G - W CLASSES, GONDIA
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SUB - SCIENCE (086) **TIME: 3 HOURS**

MAX. MARKS: 80 **CLASS X**

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. When a blood vessel is cut, the bleeding is stopped by the formation of a clot. Which component of blood is primarily responsible for initiating this process?
   (a) Red Blood Cells (RBCs)
   (b) White Blood Cells (WBCs)
   (c) Plasma
   (d) Platelets

2. Which endocrine gland, located at the base of the brain, is often called the 'master gland' because it secretes hormones that regulate many other glands in the body?
   (a) Thyroid gland
   (b) Adrenal gland
   (c) Pituitary gland
   (d) Pancreas

3. The male reproductive part of a flower is the stamen. The stamen is composed of which two distinct parts?
   (a) Stigma and Style
   (b) Anther and Filament
   (c) Ovary and Ovule
   (d) Petal and Sepal

4. The wings of a bird and the wings of an insect both enable flight, but they have different evolutionary origins and internal structures. Such organs are referred to as:
   (a) Homologous organs
   (b) Vestigial organs
   (c) Analogous organs
   (d) Fossil organs

5. Waste materials can be classified as biodegradable or non-biodegradable. Which of the following items is biodegradable?
   (a) A plastic toy
   (b) A glass jar
   (c) An aluminum can

(d) A paper bag

6. Consider the following statements about the major parts of the human brain :
(i) The cerebrum is the site of intelligence, consciousness, and memory.
(ii) The cerebellum is primarily responsible for maintaining posture and balance.
(iii) The medulla controls involuntary actions like breathing and heartbeat.
(iv) The entire brain is protected by the flexible vertebral column.
Which of the above statements are correct?
(a) (i) and (iv) only
(b) (i), (ii), and (iii)
(c) (ii) and (iv) only
(d) All are correct.

7. The human digestive system breaks down complex food molecules into simpler ones. In which part of the alimentary canal does the final and complete digestion of carbohydrates, fats, and proteins occur?
(a) Stomach (b) Small intestine
(c) Large intestine (d) Liver

8. **Assertion (A) :** Food chains in an ecosystem are generally short, usually consisting of three to four trophic levels.
Reason (R) : The amount of available energy increases at each successive trophic level in a food chain.
(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 copying of DNA is a fundamental event in the process of reproduction.
Reason (R) : DNA copying ensures that the offspring receives the complete genetic blueprint from the parent(s).
(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. It is generally advised not to talk while eating. Explain the biological reason behind this precaution in relation to the passage of air and food.

11. Student to attempt either A or B.
A. List two vital functions of the human kidneys apart from the excretion of nitrogenous waste like urea.

OR

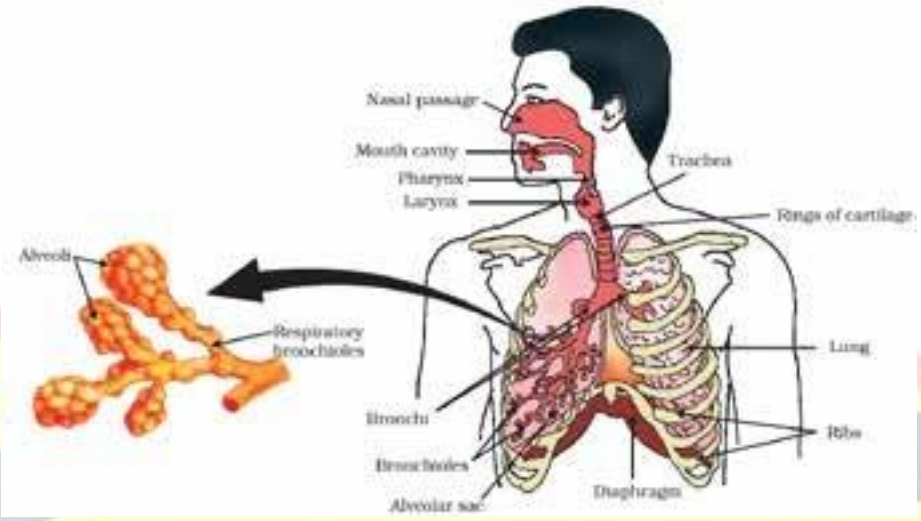
B. How do autotrophs obtain the following raw materials required for photosynthesis :
(i) Carbon dioxide and
(ii) Water?

12. What is meant by the 'Ozone Hole'? Name the main class of synthetic chemicals responsible for its creation.

13. What is a reflex action? Give two examples. How does it differ from a voluntary action?

14. How can the evolutionary relationships between different organisms be traced? Mention any three methods that scientists use.

15. Refer to the diagram of the human respiratory system to the following questions.



A. What is the role of the diaphragm, a large muscular sheet, in the process of breathing?

OR

B. What are alveoli? How are they structurally adapted to maximize gaseous exchange?

C. Explain why the breathing rate of a person increases significantly during vigorous exercise.

16. A. (i) How does binary fission in Leishmania differ from that in Amoeba?
(ii) What is fragmentation? Give an example of an organism that reproduces by this method.
(iii) Can regeneration in an organism like a lizard be considered a form of reproduction? Why or why not?

