B.K. Birla Centre For Education

Date: 13-12-2025 PRE BOARD EXAMINATION-II **SET-2** **Duration**: 3 Hrs

Class: X Science **Total Marks** : 80

Instructions to the Students

- Write only question numbers clearly outside the margin (1, 2, 3.i, 5.b, 4.c.ii, etc.).
- Do not write questions or any titles. (For ex. - Do not write **II. Answer the following**).
- After every answer, give a one-line space.
- For Multiple choice Questions - Both Option and Answer should be written.
- This question paper consists of 3 sections: Section A - Biology, Section B - Chemistry and Section C - Physics.
- All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
- Bullet points & Sub-points should be written inside the margin.
- Do not fold / staple the paper.

Section A

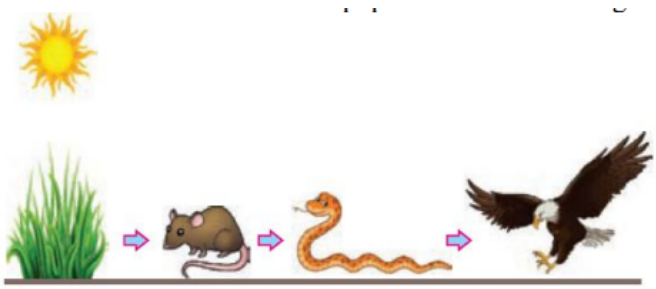
1. Why is leaf fall considered a method of excretion in plants? [1]
   a) Leaves store oxygen that plants don't need
   b) Leaves store water for future use
   c) Waste products are stored in leaves, which are then shed
   d) Leaves block sunlight needed for photosynthesis

2. A stomata closes when: [1]
   A) It needs Carbon dioxide for photosynthesis
   B) It does not need Carbon dioxide for photosynthesis
   C) Water flows out of the guard cells
   D) Water flows into the guard cells

   a) A only. b) A and C.
   c) B and C. d) B and D

3. Why do arteries have thicker walls than veins? [1]
   a) They carry oxygenated blood
   b) They have to withstand high pressure from the heart
   c) They contain valves to prevent backflow
   d) They transport nutrients only

4. Which of these statements would be correct if the population of snakes is greatly increased? [1]



   a) Population of green plants will decrease.
   b) Population of mice will decrease.
   c) Population of hawk will decrease
   d) Both (a) and (c)

5. The incorrect statement about ozone is [1]
   a) It is a deadly poisonous gas.
   b) It shields the surface of the earth from UV radiation from sun.
   c) It is used as a refrigerant and in fire-extinguishers.
   d) It is formed by combining oxygen molecule with free oxygen atom.

6. **Statement 1:**Roots absorb minerals like nitrogen and phosphorus from the soil. [1]
   Statement 2: Energy needs of plants are high because they are constantly moving.
   a) Both Statements 1 and 2 are true
   b) Both Statements 1 and 2 are false
   c) Statement 1 is true and Statement 2 is false
   d) Statement 1 is false and Statement 2 is true

7. Why is the spinal cord protected by the vertebral column? [1]
   a) It controls voluntary actions.
   b) It needs protection from mechanical injury.
   c) It supports muscle movement.
   d) It stores neurotransmitters.

8. **Assertion (A):** A geneticist crossed two pea plants and got 50% tall and 50% short progeny. [1]
   Reason(R): One plant was heterozygous tall and the other one was short.
   a) Both (A) and (R) are true and (R) is the correct explanation of (A)
   b) Both (A) and (R) are true but (R) is not the correct explanation of (A)
   c) (A) is correct but (R) is wrong
   d) (A) is wrong but (R) is correct

9. **Assertion (A):** Plastics decompose quickly in the environment because bacteria produce enzymes that break them down efficiently. [1]
   Reason (R): Non-biodegradable substances resist breakdown by biological processes and persist for a long time in the environment, causing pollution.
   a) Both (A) and (R) are true and (R) is the correct explanation of (A)
   b) Both (A) and (R) are true but (R) is not the correct explanation of (A)
   c) (A) is correct but (R) is wrong
   d) (A) is wrong but (R) is correct

10. **Give reason:** We do not have to think consciously to breathe, digest food, or make our heart beat. [2]

11.A. Why is it important for mammals and birds to have a four-chambered heart, whereas amphibians can survive with a three-chambered heart? [2]

(OR)

