Sample Paper 12

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. Bile juice is secreted by the liver and stored in the gall bladder. What is its primary function in the process of digestion?
(a) To digest carbohydrates into simple sugars.
(b) To make the medium in the small intestine acidic.
(c) To emulsify large fat globules into smaller droplets.
(d) To break down proteins into amino acids.

2. The growth of a pollen tube from the stigma towards the ovule inside the carpel is an example of which type of plant movement?
(a) Geotropism
(b) Phototropism
(c) Hydrotropism
(d) Chemotropism

3. The female reproductive part of a flower is the pistil (or carpel). Which three parts make up the pistil?
(a) Anther, Stamen, and Pollen
(b) Stigma, Style, and Ovary
(c) Sepal, Petal, and Thalamus
(d) Filament, Ovule, and Pollen tube

4. In humans, sex is determined by a specific pair of chromosomes. What is the chromosomal composition of a normal male and a normal female, respectively?
(a) XY and XX
(b) XX and XY
(c) XX and YY
(d) XY and XO

5. What does the 10% law of energy transfer in an ecosystem state?
(a) That organisms use 90% of their energy for reproduction.
(b) That only 10% of the energy from one trophic level is incorporated into the next level.
(c) That 10% of all organisms in one trophic level are eaten by the next.
(d) That plants only capture 10% of the sun's total energy.

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6. Consider the following statements about the components of human blood :
(i) Red blood cells contain haemoglobin and are responsible for oxygen transport.
(ii) White blood cells are the body's primary defense against infectious diseases.
(iii) Plasma is the solid, red-coloured component of blood.
(iv) Platelets are cell fragments that play a crucial role in blood clotting.
Which of the above statements are correct?
(a) (i), (ii), and (iv)
(b) (ii) and (iv) only
(c) (i) and (iii) only
(d) All are correct.

7. What is the name for the basic structural and functional unit of the nervous system, which is specialized to transmit nerve impulses?
(a) Nephron
(b) Neuron
(c) Alveolus
(d) Villus

8. **Assertion (A) :** Skills like swimming or learning a musical instrument, acquired during a person's life, cannot be passed on to their children
Reason (R) : Acquired traits do not cause any change in the DNA of the reproductive cells (gametes).
(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 use of disposable plastic items is generally discouraged for environmental reasons.
Reason (R) : Paper is a biodegradable material, whereas plastic is non-biodegradable.
(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 characteristic 'lub-dub' sound of a heartbeat is produced by the heart muscle itself. Which mechanical events within the cardiac cycle are responsible for producing these two sounds?

11. Student to attempt either option A or B
A. What is translocation in plants? Why is it an essential process?

OR

B. List the main components of the initial filtrate that enters the Bowman's capsule during ultrafiltration in the nephron.

12. How can the increasing demand for energy negatively impact our environment? Give two examples.

13. What is a synapse? Explain how a nerve impulse is transmitted across a synapse between two neurons.

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14. A man with blood group A marries a woman with blood group B. Their first child has blood group O.
(i) What are the genotypes of the parents?
(ii) What are the other possible blood groups of their future offspring? Show with a cross.
(iii) Can any of their children have blood group AB?

15. A student is studying the transport systems in plants. the following questions based on this topic.
A. Differentiate between the ascent of sap and translocation.

OR

B. Explain why the transport of materials in the xylem is unidirectional, while in the phloem it is bidirectional.
C. What role does the cohesive and adhesive properties of water play in the ascent of sap?

16. A. (i) What is meant by vegetative propagation? Give two examples of plants grown using this method.
(ii) Describe the process of growing a new rose plant using the technique of 'cutting'.
(iii) State two benefits for a gardener using this method.

OR

B. (i) What is the role of the testes and ovaries in the human reproductive system, besides gamete production?
(ii) Where in the human female reproductive system do the following events take place : (a) Fertilization, (b) Implantation?
(iii) What is the function of the fluid secreted by the seminal vesicles and prostate gland in males?

