_2 was smaller. The larger lens gathers and bends the light,while the smaller lens magnifies the image. Big, thick lenses are more powerful. So to see far away, she needed a big powerful lens. Unfortunately, she realised that a big lens is very heavy.

Heavy lenses are hard to make and difficult to hold in the right place. Also since the light is passing through the lens, the surface of the lens has to be extremely smooth. Any flaws in the lens will change the image. It would be like looking through a dirty window.

A. Based on the diagram shown, what kind of lenses would Sumati need to make the telescope?
B. What is the formula of magnification obtained with a lens?
   Attempt either subpart C or D.
C. Sumati did some preliminary experiment with the lenses and found out that the magnification of the eyepiece L_2 is 3. If in her experiment with L_2 she found an image at 24 cm from the lens, at what distance did she put the object?

OR

D. If the powers of the lenses L_1 and L_2 are in the ratio of 4 : 1, what would be the ratio of the focal length of L_1 and L_2?

39. Attempt either option A or B.

A. Although electric kettle and electric toaster were used simultaneously in the kitchen to prepare breakfast for the family, yet the two devices could work efficiently due to 'fuse' used in the electric circuit.





(i) What is a fuse? Write the material used in fuse wires. How is a fuse connected in an electric circuit?
(ii) State the ratings of fuse used in electric circuits.
(iii) What is the function of a fuse ? How does it perform its function ?
(iv) A device uses 1 kW electric power when operated at 220 V. Calculate the rating of the fuse to be used.

OR

B. (i) What do you mean by short-circuiting?
   (ii) Write some precautions in the use of electricity.

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