11.B. Riya's father is suffering from kidney failure and is in urgent need of a transplant. Riya offers to donate one of her kidneys. Based on your understanding of organ donation, explain whether this is possible and under what conditions it can be done. [2]

12. Define biomagnification and explain why pesticides accumulate in higher amounts in humans compared to plants. [2]

13. Define a reflex arc. Why have reflex arcs evolved in animals? Trace the sequence of events, which occur, when you suddenly touch a hot object. [3]

14. The gene combination of purple flowered pea plants is denoted as (WW) and that of white flowered pea plants as (ww), when these two plants are crossed F_1 generation is obtained. [3]

i) List two observations made by Mendel in F_1 generation plants.

ii) Give the (a) percentage white flowered plants and (b) ratio of the gene combinations WW, Ww and ww in F_2 generation.

iii) Write one difference between dominant and recessive trait.

15. The human alimentary canal is a long, specialized tube where food is mechanically and chemically digested. Enzymes like salivary amylase, pepsin, and pancreatic enzymes break down complex food molecules into simpler forms, which are then absorbed through villi in the small intestine. The process is aided by bile for fat digestion and regulated by muscular movements and sphincters to ensure proper digestion and absorption.

15.A. Why is food first made alkaline in the small intestine before digestion by pancreatic enzymes? [1]

15.B. A person has a weak anal sphincter. What problem might they face? [1]

15.C. A student has a condition where their small intestine cannot absorb nutrients efficiently. Which structural feature of the small intestine is likely affected, and why? [2]

(OR)

15.D. If bile secretion is blocked, how will fat digestion be affected, and why? [2]

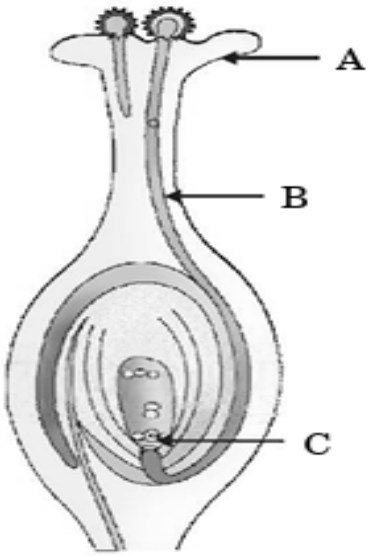
16. Puneet wanted to grow banana plants

16.A.i. Based on your knowledge on plant reproduction should he opt for seeds or any alternate method of reproduction. Justify your answer. [2]

16.A.ii. Offsprings of a banana plant usually show very little variation. What causes variation and are variations good or bad? Justify. [3]

(OR)

16.B.i. Identify A, B and C in the diagram given below and write one function of each. [3]



16.B.ii. Compare the processes of Pollination and germination [2]

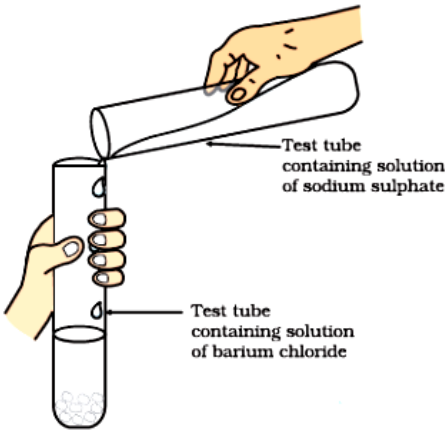
Section B

17. **Statement 1:** Skeletal chemical equations show reactants and products but are not necessarily balanced. [1]

Statement 2: The number of atoms on the reactant side can be different from the products side in a balanced chemical equation.

a) Both Statements 1 and 2 are true
b) Both Statements 1 and 2 are false
c) Statement 1 is true and Statement 2 is false
d) Statement 1 is false and Statement 2 is true

18. [1]



Identify the product which represents the solid state in the above reaction.

a) Barium chloride b) Barium sulphate c) Sodium chloride d) Sodium sulphate

19. Which one of the following can be used as an acid-base indicator by a blind student? [1]

a) Turmeric b) Litmus c) Vanilla essence d) Methyl orange

20. In the chlor-alkali process, which gas is released at the anode? [1]

a) Hydrogen b) Chlorine c) Oxygen d) Nitrogen

21. Wires in homes are coated with polyvinyl chloride (PVC) or rubber-like materials. This coating ensures that: [1]

a) The wires do not rust over time.
b) The wires can carry more current.
c) The wires become more flexible.
d) The wires are safe to touch and prevent electric shocks.