SECTION-B

17. Which of the following is a thermal decomposition reaction that is also a redox reaction?
(a) $CaCO_3(s) \xrightarrow{\text{Heat}} CaO(s) + CO_2(g)$
(b) $2Pb(NO_3)_2(s) \xrightarrow{\text{Heat}} 2PbO(s) + 4NO_2(g) + O_2(g)$
(c) $2H_2O(l) \xrightarrow{\text{Electrolysis}} 2H_2(g) + O_2(g)$
(d) $2AgCl(s) \xrightarrow{\text{Sunlight}} 2Ag(s) + Cl_2(g)$

18. A metal oxide reacts with both dilute sulphuric acid and aqueous potassium hydroxide to form salt and water. Which of the following metals could be present in the metal oxide?
(i) Sodium
(ii) Zinc
(iii) Copper
(iv) Aluminium
(a) (i) and (iii)
(b) (ii) and (iv)
(c) (i) and (iv)
(d) (ii) and (iii)

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19. A student places a strip of zinc metal in an aqueous solution of copper(II) sulphate and another strip in an aqueous solution of iron(II) sulphate. A visible reaction occurs in :
(a) Both solutions.
(b) The copper(II) sulphate solution only.
(c) The iron(II) sulphate solution only.
(d) Neither of the solutions.

20. A few drops of a solution 'X' turn blue litmus red, and a few drops of a solution 'Y' turn red litmus blue. What would be the colour change if a blue litmus paper is dipped in solution 'Y'?
(a) It turns red.
(b) It turns colourless.
(c) No colour change.
(d) It turns green.

21. Which of the following options has the substances arranged in the increasing order of their pH values?
(a) Gastric juice, Milk of Magnesia, Sodium hydroxide solution
(b) Milk of Magnesia, Gastric juice, Sodium hydroxide solution
(c) Gastric juice, Sodium hydroxide solution, Milk of Magnesia
(d) Sodium hydroxide solution, Milk of Magnesia, Gastric juice

22. When dilute hydrochloric acid is added to solid sodium carbonate, a brisk effervescence is observed. This is due to the evolution of :
(a) Hydrogen gas
(b) Oxygen gas
(c) Carbon dioxide gas
(d) Chlorine gas

23. When an aqueous solution of potassium iodide is added to an aqueous solution of lead(II) nitrate, what is observed?
(a) A white precipitate is formed.
(b) The solution turns red.
(c) A yellow precipitate is formed.
(d) A clear solution is formed.

24. **Assertion (A) :** Soaps are not effective cleaning agents in hard water.
Reason (R) : Soaps form insoluble precipitates (scum) with the calcium and magnesium ions present in hard water.
(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 questions based on the properties of metals.
(a) Name the property of metals that allows them to be drawn into thin wires. Give an example of a metal that is highly ductile.
(b) What is meant by sonority? Why are school bells made of metals and not wood?

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26. Attempt either option A or B.

(A) Differentiate between roasting and calcination used in metallurgy. Give one balanced chemical equation for each.

