Sample Paper 06

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. In the human circulatory system, besides blood, there is another fluid called lymph. What is a key function of lymph?
(a) To transport oxygen from the lungs to the tissues.
(b) To carry digested fats and return fluid from tissues to the blood.
(c) To produce hormones for the endocrine system.
(d) To initiate the process of blood clotting at a wound.

2. Plants respond to environmental stimuli like gravity. The downward growth of roots and the upward growth of the shoot are known respectively as:
(a) Positive phototropism and negative phototropism
(b) Positive geotropism and negative geotropism
(c) Negative geotropism and positive geotropism
(d) Thigmotropism and hydrotropism

3. The onset of puberty in human females is marked by the development of secondary sexual characteristics. Which hormone is primarily responsible for these changes?
(a) Testosterone
(b) Insulin
(c) Adrenaline
(d) Oestrogen

4. The process by which characteristics or traits are passed on from parents to their offspring through genes is known as:
(a) Heredity
(b) Variation
(c) Evolution
(d) Adaptation

5. In a typical food chain, organisms are grouped into different trophic levels. The third trophic level is always occupied by:
(a) Producers
(b) Herbivores
(c) Carnivores
(d) Decomposers

Continue on next page.....

6. Consider the following statements describing the events of photosynthesis:
(i) The process is initiated by the absorption of light energy by chlorophyll molecules.
(ii) Light energy is converted into chemical energy.
(iii) Water molecules are split into hydrogen and oxygen.
(iv) Carbon dioxide is reduced by hydrogen to form proteins as the final product.
Which of the above statements are correct?
(a) (i) and (iv) only
(b) (ii), (iii), and (iv)
(c) (i), (ii), and (iii)
(d) All are correct.

7. The cerebrum is the largest and most prominent part of the human brain. What is its primary function?
(a) To control posture and balance.
(b) To regulate involuntary actions like heartbeat and breathing.
(c) To act as a relay center for sensory information.
(d) To be the center for intelligence, memory, and voluntary actions.

8. **Assertion (A) :** Cross-pollination leads to greater genetic variation in the offspring.
Reason (R) : Pollen grains are transferred between flowers of genetically different plants during cross-pollination.
(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 inner lining of the small intestine has numerous finger-like projections called villi.
Reason (R) : The villi decrease the internal surface area for the absorption of food.
(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. Despite being a single-celled organism without a dedicated mouth or digestive system, Amoeba exhibits a holozoic mode of nutrition. Justify this statement.

11. Student to attempt either option A or B.
A. Differentiate between breathing and respiration on the basis of
(i) energy release and
(ii) the nature of the process (physical/biochemical).

OR

B. What is transpiration? List any two external factors that can increase the rate of transpiration in plants.

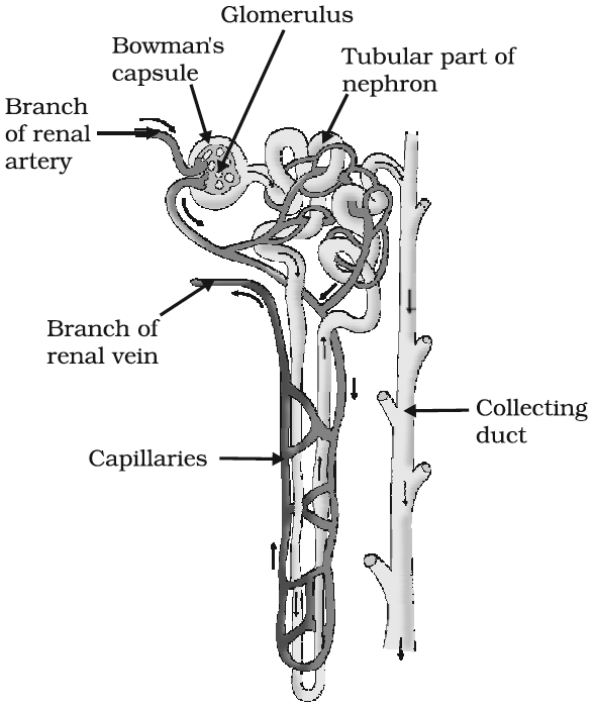
12. What is ozone, and how is it formed in the stratosphere? Explain why the depletion of the ozone layer is a major environmental concern.

