Sample Paper 14

Class X 2026-27

Science (086)

Time: 3 Hours **Max. Marks: 80**

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. In plant cells, the process of photosynthesis, which converts light energy into chemical energy, occurs within which specific organelle?
(a) Mitochondrion
(b) Ribosome
(c) Chloroplast
(d) Nucleus

2. The hindbrain is composed of several parts that control various bodily functions. Which part acts as a bridge, relaying signals between the cerebrum and cerebellum, and helps regulate respiration?
(a) Medulla
(b) Pons
(c) Cerebellum
(d) Thalamus

3. A gardener takes a cutting from a rose plant and plants it in the soil, where it grows into a new, complete rose plant. This method of asexual reproduction is known as:
(a) Budding
(b) Spore Formation
(c) Fission
(d) Vegetative propagation

4. The evolutionary process by which new biological species arise from existing ones, often due to geographical or reproductive isolation, is called:
(a) Natural Selection
(b) Speciation
(c) Genetic Drift
(d) Artificial Selection

5. Which of the following best defines an ecosystem?
(a) The group of all organisms of the same species in an area.
(b) All the living organisms found within a specific geographical area.
(c) The non-living components like water, soil, and air in an area.
(d) All the living organisms in an area interacting with each other and their non-living environment.

6. Consider the following statements about the human digestive process:
(i) The chemical digestion of starch begins in the mouth with the help of salivary amylase.
(ii) The stomach secretes hydrochloric acid, which helps to kill harmful bacteria in food.
(iii) The final and complete digestion of all food components occurs in the large intestine.
(iv) The small intestine has numerous villi on its inner surface to increase the area for absorption.
Which of the above statements are correct?
(a) (i), (ii), and (iv)
(b) (i) and (iii) only
(c) (ii), (iii), and (iv)
(d) All are correct.

7. The level of glucose in the blood is tightly controlled by a negative feedback loop. This regulation is primarily managed by which pair of hormones secreted by the pancreas?
(a) Adrenaline and Noradrenaline
(b) Oestrogen and Progesterone
(c) Insulin and Glucagon
(d) Thyroxine and Calcitonin

8. **Assertion (A) :** In human males, the testes are located within the scrotum, outside the abdominal cavity.
Reason (R) : The formation of sperm requires a temperature that is slightly lower than the normal internal body temperature.
(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) :** Opting for public transport over private vehicles can help reduce air pollution in cities.
Reason (R) : Public transport vehicles are designed to run without releasing any pollutants.
(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. Veins are equipped with valves, while arteries generally are not. Justify this anatomical difference based on the function of these blood vessels.

11. Student to attempt either option A or B
A. List two different ways in which plants excrete their waste products.

OR

B. What is the function of the rings of cartilage present in the human trachea (windpipe)?

12. Our food chain is a part of a larger ecosystem. For instance, in a forest, grass is eaten by deer, which in turn is eaten by a tiger. What is the role of organisms like bacteria and fungi in this ecosystem?

13. Differentiate between tropic movements and nastic movements in plants, giving three points of distinction.

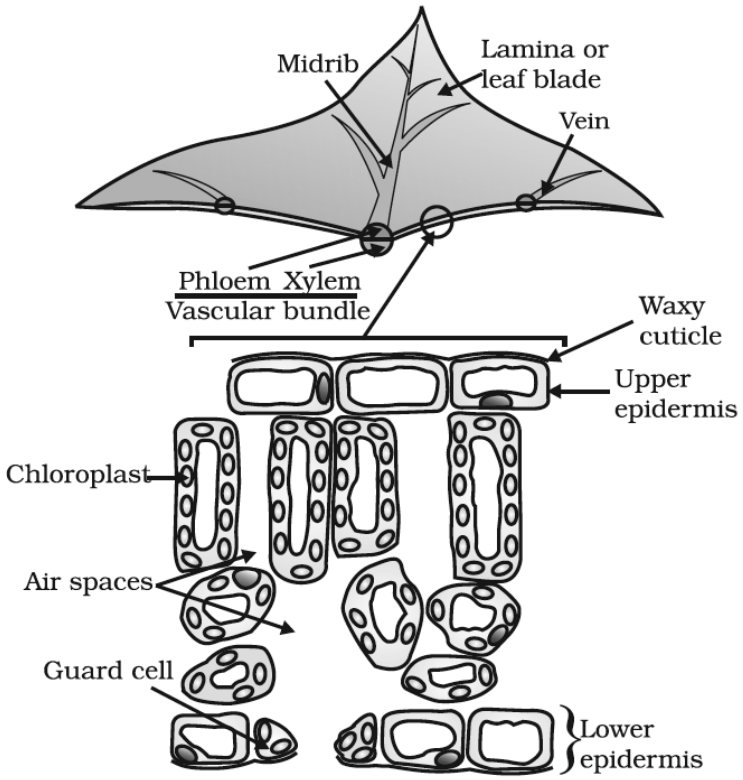
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14. The gene for brown eyes (B) is dominant over the gene for blue eyes (b). A man with brown eyes marries a woman with blue eyes, and their first child has blue eyes.

