B.K. Birla Centre For Education

Date: 15-11-2025 PRE BOARD EXAMINATION **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.
- Bullet points & Sub-points should be written inside the margin.
- Do not fold / staple the paper.

Section A

1. **Statement 1:** The first generation of offspring always inherits completely new traits unrelated to their parents. [1]

   Statement 2: Reproductive processes in animals do not show any visible variations among individuals.

   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

2. Paddy plants → Insects → Frog → Snake → Eagle [1]

   If pesticides are sprayed on the paddy plants, which organism in this food chain is likely to have the highest concentration of harmful chemicals in its body?

   a) Paddy plants b) Insects c) Snake d) Eagle

3. The sensitive plant responds to touch by folding its leaves. This movement does not involve growth. Which of the following best explains how the plant achieves this movement without muscles or nerves? [1]

   a) The plant generates muscular contractions in its stem to move leaves.
   b) The plant uses hormones to break down leaf cells at the point of contact.
   c) The plant changes water content in specific cells, causing them to shrink or swell, resulting in movement.
   d) The plant uses nervous tissue to transmit impulses rapidly, causing motion.

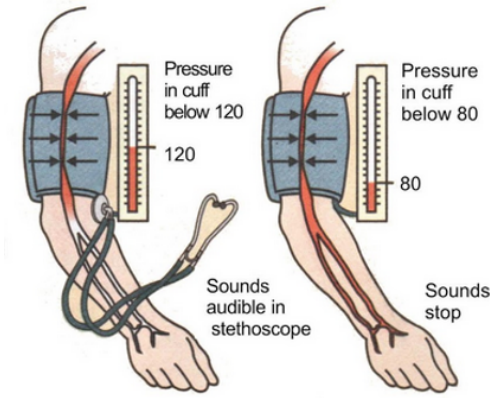
4. A 10-year-old child shows signs of stunted growth and underdevelopment compared to peers. Laboratory tests reveal underactivity of a specific endocrine gland. Which hormone is most likely deficient, and which gland secretes it? [1]

   a) Thyroxin – Thyroid gland b) Insulin – Pancreas
   c) Growth hormone – Pituitary gland d) Testosterone – Testes

5. Which of the following statements about ozone (O_3) is correct? [1]

   a) Ozone is essential for human respiration at ground level
   b) Ozone is a deadly poison at ground level but protects life at high altitudes
   c) Ozone is a stable form of oxygen and exists in abundance at sea level
   d) Ozone is used as a fuel in jet engines

6. What does a reading of 120/80 mm Hg represent. [1]



a) 120 mm Hg is the diastolic pressure and 80 mm Hg is the systolic pressure
b) 120 mm Hg is the systolic pressure and 80 mm Hg is the diastolic pressure
c) 120 mm Hg is the pulse rate and 80 mm Hg is the blood sugar level
d) 120 mm Hg and 80 mm Hg are both average heart rates during rest

7. The key difference in the nutritional process between autotrophs and heterotrophs lies in the initial form of their carbon source. Which of the following correctly identifies this difference? [1]

a) Autotrophs derive carbon from organic acids, while heterotrophs use atmospheric nitrogen.
b) Autotrophs obtain carbon from dissolved carbonates, while heterotrophs use gaseous oxygen.
c) Autotrophs utilize carbon from simple inorganic CO_2, while heterotrophs utilize carbon from complex organic substances.
d) Autotrophs absorb carbon from decaying matter, while heterotrophs use carbon fixed by bacteria.

8. **Assertion (A):** Decomposers play a crucial role in breaking down dead plants and animals into simple inorganic substances. [1]

Reason (R): Without decomposers, dead organisms and waste would accumulate, and natural replenishment of soil nutrients would not occur.

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):** An offspring shows a recessive trait even if both parents do not visibly express it. [1]

Reason (R): A recessive trait (rr) is expressed only when two copies of the recessive allele are present.

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. About 100 acres of forest land was declared as Natural reserve park. The following organisms were predominant in the Natural reserve park: rabbit, frog, grass, fish, fox, water insects, zebra, peacock, snake, trees, bird, owl, insects, tiger, vulture, duck. [2]

Create a food web comprising two separate food chains with different producers by using the above data.

11. After a leg injury, Ramesh noticed swelling in the injured area. His doctor said it was due to fluid buildup in the tissues. Using your understanding of the lymphatic system, explain why this swelling occurred and how it can be reduced naturally by the body. [2]

12.A. i) Farmers are advised to water plants in the early morning or evening. How is this related to transpiration and water transport? [2]

ii) Why is transpiration important for tall trees, and what would happen if transpiration did not occur?