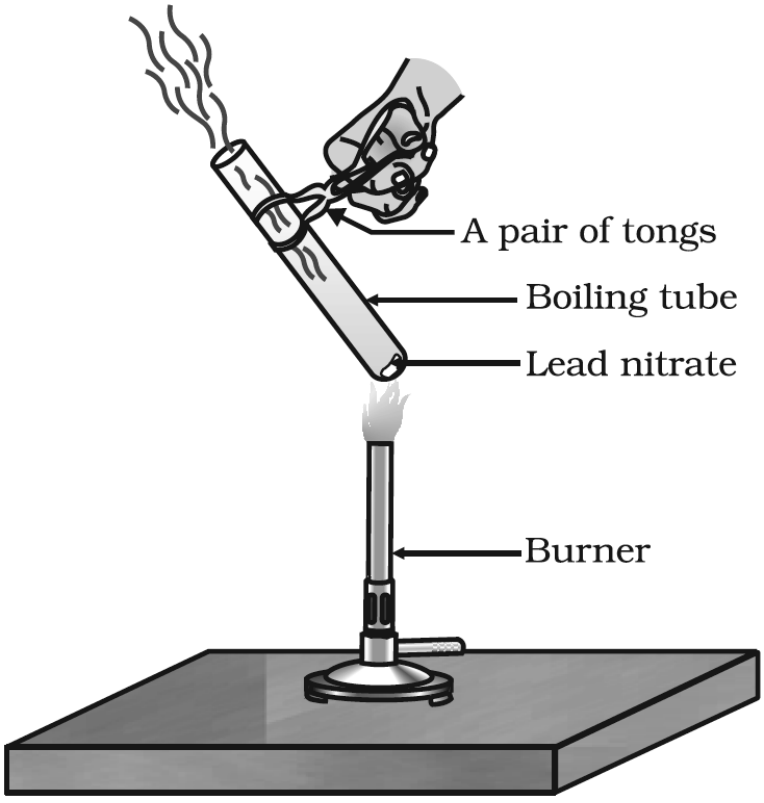
OR

(B) (i) What is an alloy?

(ii) Why is stainless steel preferred over pure iron for making cooking utensils?

(iii) Name the constituents of the alloy solder.

27. A student gently heats a small amount of lead nitrate powder in a dry test tube.



(a) What two observations will the student make during the experiment?

(b) Name the type of chemical reaction taking place.

(c) Write a balanced chemical equation for the reaction.

28. A student took 2 mL of a colourless liquid 'X' (a common household cleaner) in a test tube and added a few drops of phenolphthalein. The solution turned deep pink. He then started adding another colourless liquid 'Y' (used as a food preservative) drop by drop. After adding 30 drops, the pink colour disappeared.

(a) What is the nature (acidic/basic) of liquid 'X' and liquid 'Y'? Justify your answer.

(b) Name the type of reaction occurring between X and Y. Write a general equation for this type of reaction.

(c) If liquid 'X' is aqueous sodium hydroxide and liquid 'Y' is acetic acid (CH_3COOH), write the balanced chemical equation for the reaction. What is the chemical name of the salt formed?

OR

(c) If the student used a more concentrated solution of liquid 'Y', would he need more, less, or the same number of drops to make the solution colourless? Justify your answer.

29. Attempt either option A or B.

(A) An organic compound 'A' with the molecular formula $C_2H_4O_2$ gives a brisk effervescence with sodium hydrogencarbonate solution.

(a) Identify the compound 'A' and name its functional group.

(b) Write the chemical equation for the reaction of 'A' with sodium hydrogencarbonate.

(c) Draw the electron-dot structure of compound 'A'. (Reference : NCERT Class 10 Chemistry Textbook (2025-26), Page 62)

(d) What happens when 'A' is heated with ethanol in the presence of a few drops of concentrated sulphuric acid? Name the reaction and write the chemical equation involve (d)

OR

(B) The electronic configurations of two elements, X and Y, are (2, 6) and (2, 8, 1) respectively.

(a) What type of bond will be formed between X and Y? Show the formation of the bond using electron-dot structures.

(b) Write the chemical formula of the compound forme(d)

(c) Why do compounds of this type generally have high melting points and are good conductors of electricity in their molten state?

SECTION-C

30. A student is analyzing the mirror formula and sign conventions and makes the following statements:

I. For a convex mirror, the focal length is always positive.

II. For a concave mirror, the focal length is always negative.

III. The mirror formula is applicable only for plane mirrors.

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. Why does the sky appear white during midday?

(a) The scattering of all colors is at its maximum.

(b) There is no scattering of light at midday.

(c) Light travels a shorter path, so all colors are scattered almost equally.

(d) The sun emits more white light at midday.

32. **Assertion (A) :** The refractive index of a medium is defined as the ratio of the speed of light in vacuum to the speed of light in that medium.

Reason (R) : A higher refractive index of a medium means that the speed of light in that medium is higher.