(i) What is the genotype of the man and the woman?

(ii) What is the probability that their second child will also have blue eyes? Show the cross.

15. A student is studying the cross-section of a leaf as shown in the diagram.



Cross-section of a leaf.

A. Identify the pores on the leaf surface. Name the cells that surround these pores and regulate their opening and closing.

OR

B. What are the three main events that occur during the process of photosynthesis? C. Why do these pores generally remain closed at night in most plants?

16. A. (i) Define pollination. What is the significance of pollination?

(ii) List two characteristics of wind-pollinated flowers.

(iii) How does cross-pollination promote genetic variation?

OR

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

(ii) State the functions of the testes and the seminal vesicles.

(iii) Why is it important for the testes to be located in the scrotum outside the abdominal cavity?

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SECTION-B

17. In the reaction $CuO(s) + H_2(g) \rightarrow Cu(s) + H_2O(l)$,
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.

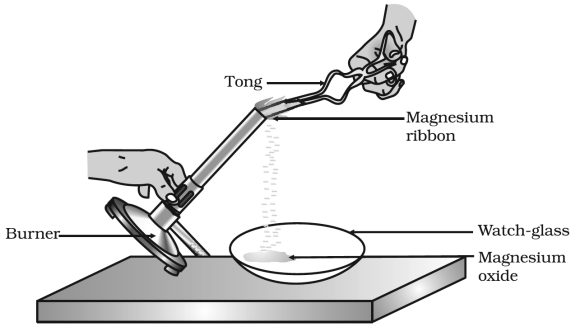
25. Explain why covalent compounds are generally poor conductors of electricity.

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 formula.
(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 studying the formation of images by a concave mirror. He makes the following observations:
I. When the object is placed at the center of curvature, the image is formed at the same position.
II. When the object is placed at infinity, the image is formed at the principal focus and is highly diminished.
III. When the object is placed between the pole and the principal focus, a real, inverted image is formed.
Choose from the following the correct option that lists the correct statements.

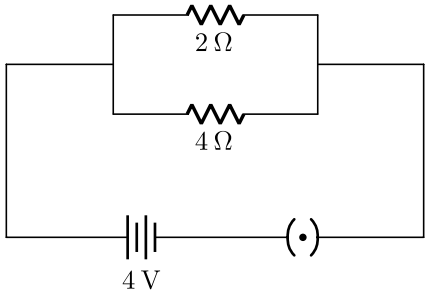
(a) I and II
(b) I and III
(c) I, II and III
(d) II and III

31. When a red light is shone on a prism, it does not produce a spectrum. What is the reason for this?
(a) Red light does not undergo refraction.
(b) The prism only separates white light.
(c) Red light is a single wavelength and cannot be dispersed further.
(d) The prism absorbs the red light.

32. **Assertion (A) :** The moon appears to be very large in size at the time of rising.
Reason (R) : This is due to atmospheric refraction, as the moon's light travels through a greater thickness of the atmosphere near the horizon.
(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. An object 5 cm long is placed 20 cm in front of a convex mirror of radius of curvature 30 cm.
A. Find the focal length of the mirror and image distance.
B. Calculate the size of the image.
C. State the nature of the image.

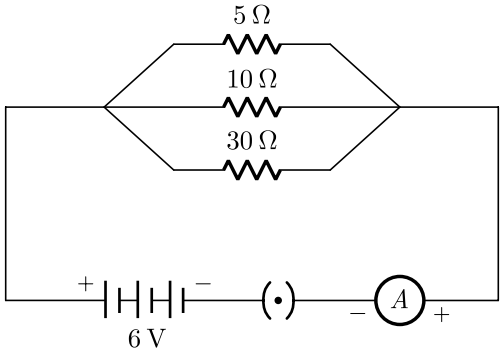
34. Attempt either option A or B
A.



1. Find out the equivalent resistance of the circuit
2. Whai the current flow through this combination ?

OR

B.



In the above circuit diagram calculate :
(a) the value of current through each resistor.
(b) the total current in the circuit.