(OR)

12.B. Why do aquatic organisms need to breathe faster compared to terrestrial organisms? Explain the physiological reason behind this difference. [2]

13. With neat labelled diagram explains the reflex arc in humans. [3]

14. A pure pea plant having round (R), yellow (Y) seeds is crossed with another pure pea plant having wrinkled (r), green (y) seeds. Subsequently F1 progeny is self-pollinated to obtain F2 progeny. [3]

i) What do the seeds of F1 generation look like?

ii) Give the possible combinations of traits in seeds of F2 generation. Also give their ratio.

iii) State the reason of obtaining seeds of new combination of traits in F2 generation.

15. Rahul has been drinking very little water throughout the day. He also sweats a lot due to outdoor sports. At night, he feels a strong burning sensation while urinating and notices he passes very little urine. His doctor says this may be due to low water intake, affecting his excretory system. The doctor explains that his kidneys filter blood, and when the body lacks water, the urine becomes more concentrated, possibly causing discomfort.

15.A. What role does the Bowman's capsule play in the process of urine formation? [1]

15.B. Why does the urinary bladder not release urine constantly, even though urine is continuously formed? [1]

15.C. If Rahul continues this habit, what long-term effect might it have on his kidneys? Suggest one preventive step. [2]

(OR)

15.D. Why does Rahul feel a burning sensation while passing urine, and how is it related to kidney function? [2]

16.A.i. A student observed a black powdery growth on a slice of bread kept in a damp place. Under a microscope, she saw thin thread-like structures and round black blobs on their tips. Identify the organism and explain how these round structures help the organism survive and reproduce under unfavorable conditions. [2]

16.A.ii. What is regeneration? Give one example of an organism that shows this process and one organism that does not. Why does regeneration not occur in the latter? [3]

(OR)

16.B.i. i) Why is the placenta considered a life-support system for the embryo? [3]

ii) Predict what will happen if the embryo is not able to implant in the uterus.

iii) If the oviducts of a woman are surgically blocked, how will it affect reproduction?

16.B.ii. Why does the lining of the uterus break down and come out as blood and mucous every month in females? [2]

Section B

17. A student burns three different substances: naphthalene, camphor, and ethanol in a lab activity. She observes the following: [1]

- Naphthalene and camphor burn with yellow, sooty flames.
- Ethanol burns with a clean, blue flame.
- A black residue is found on a metal plate held above the flame of naphthalene.

Which of the following best explains these observations?

a) Ethanol is a saturated compound and undergoes complete combustion, producing a clean flame.
b) Naphthalene and camphor are saturated hydrocarbons, so they give sooty flames.
c) The yellow flame in naphthalene is due to excess oxygen in the combustion reaction.
d) Ethanol contains sulphur, which helps it burn more cleanly.

18. Match the following: [1]

Column A	Column B	
A. Gallium	i)	Conduct electricity despite being non-metal
B. Iodine	ii)	Melt at or near room temperature
C. Diamond	iii)	Hardest natural substance
D. Graphite	iv)	Lustrous non-metal

a) A–ii, B–iv, C–iii, D–i
b) A–i, B–ii, C–iv, D–iii
c) A–iii, B–i, C–ii, D–iv
d) A–iv, B–iii, C–i, D–ii

19. When calcium reacts with water, bubbles stick to the surface of the metal, and it floats. [1]
The bubbles are of:

a) Carbon dioxide b) Hydrogen gas c) Oxygen gas d) Water vapour

20. What does the "$10H_2O$" in the chemical formula $Na_2CO_3 \cdot 10H_2O$ represent? [1]

a) 10 molecules of water added to sodium carbonate to make it wet
b) 10 molecules of water of crystallization in washing soda
c) Water used to dissolve sodium carbonate in a solution
d) Impurities present in sodium carbonate crystals

21. Which of the following statements about sodium chloride is correct? [1]

a) It is an acidic salt formed from hydrochloric acid and sodium hydroxide.
b) It is commonly found only in laboratories.
c) It is a neutral salt that can be obtained from seawater and rock deposits.
d) It was discovered during the Dandi March.

22. Which of the following equations represent redox reactions and what are the values for 'p' and 'q' in these equations? [1]

Equation 1: Fe_2O_3 (s) + 2Al (s) → Al_2O_3 (s) + p Fe (l) + heat

Equation 2: $2C_4H_{10}$ (g) + $13O_2$(g)→ $8CO_2$(g)+ q H_2O(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

23. The most common method of extraction of metals from their oxide ores is: [1]

a) Reduction with carbon
b) Reduction with hydrogen
c) Reduction with aluminium
d) Electrolytic reduction

24. **Assertion (A):** Detergents form insoluble scum with calcium and magnesium ions in hard water. [1]

Reason (R): The charged ends of detergent molecules do not form insoluble salts with hard-water ions.

