Sample Paper 18

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 the pulmonary circuit of the human circulatory system, which blood vessel carries oxygenated blood from the lungs back to the left atrium of the heart?

(a) Aorta
(b) Superior Vena Cava
(c) Pulmonary Artery
(d) Pulmonary Vein

2. The growth of a plant shoot towards a source of light is an example of which type of tropic movement?

(a) Positive phototropism
(b) Negative phototropism
(c) Positive geotropism
(d) Negative geotropism

3. What are the two primary functions of the testes in the human male reproductive system?

(a) Production of eggs and secretion of oestrogen.
(b) Production of sperm and secretion of testosterone.
(c) Production of urine and secretion of seminal fluid.
(d) Production of testosterone and storage of sperm.

4. In Mendelian genetics, what is the term used to describe the first generation of offspring produced by crossing two pure-bred parent organisms with contrasting traits?

(a) P generation
(b) F1 generation
(c) F2 generation
(d) Hybrid generation

5. Waste can be categorized based on its source. Which of the following is an example of agricultural waste?

(a) Discarded electronic devices
(b) Plastic food wrappers
(c) Used hospital syringes
(d) Crop husks and cattle dung

6. Consider the following statements about plant hormones (phytohormones) :

(i) Auxins promote cell elongation and are responsible for phototropism.
(ii) Gibberellins play a role in stem elongation and breaking seed dormancy.
(iii) Cytokinins are primarily involved in promoting cell division.
(iv) Abscisic acid is a growth-promoting hormone that helps in flowering.

Which of the above statements are correct?

(a) (i) and (iv) only
(b) (ii) and (iii) only
(c) (i), (ii), and (iii)
(d) All are correct.

7. The human kidney is composed of approximately one million microscopic filtering units that are responsible for the formation of urine. What is this structural and functional unit of the kidney called?
(a) Neuron
(b) Alveolus
(c) Nephron
(d) Villus

8. **Assertion (A) :** The walls of arteries are thicker and more elastic than the walls of veins.
Reason (R) : In arteries, blood flows under high pressure as it is pumped from the heart.
(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) :** Sexual reproduction is generally a more time-consuming and complex process than asexual reproduction.
Reason (R) : Sexual reproduction is an extremely fast method of multiplication.
(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. Plants lack a specialised excretory system like animals, yet they produce waste products. Justify this statement by explaining two ways plants manage to get rid of their waste.

11. Student to attempt either option A or B.
A. State the role of (i) bile juice and (ii) trypsin in the human digestive system.

OR

B. What are the key differences between the transport of materials in xylem and phloem?

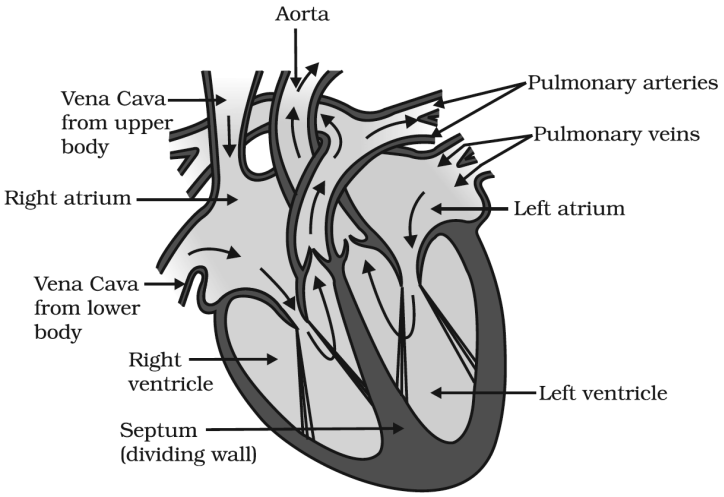
12. Suggest two effective methods that can be adopted at a household level to reduce the problem of waste generation.

13. Name the disease caused by the deficiency of the following hormones and state one major symptom for each :
(i) Insulin
(ii) Thyroxine
(iii) Growth Hormone (during childhood)

14. "Geographical isolation is a major factor in the speciation of sexually reproducing animals." Explain this statement with the help of an example.

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15. A patient is diagnosed with a condition affecting the pumping action of their heart. Refer to a diagram of the human heart to the following.



A. Why is the muscular wall of the left ventricle thicker than that of the right ventricle?

OR

B. What is the function of the septum that separates the right and left sides of the heart?

C. Trace the path of blood from the time it enters the right atrium from the body to its exit from the left ventricle to the body.

16. A. (i) Describe the process of budding in Hydra.
(ii) Draw a series of labelled diagrams to illustrate this process.
(iii) Why can't complex multicellular organisms like humans reproduce by budding?