22. Which of the following statements about metal oxides and their reactions is correct? [1]

a) All metal oxides are soluble in water and produce acids.
b) Aluminium oxide reacts with both acids and bases, so it is amphoteric.
c) Sodium oxide is insoluble in water and does not form an alkali.
d) Copper and gold react vigorously with oxygen at room temperature.

23. A student is given three metals: sodium, iron, and copper. She keeps all three in separate containers under identical conditions for one week. [1]

After a week:

i) Sodium reacts vigorously and forms a new compound.

ii) Iron shows rust formation.

iii) Copper remains mostly unchanged.

Which of the following conclusions can be correctly drawn?

a) All metals react at the same rate with air.
b) Copper is sonorous and therefore does not react.
c) Iron does not react with air, only with water.
d) Reactivity of metals depends on their position in the reactivity series.

24. **Assertion (A):** Burning of natural gas (methane) is an endothermic process. [1]

Reason (R): Methane reacts with oxygen to form carbon dioxide and water, releasing heat energy.

a) Both (A) and (R) are true and (R) is the correct explanation of (A)
b) Both (A) and (R) are true but (R) is not the correct explanation of (A)
c) (A) is correct but (R) is wrong
d) (A) is wrong but (R) is correct

25. Cinnabar is an ore of a metal 'X'. When this ore is heated in air, it is first converted into oxide of 'X' (XO) and then reduced to metal 'X' on further heating. [2]

Identify metal X and write chemical equations for the reactions that occur in the above processes.

26. The domes of many building in Europe are made of copper. These domes now appear greenish in colour. [3]

(i) Why do the domes appear greenish though copper is orange-red in colour?

(ii) In your opinion, should the copper domes be replaced by iron domes to overcome the problem of change of colour of copper domes?

(iii) Domes used to be made from thin sheets of metals. Why did the ancient architects use copper to make domes?

27.A. A student dipped an iron nail in copper sulphate solution and left it for a day. [3]

i) What observation is recorded?

ii) Write the balanced equation.

iii) Identify the reaction type and justify.

(OR)

27.B. Balance the following chemical equations and identify the type of chemical reaction [3]

.(a) $TiCl_4$ (l) + Mg(s) → Ti(s) + $MgCl_2$ (s)

(b) HgO(s) —— (Heat) → Hg(l) + O_2(g)

(c) Na(s) + S(s) —— (Fuse) → Na_2S(s)

28. At a hospital, doctors use a white powder which, when mixed with water, sets into a hard solid mass to support fractured bones. This substance is obtained by carefully heating gypsum at 373 K.

28.A. Write its chemical name and chemical formula. [1]

28.B. Explain why this substance must be stored in a moisture-proof container. [1]

28.C. Write the balanced chemical equation for the preparation of this substance from gypsum. [2]

(OR)

28.D. Write the balanced chemical equation for the reaction that occurs when this powder is mixed with water. [2]

29.A. Alkanes, Alkenes, and Alkynes are the three main classes of aliphatic hydrocarbons. [5]

i) What is meant by a homologous series? List any two characteristics of the members of such a series.

ii) Write the general formula for alkanes and alkynes.

iii) Explain why alkanes generally burn with a clean flame while alkenes and alkynes burn with a sooty flame.

(OR)

29.B. i) What are soaps? Write the structure of a soap molecule. [5]

ii) Explain the cleansing action of soap with the help of a labelled diagram.

iii) Why do soaps not work well in hard water? How can we overcome this problem?

Section C

30. An object is placed at a distance of 30 cm from the pole of a concave mirror. If its real and inverted image is formed at 60 cm in front of the mirror, the focal length of the mirror is : [1]

a) -15 cm b) - 20 cm c) + 20 cm d) + 15 cm

31. The value of 1 KWh is _____ joules. [1]

a) 36000 b) 3.6×10^6

c) 6.3×10^6 d) 3.6×10^5

32. **Assertion (A):** The current is different in different components of a circuit. [1]

Reason (R): Different components offer different resistances to the flow of electric current; good conductors have low resistance, resistors have moderate resistance, and insulators have very high resistance.

a) Both (A) and (R) are true and (R) is the correct explanation of (A)
b) Both (A) and (R) are true but (R) is not the correct explanation of (A)
c) (A) is correct but (R) is wrong
d) (A) is wrong but (R) is correct

