



PRINCE ACADEMY

OF HIGHER EDUCATION

[Co-edu. Sr. Sec. School, Affiliated to CBSE, Affiliation No. - 1730387]

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SAMPLE PAPER - II (2025-26)

CLASS : X

Time : 03 Hour

SCIENCE (086)

MM : 80

General Instructions:

(i) This question paper consists of 39 questions in 3 sections. Section A is Biology, Section B is Chemistry and Section C is Physics.

(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.

SECTION - A (BIOLOGY)

- 01.** In a plant, water continues to rise even when transpiration is very low at night. Which force is mainly responsible? 1
(a) Transpiration pull (b) Root pressure
(c) Capillarity (d) Diffusion pressure deficit
- 02.** Which event ensures variation during sexual reproduction in humans? 1
(a) Mitosis
(b) Budding
(c) Meiosis
(d) Formation of gametes by binary fission
- 03.** In human reproduction, why does the uterus lining thicken every month? 1
(a) To help in digestion of the embryo
(b) To provide a nutrient-rich environment in case fertilization occurs
(c) To increase uterine temperature
(d) To protect the ovaries
- 04.** If the population of carnivores suddenly increases in a forest ecosystem, what will happen FIRST? 1
(a) Increase in producers (b) Increase in herbivores
(c) Decrease in herbivores (d) Decrease in decomposers
- 05.** A child has blood group O but both parents have blood group A. What must be true? 1
(a) Both parents have genotype $I^A I^A$
(b) Both parents have genotype $I^A i$
(c) One parent is $I^A i$ and the other is $I^B i$
(d) Both parents are $I^A I^B$
- 06.** In which of the following situations will the rate of transpiration be maximum? 1
(a) High humidity, low temperature (b) Low humidity, high temperature
(c) Low humidity, low temperature (d) High humidity, high temperature
- 07.** Which of the following BEST explains, why oxygen diffuses from alveoli to blood? 1
(a) Higher O_2 concentration in blood (b) Higher O_2 concentration in alveoli
(c) Higher CO_2 concentration in alveoli (d) Blood flows faster in alveoli

The following question consist of two statements. Assertion (A) and Reason (R). Answer the question by 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.

- 08. Assertion (A) :** Plant growth toward light is called phototropism. 1
Reason (R) : Light causes auxin to accumulate more on the darker side of the stem.
- 09. Assertion (A) :** Urea is the main nitrogenous waste in humans. 1
Reason (R) : Urea is formed in the kidneys.
- 10.** If bile juice contains no digestive enzymes, then why is it essential for digestion? Justify your answer. 2
- 11. (A)** If gibberellins were not present in a plant, what effect would you expect on stem growth and seed germination? 2

OR

(B) How can abscisic acid (ABA) help plants survive in drought conditions?

- 12.** Why is sexual reproduction considered superior to asexual reproduction in terms of population survival? 2
- 13.** Why do siblings not look identical even though they have the same parents? Explain with the help of example or linear chart. 3
- 14.** What is biological magnification? Explain how it affects organisms at higher trophic levels. 3
- 15.** Ankita started feeling changes in her body and also observed similar changes taking place in all the girls of her class. She is curious to know about it. Her mother explained that changes are seen both in boys and girls. But in girls, the changes are more important as they become mothers to babies and the baby is carried in mother's body for a long period and will be breast fed later.
Answer the following questions on the basis of your knowledge of abstract. 1+1+2=4
- (a) What is menstruation?
 - (b) What are some of the changes that are seen in girls but not in boys?
 - (c) Draw a diagram of human female reproductive system and mark where the baby is carried in mother's womb for a long time.

OR

(c) Ankita also wants to know, how does embryo get nutrition from mother's blood? Help her to know the answer.

- 16.** (a) Mention any two components of blood. 1+1+1+2=5
(b) Trace the movement of oxygenated blood in the body.
(c) Write the function of valves present in between atria and ventricles.
(d) Write one structural difference between the composition of artery and veins.

OR

Give reasons:

- (a) Ventricles have thicker muscular walls than atria.
- (b) The transport system in plants is slow.
- (c) Circulation of blood in aquatic vertebrates differs from that in terrestrial vertebrates.
- (d) During the daytime, water and minerals travel faster through the xylem as compared to the night.

