COMMON PRE-BOARD EXAMINATION

SCIENCE – Code No. 086

CLASS-X-(2025-26)

SET: 2

Time allowed: 3 Hrs. **Maximum Marks: 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

Qn. No.	Questions	Marks
1.	Consider a simple food chain: Grass → Deer → Tiger. What would be the immediate consequence if the entire tiger population were to be removed from the ecosystem? A. The population of grass would decrease. B. The population of deer would increase drastically. C. The population of deer would decrease due to starvation. D. The ecosystem would remain stable and unchanged.	1
2.	Gregor Mendel's experiments on pea plants laid the foundation for modern genetics. What was a key reason for his choice of pea plants for his study? A. They were difficult to grow, which made the experiment more challenging. B. They had a very long life cycle, allowing for long-term observation. C. They possessed several pairs of easily identifiable, contrasting characteristics. D. They could not be self-pollinated, ensuring genetic diversity.	1
3.	Which of the following statements are true? (i) Sudden action in response to something in the environment is called reflex action. (ii) Sensory neurons carry signals from the spinal cord to muscles. (iii) Motor neurons carry signals from receptors to the spinal cord. (iv) The path through which signals are transmitted from a receptor to a muscle or a gland is called the reflex arc. A. (i) and (ii) B. (i) and (iii) C. (i) and (iv) D. (i), (ii) and (iii)	1
4.	The hindbrain controls many of the body's vital functions. Which part of the hindbrain is responsible for regulating involuntary actions like blood pressure, salivation, and vomiting? A. Cerebrum B. Cerebellum C. Pons D. Medulla	1

5. Bile juice is secreted by the liver and stored in the gall bladder. What is its primary function in the process of digestion? 1

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.

6. In the human circulatory system, besides blood, there is another fluid called lymph. What is a key function of lymph? 1

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

7. What does the 10% law of energy transfer in an ecosystem state? 1

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

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.

8. **Assertion (A)**: The ozone layer in the upper atmosphere protects life on Earth from harmful ultraviolet radiation. 1

Reason (R): Ozone is formed when high-energy UV radiation splits oxygen molecules (O_2) into individual atoms, which then combine with other oxygen molecules to form ozone (O_3).

9. **Assertion (A):** Variations arising during the process of reproduction can be inherited. 1

Reason (R): Variations may reduce the chance of survival of the individuals.

10. If a pesticide like DDT is sprayed on a field, it enters the food chain: 2

Grass → Goat → Human

i) In which organism will the concentration of this pesticide be the highest?

ii) Name the phenomenon and explain why.

11. <u>*Attempt either option A or B*</u> 2

A. Aquatic animals like fish have a much faster rate of breathing compared to terrestrial animals. Provide a scientific reason for this observation.

OR

B. Urine passed during the summer is usually less in quantity and is somewhat thicker. Why is it so?

12. Green plants are called producers. How do they prepare their own food? List down the steps involved in it. 2

13. In a cross between a pea plant with violet flowers (VV) and a pea plant with white flowers (vv). Make a cross and answer the following questions: 3

(i) What will be the phenotype of the F1 generation?

(ii) If the F1 plants are self-pollinated, what will be the ratio of violet to white flowered plants in the F2 generation?

(iii) What is this type of cross, involving a single trait, called?

14. Explain the phenomenon of phototropism in plants. Name the plant hormone responsible for this movement and describe its mechanism of action that causes a plant shoot to bend towards a light source. 3

15. The figures P and Q show the state of the heart at the stages of the cardiac cycle. 4

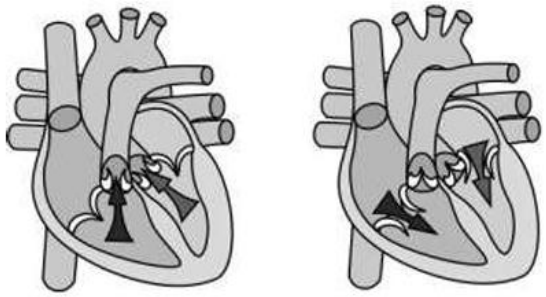


Figure P Figure Q

A. Identify the blood pressure values that will be obtained at the stages of the heart, shown in figures P and Q, for a normal person at rest.

B. Name the blood vessel that takes blood to the lungs for oxygenation.

Attempt either sub-part C or D.

C. How are arteries different from veins?

OR

D. Why is double circulation important for mammals and birds?

16. *Attempt either option A or B* 5

A. (i) Define vegetative propagation and list two natural methods of this type of reproduction in plants.

(ii) State two advantages of using vegetative propagation for growing certain types of plants.

(iii) Can plants like roses and jasmine grown by this method produce flowers? Give a reason.

OR

B. (i) Draw a neat labelled diagram of the human male reproductive system.

(ii) What is the composition of semen?

(iii) State the function of the vas deferens.