33. Why do stars appear to twinkle, while planets do not, even though both are visible in the night sky? [2]

34.A. If refractive index of water is 1.33, then determine the speed of light in this medium, if the speed of light in vacuum is given by 3×10^8 ms^{-1} [2]

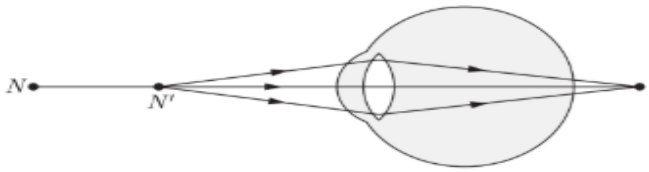
(OR)

34.B. A ray of light strikes the surface of a rectangular glass block such that the angle of incidence is [2]

i. 0° ii. 42°

Sketch a diagram to show the approximate path taken by the ray in each case as it passes through the glass block and emerges.

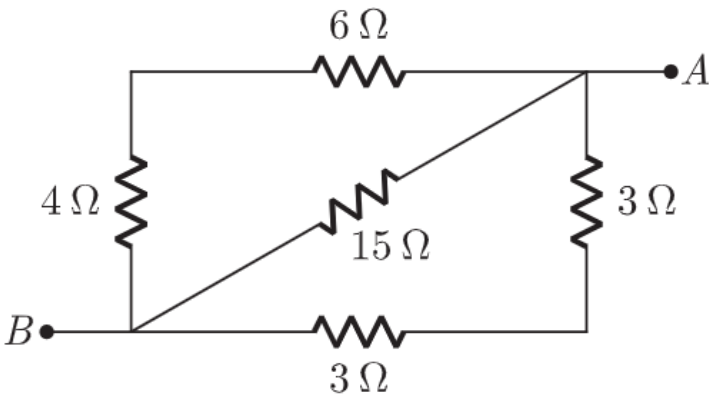
35. Study the diagram given below and answer the questions that follow: [3]



(i) Name the defect of vision represented in the diagram. Give reason for your answer.
(ii) List two causes of this defect.
(iii) With the help of a diagram show how this defect of vision is corrected.

36. (i) Why can't two magnetic field lines cross each other? [3]
(ii) State the conclusion which can be drawn from the pattern of magnetic field lines inside the solenoid.
(iii) Name any two factors on which the magnitude of the magnetic field due to this solenoid depends.

37. Calculate the effective resistance between A and B in the circuit given below: [3]



38. Study the data given below showing the focal length of three concave mirrors A, B and C and the respective distances of objects placed in front of the mirrors:

Case	Mirror	Focal Length (cm)	Object Distance (cm)
1	A	20	45
2	B	15	30
3	C	30	20

38.A. In which one of the above cases the mirror will form a diminished image of the object? Justify your answer. [1]

38.B. List any two properties of the image formed in Case-2. [1]

38.C. An object is placed at a distance of 18 cm from the pole of a concave mirror of focal length 12 cm. Find the position of the image formed in this case. [2]

(OR)

38.D. Case 3: An object is placed 20 cm in front of a concave mirror of focal length 30 cm. Draw a ray diagram to show the formation of the image. [2]

39. A school plans to install decorative LED strips powered by a 12 V battery. The engineer recommends using four resistors of equal resistance connected in parallel to reduce overheating.

39.A.i. Explain how the equivalent resistance of this setup helps reduce the heating of the circuit. [2]

39.A.ii. Derive the expression for equivalent resistance of four identical resistors R connected in parallel. [2]

39.A.iii. If each resistor is 8 Ω, calculate the total resistance and the current drawn from a 12 V battery. [1]

(OR)

39. A student is designing a heating device using nichrome wire for laboratory use. She has two nichrome wires of the same material:

- Wire A: Length = 1 m, diameter = 0.3 mm
- Wire B: Length = 1 m, diameter = 0.6 mm

She wants the device to reach higher temperatures faster.

39.B.i. Which wire should she choose? Why? [1]

39.B.ii. Justify your answer using the relationship between resistance and dimensions of a conductor. [2]

39.B.iii. If the resistance of Wire A at 20°C is 26 Ω, calculate the resistance of Wire B. [1]

39.B.iv. Explain how the chosen wire affects heat generation using Joule's law. [1]

**********THE END**********