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. Observe the following reactions and identify X, Y, and Z: [2]

1. Na_2CO_3 (s) + 2HCl (aq) -----> X + H_2O (l) + Y
2. 2NaOH (aq) + Zn (s) -------> Z + H_2 (g)

26.A. Compare in tabular form the reactivities of the following metals with cold and hot water: [3]

i) Sodium
ii) Calcium
iii) Magnesium

(OR)

26.B. Magnesium, aluminium, zinc, and iron all react with dilute hydrochloric acid but at different rates. [3]

i) Arrange these metals in decreasing order of reactivity based on their reaction with dilute HCl.

ii) Write balanced chemical equations for the reactions of magnesium and zinc with dilute HCl.

iii) Explain why copper does not react with dilute hydrochloric acid.

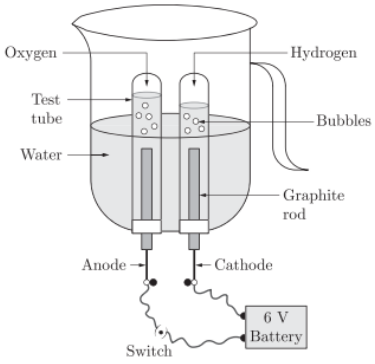
27. Study the figure given below and answer the following questions : [3]

i) Name the process depicted in the diagram.

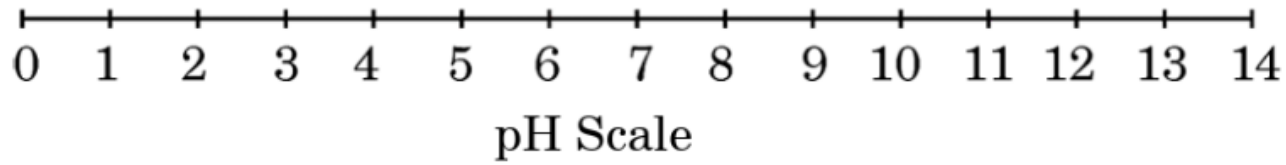
ii) Write the composition of the anode and the cathode.

iii) Write the balanced chemical equation of the reaction taking place in this case.

iv) The reaction does not take place if a few drops of dilute sulphuric acid are not added to water. Why?



28. Acid-base indicators can be used to distinguish between an acid and a base. Universal indicator, a mixture of several indicators, shows different colours at different concentrations of acids and bases, thereby indicating their pH on the pH scale of 0 – 14. The pH of a solution is measured by pH paper, which is a paper impregnated with a universal indicator.



28.A. Solution P is a strong acid while solution Q is a strong base. On the pH scale, where would you place the solutions P and Q ? [1]

28.B. A solution has a pH of 7. Name a compound you would use to [1]

(i) increase its pH, and

(ii) decrease its pH.

28.C. When the pH of a solution is decreased from 4 to 2, what effect does it produce on its hydronium ion concentration ? State the colour change shown by the pH paper. [2]

(OR)

28.D. A person is feeling pain and irritation in the stomach due to indigestion. What could be the pH of the fluid in the stomach ? Write the common name of the medicines people use for remedy. Give the chemical name of ‘‘milk of magnesia’’ often used for this purpose. [2]

29.A.i. Write chemical equation to show what happens when ethanol : [3]

(a) burns in oxygen/air.

(b) is heated at 443 K in excess conc. H_2SO_4.

(c) reacts with acidified potassium dichromate.

29.A.ii. Write in tabular form the structural formula and functional group present in following compounds? [2]

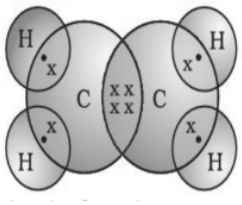
(a) Ethanol

(b) Ethanoic acid

(OR)

29.B.i. What are hydrocarbons? Distinguish alkanes from alkenes and each of them from alkynes, giving one example of each. [2]

29.B.ii. [3]



i) Identify the Hydrocarbon and write its name and molecular formula

ii) Draw its bond structure.

iii) Is it saturated or unsaturated compound? Justify.