SECTION B

17. An aqueous solution of salt turns phenolphthalein pink. The salt could be the one obtained by the reaction: 1

A. CH_3COOH and NaOH B. H_2SO_4 and KOH

C. HNO_3 and NaOH D. HCl and NH_4OH

18. Hydrochloric acid was added to a solid X kept in a test tube. A colourless and odourless gas was evolved. The gas was passed through lime water, which turned milky. It was concluded that 1

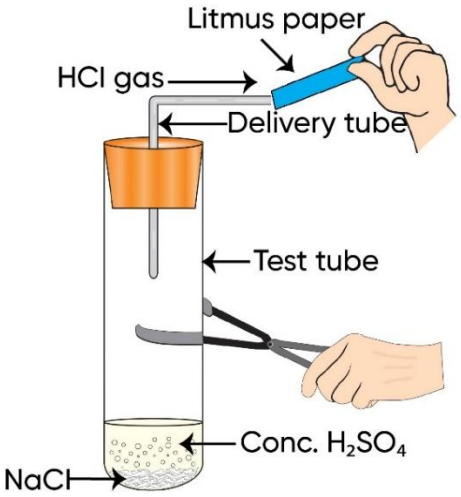
A. Solid X is zinc, and the gas evolved is H_2

B. Solid X is sodium bicarbonate, and the gas evolved is CO_2

C. Solid X is sodium hydroxide, and the gas evolved is CO_2

D. Solid X is sodium chloride, and the gas evolved is Cl_2

19. The figure given below represents the experiment carried out between Conc. sulphuric acid and sodium chloride, which react with each other to form HCl gas. Blue litmus paper is brought near the mouth of the delivery tube to check the presence of HCl, but no change is observed in the colour of the litmus paper because: 1



A. The litmus paper used is moist

B. The litmus paper used is dry

C. Blue litmus paper does not change its colour with an acid

D. The litmus paper is kept very close to the mouth of the delivery tube

20. Amalgam is an alloy of: 1

A. Copper and Tin B. Mercury

C. Lead and Tin D. Copper and Zinc

21. In the following cases combination reaction occurs in: 1

A. $CuO + H_2 \rightarrow$ B. $ZnO + C \rightarrow$ C. $Na + O_2 \rightarrow$ D. $CH_4 + O_2 \rightarrow$

22. Which of the following reactions is an endothermic reaction? 1

A. Process of respiration

B. Burning of coal

C. Decomposition of vegetable matter into compost

D. Decomposition of calcium carbonate

23. Four solutions labelled as P, Q, R and S have pH values 1, 3, 9 and 13, respectively. Which of the following statements about the given solutions is incorrect? 1

A. Solution P has a higher concentration of hydrogen ions than solution Q.

B. Solution R has a lower concentration of hydroxide ions than solution S.

C. Solutions P and Q will turn the red litmus solution blue.

D. Solution P is highly acidic, while solution R is weakly basic.

The following question consists of two statements - Assertion (A) and Reason (R). Answer this 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.

24. **Assertion (A):** Saturated hydrocarbons are chemically less reactive. 1

Reason (R): All the valencies of the carbon atom are satisfied by single covalent bonds.

25. When a metal X, which is stored in kerosene, is treated with cold water, it gives a basic compound Y and liberates a gas which easily catches fire. Identify X and Y, and also write the chemical reaction involved. 2

26. Tina found a photographic film coated with a white material in a photo studio. After leaving it near the window for a few minutes, she noticed that the white material had turned grey. 3

i. Identify the white substance on the film.
ii. Write the balanced chemical equation for the change observed.
iii. Write the type of chemical reaction that takes place in this process.

27. *Attempt either option A or B*

A. A reddish-brown metal P, when heated in air, gives a black compound Y, which, when heated in the presence of H_2 gas, gives P back. P is refined by the process of electrolysis; this refined form of P is used in electrical wiring.

i. Identify P and Y.

ii. Draw a well-labelled diagram to represent the process of refining P.

OR

B. i. An element M with electronic configuration 2,8,2 combines with another element X having electronic configuration 2,6 to form a compound. Draw the electron dot structure of the compound.

ii. State the difference in electrical conductivity of such compounds in solid and molten states.

28 Seawater contains many salts dissolved in it. Sodium chloride is separated from these salts. The common salt thus obtained is an important raw material for various materials of daily use. Some of these compounds are used in bleaching, cleaning and even for cooking purposes. 4

A. Name the process involved in the preparation of sodium hydroxide from brine.

B. Write the balanced chemical equation for the process.

Attempt either sub-part C or D

C. State the uses of sodium hydroxide.

OR

D. Write the name and chemical formula of the calcium compound used in bleaching.
How is this compound manufactured?

29. *Attempt either option A or B* 5

A. When a saturated organic compound **X** (an alcohol) is heated with concentrated sulphuric acid at 443 K, it forms an unsaturated compound **Y** with molecular mass 28 u. The compound **Y**, on addition of one mole of hydrogen in the presence of nickel, changes to a saturated hydrocarbon **Z**.

i. Identify **X**, **Y** and **Z**.
ii. Write the chemical equation showing the conversion of **X** into **Y**.
iii. What happens when compound **Z** undergoes combustion?
iv. State one industrial application of the hydrogenation reaction.
v. Name the products formed when compound **X** reacts with sodium.