SECTION-B
(CHEMISTRY)

17. Which of the following is a balanced equation? 1
(a) $\text{H}_2 + \text{O}_2 \rightarrow \text{H}_2\text{O}$ (b) $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$
(c) $\text{Na} + \text{Cl}_2 \rightarrow \text{NaCl}$ (d) $\text{Fe} + \text{O}_2 \rightarrow \text{FeO}$
18. Rusting of iron is an example of: 1
(a) Reduction (b) Oxidation
(c) Neutralization (d) Decomposition
19. Which acid is found in vinegar? 1
(a) Acetic acid (b) Sulphuric acid
(c) Nitric acid (d) Citric acid
20. Which of the following is a basic oxide? 1
(a) CO_2 (b) SO_2 (c) MgO (d) N_2O
21. Which of the following equations represent redox reactions and what are the values for 'p' and 'q' in these equations? 1
Equation 1 : $\text{Fe}_2\text{O}_3(\text{s}) + 2\text{Al}(\text{s}) \rightarrow \text{Al}_2\text{O}_3(\text{s}) + p \text{Fe}(\text{l}) + \text{heat}$
Equation 2 : $2\text{C}_4\text{H}_{10}(\text{g}) + 13\text{O}_2(\text{g}) \rightarrow 8\text{CO}_2(\text{g}) + q \text{H}_2\text{O}(\text{g})$
(a) Only equation 1 is a redox reaction, $p = 1$ and $q = 3$
(b) Both equations 1 and 2 are redox reactions, $p = 2$ and $q = 4$
(c) Only equation 2 is a redox reaction, $p = 2$ and $q = 10$
(d) Both equations 1 and 2 are redox reactions, $p = 2$ and $q = 10$
22. Which of the following substances when dissolved in equal volume of water, will have the highest pH value? 1
(a) Sulphuric acid (b) Acetic acid
(c) Magnesium hydroxide (d) Sodium hydroxide
23. C_3H_8 belongs to the homologous series of 1
(a) Alkynes (b) Alkenes
(c) Alkanes (d) Cyclo alkanes

The following two questions consist of two statements. Assertion (A) and Reason (R). Answer these questions by 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.
24. **Assertion (A) :** If the first member of a homologous series is methanal, its third member will be propanal. 1
Reason (R) : All the members of a homologous series show similar chemical properties.

- 25.** State reasons for the following 2
- (A) Zinc oxide is an amphoteric oxide
(B) In the reaction of nitric acid with metals, generally hydrogen gas is not evolved.
- 26.** An organic compound 'A' having molecular formula $C_2H_4O_2$ reacts with sodium metal and evolves a gas 'B' which readily catches fire. 'A' also reacts with ethanol in the presence of concentrated sulphuric acid to form sweet smelling substance 'C' used in the making perfumes. 3
- (a) Identify A, B and C
(b) Write balanced chemical equations to represent the
(1) evolution of gas B from compound A
(2) Conversion of compound A into compound C.
- 27.** What is an oxidation reaction? Identify the substance which gets oxidised, the substance which gets reduced, the oxidising agent and the reducing agent in the following reaction; 3
- $$MnO_2 + 4HCl \rightarrow MnCl_2 + 2H_2O + Cl_2$$
- 28.** Large scale preparation of sodium hydroxide is done by the electrolysis of brine solution. Brine is highly concentrated solution of sodium chloride. Electricity causes decomposition of sodium chloride resulting in the formation of sodium hydroxide along with some industrially important gases. 4
- Answer the following questions using this information.
- (A) What is the name of the process given in paragraph?
(B) What are the by-product gases of this process?
(C) Sodium hydroxide is also called _____?
(D) Write any two uses of sodium hydroxide.
- 29.** Attempt either option A Or B. 5
- (A)** (i) Write the name and structure of an organic compound X having two carbon atoms in its molecule and its name is suffixed with "ol".
(ii) What happens when X is heated with excess concentrated sulphuric acid at 443k? Write chemical equation for the reaction stating the conditions for the reaction. Also state the role played by concentrated sulphuric acid in the reaction.
(iii) Name and draw the electron dot structure of hydrocarbon produced in the above reaction.

OR

- (B)** (i) Carryout the following conversions giving complete conditions for the reaction to take place in each case:
- (a) Ethanoic acid from Ethanol
(b) Ethane from Ethene
(c) Ester from Ethanoic acid and Ethanol
- Also, state the names given to all the above conversions.
- (ii) Detergents are preferred over soaps. Why? Give reasons.