OR

B. (i) Draw a labelled diagram of the longitudinal section of a flower.
(ii) What happens to the pollen grain after it lands on a suitable stigma?
(iii) What is the fate of the ovule and ovary after fertilization?

SECTION-B

17. In the reaction $MnO_2 + 4HCl \rightarrow MnCl_2 + 2H_2O + Cl_2$, Which substance is oxidized?
(a) MnO_2 (b) HCl
(c) $MnCl_2$ (d) H_2O

18. Which of the following is a strong mineral acid?
(a) Acetic acid (b) Citric acid
(c) Sulphuric acid (d) Lactic acid

19. Carbon is a non-metal that can exist in different forms called allotropes. Which allotrope of carbon is a good conductor of electricity?
(a) Diamond (b) Graphite
(c) Fullerene (d) Coal

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20. The characteristic properties of carboxylic acids are due to the presence of which functional group?
(a) –OH (Hydroxyl) (b) –CHO (Aldehyde)
(c) C=O (Ketone) (d) –COOH (Carboxyl)

21. Baking powder, used to make cakes soft and spongy, is a mixture of baking soda (sodium hydrogencarbonate) and a mild, edible acid. A common acid used for this is :
(a) Hydrochloric acid (b) Sulphuric acid
(c) Tartaric acid (d) Nitric acid

22. Solder is an alloy with a low melting point, making it ideal for welding electrical wires together. Solder is an alloy of which two metals?
(a) Lead and Tin (b) Copper and Zinc
(c) Copper and Tin (d) Iron and Chromium

23. The law of conservation of mass states that mass can neither be created nor destroyed in a chemical reaction. This is the fundamental principle behind :
(a) Writing the physical states of reactants. (b) Balancing chemical equations.
(c) Naming chemical compounds. (d) Predicting the speed of a reaction.

24. **Assertion (A) :** An iron nail placed in a copper sulphate solution turns brownish in colour.
Reason (R) : Iron is more reactive than copper and displaces it from its salt solution.
(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. What do you mean by a precipitation reaction? Explain with the help of a suitable chemical equation.

26. Attempt either option A or B.
(a) (i) What are structural isomers?
(ii) Draw the two structural isomers of butane (C_4H_{10}).

OR

(b) Draw the electron-dot structure for the following molecules:
(i) Methane (CH_4)
(ii) Ethene (C_2H_4)

27. Give a scientific reason for each of the following observations :
(a) School bells are made of metals rather than wood.
(b) The handles of cooking utensils are made of plastic or wood.
(c) Immersion rods used for heating water are made of metallic substances.

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28. When electricity is passed through an aqueous solution of sodium chloride (brine), it decomposes. This process is called the chlor-alkali process.
(a) Why is the process given the name 'chlor-alkali'?
(b) Name the three commercially important products obtained from this process.
(c) At which electrode (anode or cathode) is hydrogen gas produced? At which electrode is chlorine gas produced?

OR

(d) Mention one important use for each of the three products obtained in this process.

29. Attempt either option A or B.
(A) (a) Give two points of difference between soaps and detergents.
(b) Draw a well-labelled diagram of a soap micelle.
(c) Explain why scum is formed when soap is used with hard water. Write the general type of reaction that occurs.

OR

(B) (a) Define combination and decomposition reactions.
(b) Give one example of each type of reaction, writing a balanced chemical equation.
(c) What type of chemical reaction is the digestion of food in our body?

SECTION-C

30. A student makes the following statements about the image formed by a concave lens:
I. The image is always located between the optical center and the principal focus.
II. The image is always virtual and erect.
III. The image size decreases as the object moves closer to the lens.
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. Why is the sky blue and not violet, even though violet light scatters the most?
(a) The human eye is more sensitive to blue light.
(b) Violet light is absorbed by the atmosphere.
(c) The sun emits more violet light than blue light.
(d) The scattering of violet light is minimal compared to blue light.

32. **Assertion (A) :** When a light ray travels from a denser medium to a rarer medium, it bends away from the normal.
Reason (R) : The speed of light is greater in a denser medium than in a rarer medium.
(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.

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33. Define the principal focus of a concave mirror.

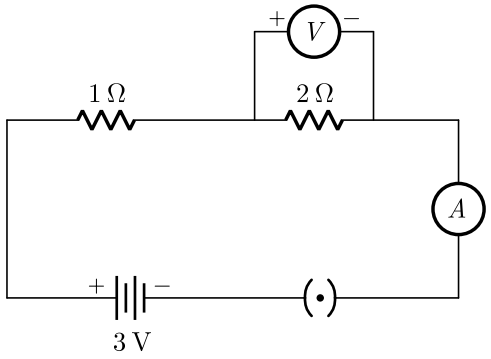
A. Describe the behaviour of rays parallel to the axis after reflection.