(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. An object is placed 10 cm from a convex mirror of focal length 15 cm.

A. Calculate the image position using mirror formula.

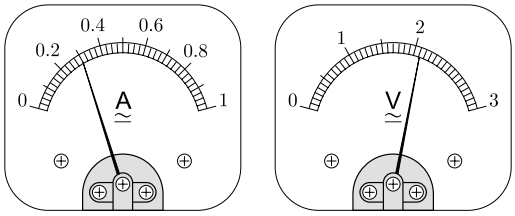
B. State the nature of the image formed.

C. Explain why convex mirrors always form virtual images.

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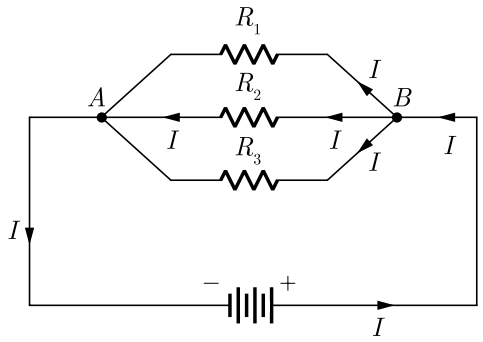
34. Attempt either option A or B.

A. The current flowing through a resistor connected in an electrical circuit and the potential difference developed across its ends are shown in the given ammeter and voltmeter. Find the least count of the voltmeter and ammeter. What is the voltage and the current across the given resistor?



OR

B. In the given circuit diagram suppose the resistors R_1, R_2 and R_3 have the values $5\,\Omega$, $10\,\Omega$, $30\,\Omega$ respectively, which have been connected to a battery of 12 volt. Calculate



(a) The current through each resistor,

(b) The total current in the circuit and

35. The apparent altitude of stars appears to be generally more than their true altitudes. Explain, how.

36. Calculate the total cost of running the following electrical devices in the month of September, if the rate of 1 unit of electricity is ` 6.00.

(i) Electric heater of 1000 W for 5 hours daily.

(ii) Electric refrigerator of 400 W for 10 hours daily.

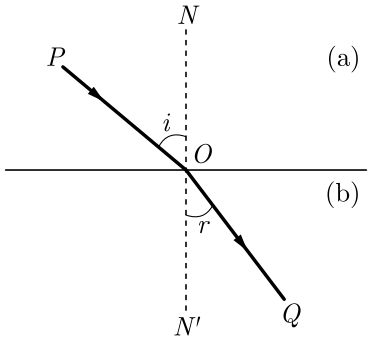
37. A student observes that during sunrise and sunset the Sun appears reddish.

(i) Explain if the observation is correct.

(ii) Give the reason.

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38. When light ray goes from one transparent medium to another transparent medium, it suffers a change in direction, into second medium. The extent of the change in direction suffered by the phenomenon of change in the path of light rays when going from one medium to another medium is known as refraction. Ray is a given pair of media can be expressed in terms of refractive index. The refractive index is related to an important physical quantity in the relative speed of light in different media.



(i) When light goes from one medium to another, which of the three parameters, frequency, wavelength, velocity change ?

(ii) A ray of light enters into the glass from air. Does it bend towards normal ?
Attempt either subpart C or D.

(iii) Light enters from air to glass having refractive index 1.50. What is the speed of light in the glass? The speed of light in vacuum is $3 \times 10^8\,\text{ms}^{-1}$.

OR

(iv) What is the unit of refractive index ?

39. Attempt either option A or B.

A. (i) Consider a conductor of resistance R, length L, thickness d and resistivity ρ. Now this conductor is cut into four equal parts. What will be the new resistivity of each of these parts? Why?

(ii) Find the resistance if all of these parts are connected in:

(a) Parallel

(b) Series

(iii) Out of the combinations of resistors mentioned above in the previous part, for a given voltage which combination will consume more power and why?

OR

B. Derive an expression for equivalent resistance when two resistors of resistance R_1 and R_2 are connected in parallel.

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