OR

B. i. Kiran thinks that substitution reaction occurs in saturated hydrocarbons; on the contrary, Suman thinks it occurs in unsaturated hydrocarbons. Justify with valid reasoning whose thinking is correct.

ii. Draw the electron dot structure of the immediate lower homologue of propane.

iii. Give any two characteristics of homologues of a given homologous series.

SECTION – C

30. The danger signals installed at the top of tall buildings are red in colour. These can be easily seen from a distance because among all other colours, the red light – 1

A. Is scattered the most by smoke or fog
B. Is scattered the least by smoke or fog
C. Is absorbed the most by smoke or fog
D. Moves fastest in air

31. Riya was experimenting using a concave mirror to determine its focal length. She placed a lit candle at different distances from the mirror and noted the image characteristics. 1

I. When the candle was placed beyond the centre of curvature (C), the image was formed between F and C, real and inverted.

II. When the candle was placed between F and the pole (P), the image formed was virtual, erect, and enlarged.

III. When the candle was placed at the centre of curvature, the image was formed at infinity and was highly enlarged.

Choose the correct option:

A. I and II B. II and III C. I and III D. Only I

The following question consists of two statements - Assertion (A) and Reason (R). Answer this 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.

32. **Assertion (A):** A convex lens of focal length 15 cm forms a real image of an object placed 30 cm away from it. 1

Reason (R): The image formed is on the same side of the lens as the object is placed.

33. *Attempt either option A or B* 2

A. An electric iron of 1KW is operated at 220V. Find which of the following fuses that respectively rated at 1A, 3A and 5A, can be used in it? Justify your answer.

OR

B. A wire of resistance 25 Ω is cut into five equal pieces. But if they are connected in parallel, what is the net resistance?

34. Object placed at 12 cm from the optical instrument; image formed is virtual, erect and twice the size of the object, image on the same side of the object. 2

i. Identify the instrument.

ii. Find the position of the image.

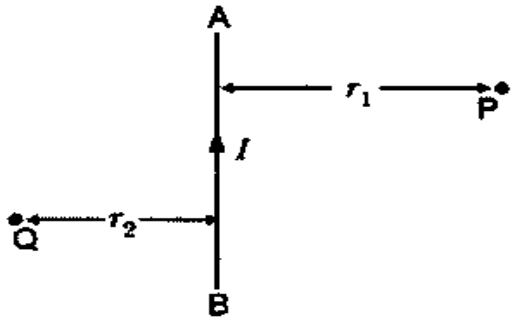
35. AB is a current-carrying conductor in the plane of the paper, as shown in the figure. 3

Given $r_1 > r_2$

(i) Mention the direction of magnetic fields produced by it at points P and Q.

(ii) Where will the strength of the magnetic field be larger? Give reason.

(iii) State the rule used to find the direction of magnetic field produced by the conductor in this case.



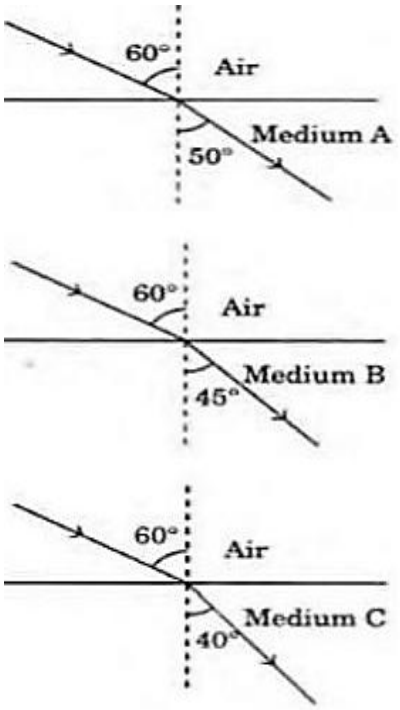
36. An old man cannot see objects closer than 1 m from the eye clearly. 3

(i) Name the defect of vision he is suffering from. How can it be corrected?
(ii) Draw the ray diagram for its correction.
(iii) Calculate the power of the lens used for its correction.

37. i. Tungsten is used almost exclusively for the filament of electric lamps. Give reason. 3

ii. Explain the working of a fuse wire in an electric circuit.

38. The diagram represents the path of a light ray from air to three different media, A, B and C. 4



A. (i) In which of the following media is the speed of light minimum?
(ii) Identify the medium having the lowest refractive index.

B. If the refractive index of Diamond is 2.42, what does it mean?

Attempt either subpart C or D.

C. What will be the refractive index of the medium in which the speed of light is 2.5×10^8 m/s?

OR

D. If the refractive index of water is 4/3 and that of glass is 3/2. What will be the refractive index of glass with respect to water?

39. *Attempt either option A or B* 5

A. Two bulbs, one rated 200W at 20V and the other 50W at 20V, are connected in series to the electric mains supply. Which bulb glows brighter if the supply voltage is 40V?

OR

B. In a circuit, an 8 Ω resistor is connected in series with a parallel combination of 12Ω and 6 Ω resistors. The combination is connected to a 12 V battery. Find:

(i) Effective resistance of the circuit.
(ii) Current through each resistor