13. What is a feedback mechanism in the endocrine system? Using the example of blood sugar regulation, explain how this mechanism controls the secretion of insulin.

Continue on next page.....

14. A pea plant with round yellow seeds (RRYY) was crossed with a plant having wrinkled green seeds (rryy).
(i) Write the genotype and phenotype of the F1 generation plants.
(ii) If the F1 plants are allowed to self-pollinate, list the four different types of gametes that would be produced.
(iii) What is this type of cross known as?

15. The diagram provided shows the structure of a nephron. the questions based on it.



A. Identify the part labelled as 'glomerulus' and 'Bowman's capsule'. What is the primary function occurring in this region?
B. What is selective reabsorption? Name two substances that are almost completely reabsorbed from the initial filtrate.
C. A person is suffering from complete kidney failure. Name the life-support procedure they would need to undergo regularly and briefly state its principle.

16. A. (i) Define fertilization. Differentiate it from pollination.
(ii) What is double fertilization in flowering plants?
(iii) After fertilization, which part of the flower develops into the (a) seed and (b) fruit?

OR

B. (i) What is the placenta? Describe its structure.
(ii) List any three functions of the placenta during the development of the embryo.
(iii) What is the gestation period in humans?

Continue on next page.....

SECTION-B

17. For the Haber's process shown, identify the correct values for 'p' and 'q' and the substance that acts as the reducing agent.

Equation: $pN_2(g) + qH_2(g) \rightleftharpoons 2NH_3(g)$

(a) p = 1, q = 3; Reducing agent is N_2
(b) p = 1, q = 3; Reducing agent is H_2
(c) p = 1, q = 2; Reducing agent is N_2
(d) p = 3, q = 1; Reducing agent is H_2

18. Which of the following common chemical compounds does not contain water of crystallisation?

(a) Blue Vitriol ($CuSO_4 \cdot 5H_2O$)
(b) Gypsum ($CaSO_4 \cdot 2H_2O$)
(c) Washing Soda ($Na_2CO_3 \cdot 10H_2O$)
(d) Baking Soda ($NaHCO_3$)

19. Although non-metals are typically poor conductors of electricity, one of its forms is an exception and is used to make electrodes. Identify this exception.

(a) Diamond
(b) Graphite
(c) Sulphur
(d) Phosphorus

20. A person stung by an ant feels a sharp, burning pain. This is due to the injection of methanoic acid. Applying a solution of baking soda gives relief because:

(a) it is a strong acid that overpowers the methanoic acid.
(b) it is a mild base that neutralizes the methanoic acid.
(c) it is a neutral salt that washes away the acid.
(d) it has a cooling effect on the skin.

21. Four solutions labelled A, B, C, and D have pH values of 4, 6, 8, and 10, respectively. Which solution contains the highest concentration of hydrogen ions (H^+)?

(a) Solution A
(b) Solution B
(c) Solution C
(d) Solution D

22. Based on the reactivity series of metals, which one of the following reactions will not occur?

(a) $Zn(s) + CuSO_4(aq) \rightarrow ZnSO_4(aq) + Cu(s)$
(b) $Fe(s) + ZnSO_4(aq) \rightarrow FeSO_4(aq) + Zn(s)$
(c) $Mg(s) + FeSO_4(aq) \rightarrow MgSO_4(aq) + Fe(s)$
(d) $Zn(s) + FeSO_4(aq) \rightarrow ZnSO_4(aq) + Fe(s)$

23. When a fresh apple is cut, the exposed surface turns brown after some time. This is a type of:

(a) physical change.
(b) neutralization reaction.
(c) anaerobic respiration.
(d) oxidation reaction.

24. **Assertion (A) :** Butan-1-ol and Butan-2-ol exhibit similar chemical properties.
Reason (R) : They belong to the same homologous series of alcohols and possess the same functional group (–OH).

(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. Answer the following based on the properties of metals:

(a) Bells used in temples and schools are always made of metal alloys. Which characteristic property of metals is utilized here?

(b) Name any two metals that are exceptions to the general property of hardness and can be easily cut with a knife.

26. Attempt either option A or B.

(a) Metal oxides are formed when metals react with oxygen. Their chemical nature can vary.