OR

B. (i) What changes occur in a flower after fertilization? List any three.
(ii) What is the main difference between self-pollination and cross-pollination?
(iii) Draw a diagram showing the germination of a pollen grain on the stigma of a flower.

SECTION-B

17. In the reaction $CuO(s) + H_2(g)$ " $Cu(s) + H_2O(l)$, which substances are oxidized and reduced respectively?
(a) H_2 is oxidized, CuO is reduced.
(b) CuO is oxidized, H_2 is reduced.
(c) Both CuO and H_2 are oxidized.
(d) Both CuO and H_2 are reduced.

18. When an acid reacts with a metal hydrogen carbonate, the products formed are :
(a) Salt, water, and hydrogen gas
(b) Salt and water only
(c) Salt, water, and carbon dioxide gas
(d) Salt and carbon dioxide gas only

19. Which of the following metals exists as a liquid at room temperature?
(a) Sodium

(b) Iron
(c) Mercury
(d) Gold

20. Based on the reactivity series, which of the following metals will not displace hydrogen from dilute acids?
(a) Zinc
(b) Magnesium
(c) Iron
(d) Copper

21. The organic compound propanone contains which of the following functional groups?
(a) Aldehyde (-CHO)
(b) Alcohol (-OH)
(c) Carboxylic acid (-COOH)
(d) Ketone (C=O)

22. An aqueous solution of which of the following compounds is used for whitewashing walls?
(a) Calcium carbonate ($CaCO_3$)
(b) Calcium oxide (CaO)
(c) Calcium hydroxide ($Ca(OH)_2$)
(d) Calcium sulphate ($CaSO_4$)

23. When an aqueous solution of sodium sulphate is mixed with an aqueous solution of barium chloride, a white insoluble substance is formed. What is the chemical formula of this substance?
(a) $BaSO_4$
(b) NaCl
(c) BaS
(d) Na_2Cl_2

24. **Assertion (A) :** Ionic compounds are generally hard, crystalline solids.
Reason (R) : There are strong electrostatic forces of attraction between the oppositely charged ions in their structure.
(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.

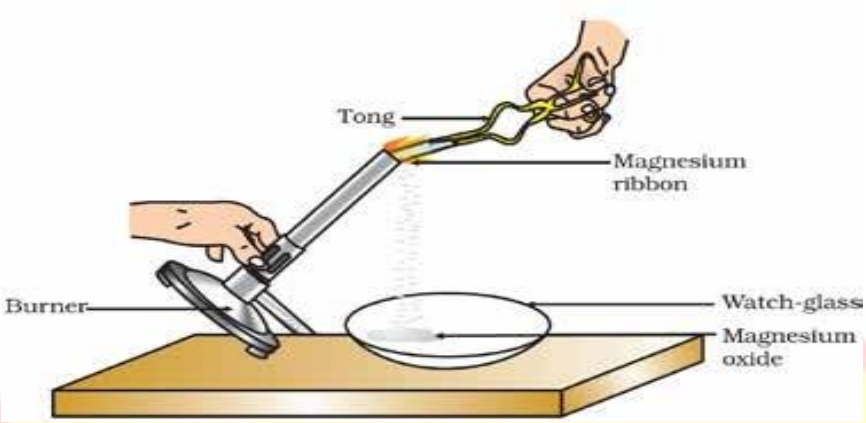
25. Explain why covalent compounds are generally poor conductors of electricity.

26. Attempt either option A or B.
(A) You are given three metals : Sodium, Magnesium, and Copper.
(i) Arrange them in decreasing order of their reactivity.
(ii) Describe a simple experiment to establish the reactivity order between Magnesium and Copper.

OR

(B) (i) What is meant by the anodising of aluminium?
(ii) How does this process make aluminium resistant to further corrosion?

27. A student burns a magnesium ribbon in the air, holding it with a pair of tongs.



(a) What is the dazzling white light produced, and what is the chemical nature of the white powder formed?
(b) Write the balanced chemical equation for this reaction.
(c) What type of chemical reaction is this?

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.
(a) Identify this white powder. Write its chemical name and chemical formul(a)
(b) Explain why this substance must be stored in a moisture-proof container.
(c) Write the balanced chemical equation for the preparation of this substance from gypsum.

OR

(c) Write the balanced chemical equation for the reaction that occurs when this powder is mixed with water. What is the hard solid mass produced known as?

29. Attempt either option A or B.
(A) (a) Draw the structure of a micelle formed when soap is dissolved in water. Clearly label the hydrophobic and hydrophilic parts of the soap molecule.
(b) With the help of the micelle structure, explain the cleansing action of soap on an oily spot.
(c) Why are soaps not effective cleaning agents in hard water?

OR

(B) (a) What are structural isomers?
(b) Draw the structures of the three possible structural isomers of pentane (C_5H_{12}).
(c) Explain why a branched-chain isomer is not possible for propane (C_3H_8).