SECTION - C
(PHYSICS)

30. When light is incident on a glass slab, the incident ray, refracted ray and the emergent ray are in three media, A, B and C. If n_1 , n_2 and n_3 are the refractive indices of A, B and C respectively and the emergent ray is parallel to the incident ray, which of the following is true? 1

- (a) $n_1 < n_2 < n_3$ (b) $n_1 > n_2 > n_3$ (c) $n_1 < n_2 = n_3$ (d) $n_1 = n_3 < n_2$

31. Select the correct statement from the following. 1

- (a) The size of the molecules of air is larger than the wavelength of visible light.
 (b) The blue light has a wavelength about 1.8 times greater than that of red light.
 (c) When sunlight passes through the fine particles in air, they scatter the blue colour of visible light more strongly than red.
 (d) The light of red colour is scattered the most by fog or smoke.

The following question consist of two statements. Assertion (A) and Reason (R).

Answer the question by 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.
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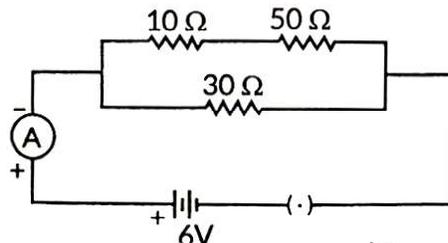
32. Assertion (A) : A concave lens of very short focal length causes higher divergence than one with longer focal length. 1

Reason (R) : The power of a lens is directly proportional to its focal length.

33. A real image $\frac{2}{3}$ rd of the size of an object is formed by a convex lens when the object is at a distance of 12 cm from it. Find the focal length of the lens. 2

34. In the given circuit determine the value of:

- (i) total resistance of the circuit
 (ii) current flowing through the ammeter.



OR

A copper wire has a diameter of 0.2 mm and resistivity of $1.6 \times 10^{-8} \Omega - m$. What will be the length of this wire to make its resistance 14Ω . How much does the resistance change, if the diameter of the wire is doubled? 2

35. A student uses spectacles of focal length $-2.5m$. $\frac{1}{2} + \frac{1}{2} + 1 + 1 = 3$

- (a) Name the defect of vision he is suffering from.
 (b) Which lens is used for the correction of this defect?
 (c) List two main causes of developing this defect.
 (d) Compute the power of this lens.

36. Two lamps, one rated 100 W at 220 V and the other 60 W at 220 V, are connected in parallel to the electric mains supply of 220 V. Draw a circuit diagram to show this arrangement and calculate the current drawn by the two lamps from the mains. 3

37. Justify the following statements:

1 + 1 + 1 = 3

- (a) Tungsten is used exclusively for filaments of electric lamps.
- (b) Series arrangement is not used for domestic circuits.
- (c) Copper and aluminium wires are usually employed for electricity transmission.

38. A highly polished surface such as a mirror reflects most of the light falling on it. In our daily life we use two types of mirrors - plane and spherical. The reflecting surface of a spherical mirrors may be curved inwards or outwards. In concave mirrors, reflection takes place from the inner surface, while in convex mirrors reflection takes place from the outer surface.

(a) Define the principal axis of a concave mirror. 1

(b) A ray of light is incident on a concave mirror, parallel to its principal axis. If this ray after reflection from the mirror passes through the principal axis from a point at a distance of 10 cm from the pole of the mirror, find the radius of curvature of the mirror. 1

(c) (i) A mirror forms a virtual, erect and diminished image of an object. Identify the type of this mirror. Draw a ray diagram to show the image formation in this case. 2

OR

(ii) An object is placed at a distance of 10 cm from the pole of a convex mirror of focal length 15 cm. Find the position of the image.

39. (i) What is meant by resistance of a conductor? Define its SI unit.

(ii) List two factors on which the resistance of a rectangular conductor depends.

(iii) How will the resistance of a wire be affected if its

(a) length is doubled, and

(b) radius is also doubled?

Give justification for your answer.

OR

(i) What is meant by the heating effect of electric current? Derive an expression for the amount of heat produced in a conductor of resistance R through which a current 'I' flows for a time t.

(ii) Calculate the amount of heat produced in a conductor of resistance 10Ω through which a current of 2 A flows for 100 seconds. 5

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