B. How is the principal focus represented in ray diagrams?

C. Draw a ray diagram for this case.

34. Attempt either option A or B

A.

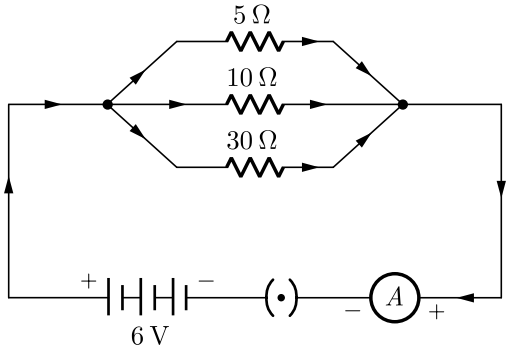


Find out the following in the above electric circuit

1. Reading of the ammeter
2. Reading of the voltmeter

OR

B. For the circuit diagram given below, calculate :



(a) the value of current through each resistor.

(b) the total current in the circuit.

35. Why is Tyndall effect shown by colloidal particles ? State four instances of observing the Tyndall effect.

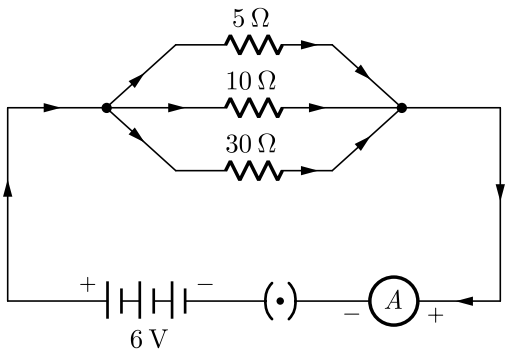
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36. For the circuit diagram given below, calculate :

(a) the value of current through each resistor.

(b) the total current in the circuit.

(c) the total effective resistance of the circuit.



37. A student places an object at infinity in front of a convex lens. He claims the image is formed at the focus.

(i) Is the statement correct?

(ii) What is the nature of the image?

38. "Change in path of a light ray as it passes from one medium to another medium is called refraction of light." When light travels from a rarer medium to a denser one, it bends towards the normal $(i > r)$ and when travels from a denser medium to a rarer one. it bends away from the normal $(i < r)$.

Where, i = Angle of incidence

and r = Angle of refraction

We can see refraction in our daily life, some of the examples are given below :

The bottom of a tank or pond containing water appears to be raised due to refraction of light which takes place when light rays pass from the pool of water into the air. The letters appear to be raised when viewed through a glass slab placed over the document because of refraction of light.

When a light ray enters in a glass slab, then the emergent ray is parallel to the incident ray but it is shifted sideward slightly.

In this case, refraction takes place twice, first when ray enters glass slab from air and second when exits from glass slab to air.

(i) What do you mean by optically rarer and denser medium ?

(ii) What is the cause of refraction ?

Attempt either subpart C or D.

(iii) Draw a ray diagram showing refraction through a glass slab.

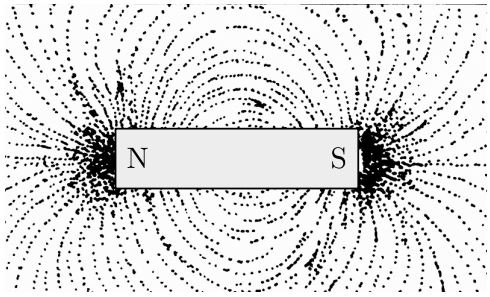
OR

(iv) Give one example of refraction from our daily life experience other than the two examples given above.

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39. Attempt either option A or B.

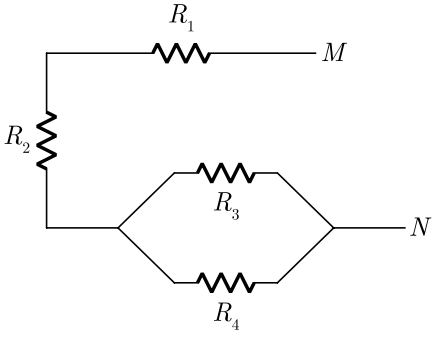
A. Study the diagram given below and answer the questions that follow :



(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 ?
(iv) Can magnetic field lines travel from the south pole to the north pole of a magnet? Explain the direction of magnetic field lines outside and inside the magnet.

OR

B. (i) For the combination of resistors shown in the following figure, find the equivalent resistance between M and N.



(ii) State Joule's law of heating.
(iii) Why we need a 5 A fuse for an electric iron which consumes 1 kW power at 220 V?
(iv) Why is it impracticable to connect an electric bulb and an electric heater in series?

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