SECTION-C

30. A student is learning about the different phenomena of light and makes the following statements:
I. Refraction is the change in the direction of light as it passes from one medium to another.
II. Reflection is the bouncing back of light into the same medium.
III. The speed of light is the same in all mediums.
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. What is the primary cause of a person suffering from myopia?

(a) The focal length of the eye lens is too long.

(b) The eyeball is too short.

(c) The focal length of the eye lens is too short.

(d) The eye lens is unable to change its focal length.

32. **Assertion (A) :** A ray of light entering a convex lens parallel to its principal axis converges at the principal focus.

Reason (R) : All parallel rays entering a converging lens are refracted to meet at the focal point.

(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. A concave lens of focal length 15 cm forms an image 10 cm from the lens.

A. Apply the lens formula to find the object distance.

B. Draw a ray diagram showing the image formation.

C. State whether the image is diminished or magnified.

34. Attempt either option A or B.

A. Two identical resistors of 24 Ω each are connected to a battery of 6 V. Calculate the ratio of the power consumed by the resulting combinations with

(a) minimum resistance and

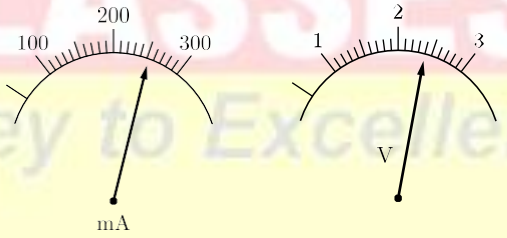
(b) maximum resistance.

OR

B. The current flowing through a resistor connected in a circuit and the potential difference developed across its ends are as shown in the diagram by milliammeter and voltmeter readings respectively :

(a) What are the least counts of these meters?

(b) What is the resistance of the resistor?



35. With the help of ciliary muscles the human eye can change its curvature and thus alter the focal length of its lens. State the changes that occur in the curvature and focal length of the eye lens while viewing (i) a distance object, (ii) nearby object.

Explain, why a normal eye is not able to the distinctly the objects placed closer than 25 cm, without putting any stain on the eye.

36. Draw a schematic diagram of a circuit consisting of a battery of six 2 V cells, a 6 Ωresistor, a 12 Ω resistor and a 18 Ω resistor and a plug key all connected in series. Calculate the following (when key is closed):

(i) Electric current flowing in the circuit.

(ii) Potential difference across 18 Ω resistor.

(iii) Electric power consumed in 18 Ω resistor.

37. A student claims that the sky appears blue due to scattering of light.

(i) Is this correct?

(ii) State the reason behind scattering.

38. A concave lens is thick at the edges and thin at the centre, while a convex lens is thick at the centre and thin at the edges. We can distinguish between a concave lens and a convex lens without touching them. For this keep a book close to a lens and observe the image of the text of the book through the lens. If the letters appear enlarged, then it is a convex lens and if the letters appear diminished then it is a concave lens.

Convex lens converges light rays and hence known as converging lens. Similarly, concave lens diverges light rays and is known as diverging lens. Linear magnification produced by a lens is equal to the ratio of the image distance to the object distance. Power of a lens is defined as the reciprocal of its focal length.

(i) What type of image is always made by a concave lens ?

(ii) If magnification produced by a spherical lens is +0.75, then what is the nature of the lens ?

Attempt either subpart C or D.

(iii) What is the power of a convex lens with focal length 80 cm ?

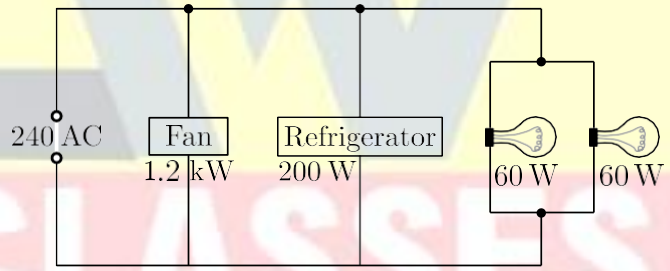
or

(iv) What kind of lens is present in human eye ?

39. Attempt either option A or B

A. Inside the house, connections to all the devices are made in parallel, each having independent switch and fuse (if necessary). Thus, whenever some fault occurs in circuit of one particular device in one room, devices in other rooms do not suffer.

Figure shows a 240V AC mains circuit to which a number of appliances are connected and switched on.



(i) Calculate the power supplied to the circuit.

(ii) Find out the value of electric current in the refrigerators.

(iii) Calculate energy used by the fan in 2 hours.

(iv) Calculate resistance of the filament of one lamp.

OR

B. (i) Which effect of the electric current is utilised in the working of an electrical fuse ?

(ii) Is a fuse connected in series or in parallel in household circuit ?

(iii) Draw a schematic labelled diagram of a domestic circuit which has a provision of a main fuse, meter, one light bulb and a switch/socket.

(iv) Why are appliances connected in parallel in the circuit?