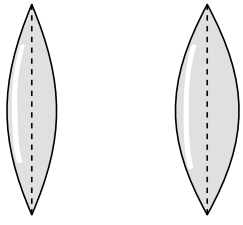
35. State the cause of dispersion of white light by a glass prism. How did Newton using two identical glass prism, show that white light is made of seven colours ? Draw a ray diagram to show the path of a narrow beam of while light through a combination of two identical prisms arranged together in inverted position with respect to each other when it is allowed to fall obliquely on one of the faces of the first prism of the combination ?

36. Draw a circuit diagram of an electric circuit containing a cell, a key, an ammeter, a resistor of 4Ω in series with a combination of two resistors (8Ω each) in parallel and a voltmeter across parallel combination. Each of them dissipate maximum energy and can withstand a maximum power of 16W without melting. Find the maximum current that can flow through the three resistors.

37. A student shines white light through a glass prism. He claims that seven colours are obtained on a screen.
(i) Is the student correct?
(ii) Name the phenomenon.

38. Lenses are objects made of transparent materials such as glass or clear plastic that has curved surfaces. Diverging lenses are thicker at their edges than at their centres and makes light rays passing through them spread out. Converging lenses are thicker in their middle than at this edges and make light rays passing through them focus at a point. These are used in spectacles to help people with poor vision see better. The converging lenses magnify by bending the rays of light that pass through them to meet at a point called focus. Thicker the converging lens is at its centre, the more its magnifies and closer the focus is to the lens.

(i) Ravi uses two lenses A and B of same size and same material as shown. P_1 and P_2 are the powers of A and B. An object is kept at the same distance from the lens between F and 2F of each lens on the principal axis in turn. Let I_1 and I_2 be the image formed by two lenses respectively. What is the relation of image distances of both lens ?

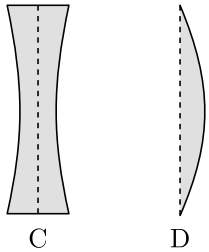


(a) Distance of image I_2 will be less than distance of I_1 from the lens.
(b) Distance of image I_2 will be greater than distance of I_1 from the lens.
(c) Size of image I_1 will be equal to size I_2.
(d) Size of image I_2 will be less than size I_2.

(ii) Write down the relation between the power of lens of both lenses ?

Attempt either subpart C or D.

(iii) Meenakshi uses above two lenses A and B along with another two lenses C and D, as shown :



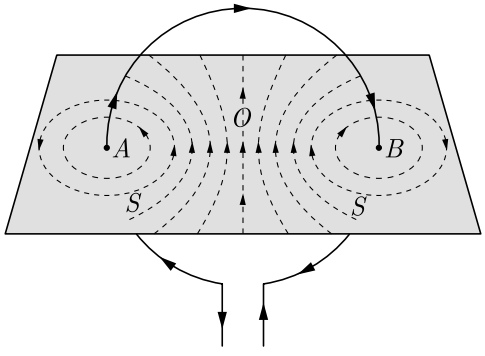
She is able to see the subject matter on the black board while sitting in the front row in the classroom but is unable to see the same matter while sitting in the last row.
Which of the above four lenses will she require to correct the defect in her vision? Why ?

OR

(iv) Natasha places an object on the principal axis of above given lens A. One end of this object coincides with the focus F and the other end with 2F. What will be the nature of the image formed by the lens on the other side ?

39. Attempt either option A or B.

A. When a current is passed through the circular loop of wire, a magnetic field lines near the coil are nearly circular and concentric. At the centre of the circular loop, the magnetic field lines are straight.
The strength of the magnetic field produced by a current-carrying circular coil (or circular wire) depends on :
(a) current flowing through the coil.
(b) radius of the circular coil.
(c) number of turns of wire in the circular coil.
The direction of the field lines can be found by applying Right-Hand Thumb Rule.



(i) State Right-hand Thumb rule.
(ii) A long horizontal power line is carrying a current of 100 A in the east-west direction. What is the direction of magnetic field at a point 1.0 m below it ?
(iii) What type of curve we get, between magnetic field and distance along the axis of a current carrying circular coil ?
(iv) If a current carrying straight conductor is placed in east-west direction, then find the direction of the force experienced by the conductor due to earth's magnetic field.

OR

B. Answer the following questions :
(i) What is the direction of magnetic field lines outside a bar-magnet ?
(ii) The magnetic field lines in a given region are getting crowded. What does it indicate ?
(iii) State one advantage of AC over DC.
(iv) When a current flows through a straight conductor, a magnetic field is produced around it. How can the direction of this magnetic field be determined?

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