(i) Give an example of a metal oxide that is basic.

(ii) Give an example of a metal oxide that shows amphoteric behaviour.

(iii) Write a balanced chemical equation to show the reaction of an amphoteric oxide (e.g., zinc oxide) with a strong acid (e.g., HCl).

OR

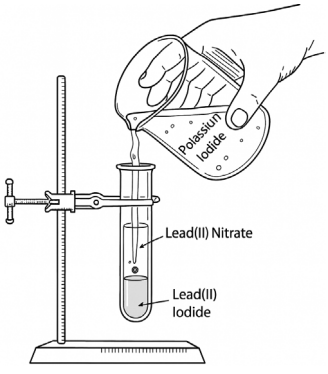
(b) The way metals react with water depends on their chemical reactivity.

(i) Name one metal that reacts violently with cold water, producing a flame.

(ii) Name a metal that does not react with cold or hot water but reacts only with steam.

(iii) Write the balanced chemical equation for the reaction of iron with steam.

27. A student performs an experiment by mixing aqueous solutions of lead(II) nitrate and potassium iodide in a test tube.



(a) What is the immediate visual observation upon mixing the two solutions?

(b) Identify the insoluble product formed by name and chemical formula.

(c) Write a balanced chemical equation for this reaction and classify the type of reaction.

28. Salts can be neutral, acidic, or basic depending on the strength of the acid and base from which they are formed. A student is given solutions of three salts: Potassium Sulphate (K_2SO_4), Zinc Chloride ($ZnCl_2$), and Potassium Acetate (CH_3COOK).

(a) Identify the parent acid and base for Potassium Sulphate. What will be the nature of its aqueous solution?

(b) Which of the three salts will form a basic solution? Justify your answer.

(c) What colour change would be observed if blue litmus solution is added to the aqueous solution of Zinc Chloride? Explain why.

OR

Fresh milk has a pH of around 6.5. When it is left to stand for a few hours, especially in summer, it turns sour and its pH value changes.

(a) When milk turns sour to form curd, does its pH value increase or decrease?

(b) Explain the chemical process responsible for this change in pH.

(c) A milkman adds a very small quantity of baking soda to fresh milk. Why does this delay the souring of milk?

29. Attempt either option A or B.

(A) Hydrocarbons can be saturated or unsaturated. This difference in their structure leads to different chemical reactivities.

(a) What are hydrocarbons?

(b) Classify the following into alkanes, alkenes, and alkynes: $C_3H_8, C_4H_6, C_2H_4, C_5H_{12}$.

(c) Describe a chemical test that can be used to distinguish between a sample of a saturated hydrocarbon (e.g., hexane) and an unsaturated hydrocarbon (e.g., hexene).

(d) Write the chemical equation for the reaction involved in the test described in part (c) using hexene (C_6H_{12}).

(e) Draw the electron dot structure for the simplest alkyne, ethyne (C_2H_2).

OR

(B) Ethanoic acid (CH_3COOH), commonly known as acetic acid, is a versatile organic compound.

(a) Explain why ethanoic acid is considered a weak acid.

(b) What is esterification? Write the chemical equation for the reaction of ethanoic acid with ethanol, and name the main product.

(c) Write a balanced chemical equation for the reaction of ethanoic acid with sodium hydroxide.

(d) Pure, water-free ethanoic acid is called glacial acetic aci(d) Explain the reason behind this name.

(e) What is vinegar, and what is it primarily used for?

SECTION-C

30. While describing the image formation by a convex lens, a student noted the following:

I. When the object is placed at $2F_1$, the image is formed at $2F_2$ and is the same size.

II. When the object is placed between F_1 and $2F_1$, the image is real, inverted, and magnified.

III. When the object is placed at F_1, the image is formed at infinity.

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. A student observes that a parallel beam of light is focused to a single point after passing through a lens. Which of the following lens types and optical phenomena would explain this observation?

(a) Concave lens, Refraction (b) Convex lens, Reflection

(c) Concave lens, Reflection (d) Convex lens, Refraction

32. **Assertion (A) :** A person uses a concave lens to correct hypermetropia.

Reason (R) : A concave lens increases the focal length of the eye lens, allowing the image of nearby objects to be formed on the retina.