Section C

30. Consider the following statements regarding eye donation: [1]

I. Individuals suffering from diabetes or hypertension are generally not eligible to donate their eyes.

II. The eye removal procedure is lengthy, often leading to disfigurement of the donor's face.

III. A single pair of donated eyes has the potential to restore vision to up to four corneal blind individuals.

IV. For successful donation, eyes must be removed within 4-6 hours after death.

Which of the above statement are correct.

a) I and II only b) II and III only c) III and IV only d) I, III and IV

31. In the equation sini/sinr=constant, what is this constant called? [1]

a) Critical angle
b) Index of refraction of the first medium
c) The refractive index of the second medium
d) The speed of light ratio

32. **Assertion (A):** The formula for the focal length of a spherical mirror depends on the object distance, image distance, and focal length. [1]

Reason (R): The formula is used to determine the magnification of lenses.

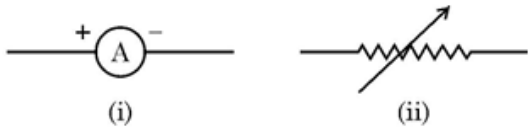
a) Both (A) and (R) are true and (R) is the correct explanation of (A)
b) Both (A) and (R) are true but (R) is not the correct explanation of (A)
c) (A) is correct but (R) is wrong
d) (A) is wrong but (R) is correct

33. A lens has a power of –2.5 D. [2]

i) What type of lens is it?

ii) Calculate its focal length in metres.

34.A. What do the symbols given below represent in an electric circuit ? [2]
Write one function of each.



(i) (ii)

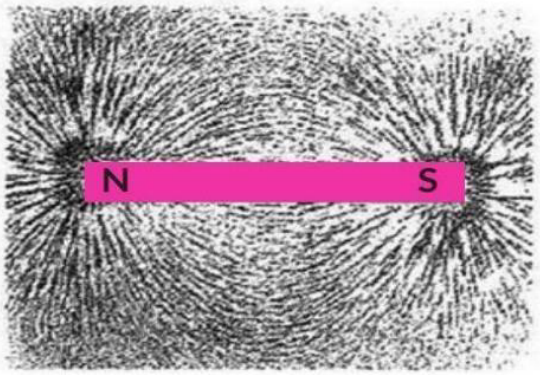
(OR)

34.B. A wire of resistance $R = 10\ \Omega$ is connected to a battery of voltage V = 12 V. If the same wire is stretched to double its original length without changing its volume, calculate the new current flowing through the wire when connected to the same battery. [2]

35. Explain the purpose of a plug key (switch) in an electric circuit and distinguish between open and closed states with their symbols. [3]

36. Mars's atmosphere is composed mainly of carbon dioxide, nitrogen, argon, negligible amounts of oxygen, water vapour and methane. [3]
i) Using the information given in the sentence above and based on the knowledge about how rainbows are formed on Earth, explain why rainbow formation is impossible on Mars.
ii) Nitin saw a rainbow on a sunny day when he looked at the sky through a waterfall. Draw a diagram of rainbow which he would have seen

37. Study the diagram given below and answer the questions that follow: [3]
i) Why do the iron filings arrange in such a pattern?
ii) What does this pattern demonstrate?
iii) Why do the iron filings near the bar magnet seem to align in the shape of closed curves?



38. Paheli was curious about how magnifying glasses and spectacles work. She observed that the glass used in them was thicker in the middle and curved. Her teacher explained that such glasses are called lenses, which are made of transparent materials and are bound by at least one spherical surface. Lenses have important parts like the optical centre, principal axis, centres of curvature (C_1 and C_2), and aperture. When light passes through a lens, its direction changes due to refraction, depending on the shape and material of the lens.

38.A. Why is a concave lens called a diverging lens? [1]

38.B. Which property of a convex lens allows it to be used in devices like magnifying glasses and microscopes? [1]

38.C. How does a convex lens differ from a concave lens in terms of shape and behavior with light? [2]

(OR)

38.D. Why does a concave lens make objects appear smaller, while a convex lens can make them appear larger? [2]

39.A.i. A house hold uses the following electric appliance; [3]

(i) Refrigerator of rating 400w for ten hour each day.

(ii) Two electric fans of rating 80w each for twelve hours each day.

(iii) Six electric tubes of rating 18w each for 6hours each day.

Calculate the electricity bill of the household for the month of June if the cost per unit of electric energy is Rs. 3.00.

39.A.ii. An electric kettle is rated 750 W; 220 V. Can this kettle be used in a circuit which has a fuse of current rating 3 A ? Give reason for your answer. [2]

(OR)

39.B.i. Three resistors of 2Ω, 3Ω, and 6Ω are connected in (i) series, and (ii) parallel. Draw the arrangements of the resistors and find the equivalent resistance of each arrangement [3]

39.B.ii. Use Ohm's law to determine the potential difference across the 3Ω resistor in the circuit shown in the following diagram when key is closed. [2]