(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. A convex mirror has a focal length of 15 cm.

A. Where will the image form if an object is placed 10 cm away?

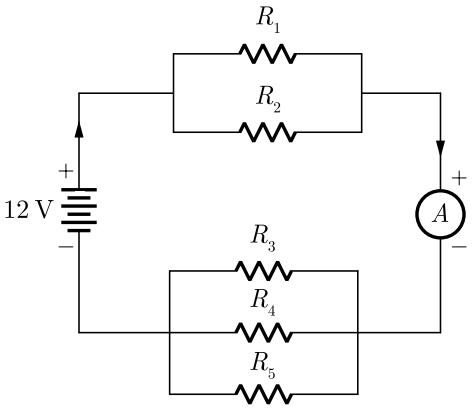
B. State the size and nature of the image formed.

C. Explain why convex mirrors are preferred in vehicles.

Continue on next page.....

34. Attempt either option A or B

A If in figure A, $R_1 = 10\,\Omega$, $R_2 = 40\,\Omega$, $R_3 = 30\,\Omega$, $R_4 = 20\,\Omega$, $R_5 = 60\,\Omega$ and a 12 V battery are connected to the arrangement, calculate :



(a) Total resistance in the circuit and

(b) Total current flowing in the circuit.

OR

B. A torch bulb is rated 5.0 V and 500 mA. Calculate

(i) its power,

(ii) resistance when it is lighted for four hours.

35. What are the causes of the following defects of vision and how can they be corrected ?

(a) Cataract

(b) Presbyopia.

36. An electric iron consumes energy at a rate of 840 W when heating is at the maximum rate and 360 W when the heating is at the minimum. The voltage is 220 V. What are the current and the resistance in each case ?

37. Answer the following questions :

(i) What is the direction of magnetic field lines outside a bar-magnet ?

(ii) The magnetic field lines in a given region are getting crowded. What does it indicate ?

(iii) State one advantage of AC over DC.

38. A hand-held magnifying glass uses a single convex lens. When a small object is placed between the lens and its principal focus, the lens forms an enlarged, upright image that appears on the same side as the object. This helps in reading fine print and observing small details in specimens. The magnification depends on the focal length of the lens and how close the object is kept to it.

A. Which lens is used as a magnifying glass and why?

B. State the nature of the image obtained when the object is kept between the optical centre and the focus of this lens.

Attempt either subpart C or D.

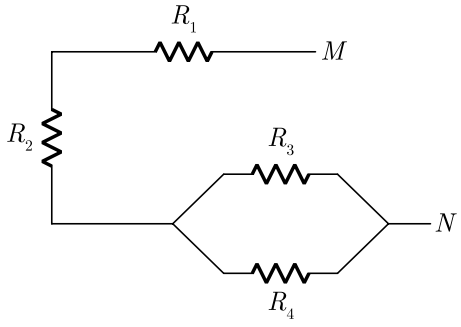
C. A convex lens has focal length $f = +\,12\text{cm}$. An object is placed $u = -\,8\text{cm}$ from the lens. Calculate the image distance v.

OR

D. For the same situation, find the magnification and comment on the image size.

39. Attempt either option A or B

A. (i) For the combination of resistors shown in the following figure, find the equivalent resistance between M and N:



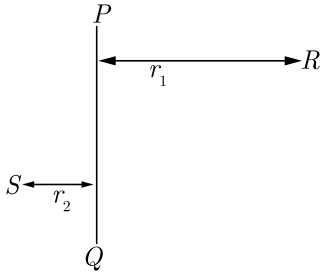
(ii) State Joule's law of heating.

(iii) Why we need a 5A fuse for an electric iron which consumes 1 kW power at 220 V?

(iv) Why is it impracticable to connect an electric bulb and an electric heater in series?

OR

B. PQ is a current carrying conductor in the plane of the paper as shown in the figure below.



(i) Find the directions of the magnetic fields produced by it at points R and S? Given $r_1 > r_2$, where will the strength of the magnetic field be larger? Give reasons.

(ii) Field strength at which point will be greater?

(iii) If the polarity of the battery connected to the wire is reversed, how would the direction of the magnetic field be changed?

(iv) Explain the rule that is used to find the direction of the magnetic field for a straight current carrying conductor.

****