Sample Paper 09

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 human respiratory system, where does the actual exchange of oxygen and carbon dioxide between the air and the bloodstream occur?

(a) Trachea (b) Bronchi
(c) Alveoli (d) Larynx

2. 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

3. The common bread mould (Rhizopus) reproduces asexually. It has a blob-on-a-stick structure that contains the cells involved in reproduction. This knob-like structure is known as the:

(a) Spore (b) Sporangium
(c) Hypha (d) Gamete

4. Some organisms possess organs that are reduced in size and no longer serve a useful function, though they were functional in their ancestors. What are these remnant organs called?

(a) Homologous organs (b) Analogous organs
(c) Vestigial organs (d) Fossilized organs

5. The thinning of the protective ozone layer in the stratosphere is a major environmental issue. This depletion is primarily caused by which class of man-made chemicals?

(a) Carbon oxides (b) Hydrocarbons
(c) Nitrogen oxides (d) Chlorofluorocarbons (CFCs)

6. Consider the following statements regarding transport in plants:

(i) Xylem tissue transports water and minerals from the roots upwards.
(ii) Phloem tissue transports prepared food from the leaves to other plant parts.
(iii) Transport in xylem is bidirectional, moving both up and down the plant.
(iv) The transport of food in phloem, or translocation, is an active process that requires energy.

Which of the above statements are correct?

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

7. Plant growth and development are regulated by hormones. Which plant hormone is primarily responsible for promoting cell division and is abundant in growing tissues like fruits and seeds?
(a) Abscisic acid (b) Auxin
(c) Cytokinin (d) Gibberellin

8. **Assertion (A) :** Gametes, the reproductive cells of an organism, are haploid.
Reason (R) : Gametes are produced by meiosis, a type of cell division that halves the number of chromosomes.
(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) :** In humans, the right lung is smaller than the left lung.
Reason (R) : The heart is located in the thoracic cavity and is tilted towards the left side.
(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. In an experiment, a destarched aquatic plant like Hydrilla is placed in water containing potassium hydroxide (KOH) and kept in sunlight. A starch test performed after a few hours is negative. What conclusion can be drawn from this experiment regarding photosynthesis? What is the role of KOH?

11. A. List any two structural differences between an artery and a vein.

OR

B. What are the functions of the following components of the human excretory system:
(i) Ureter and
(ii) Urinary bladder?

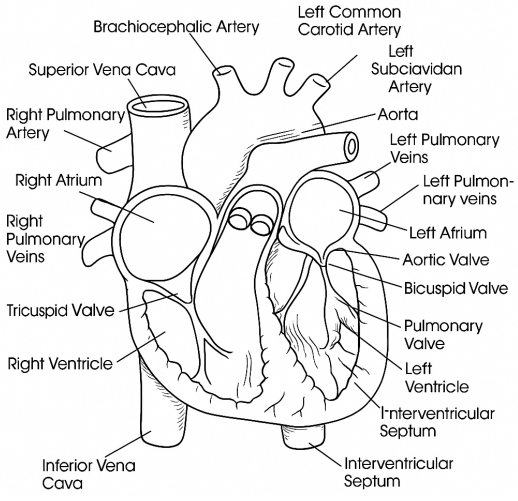
12. What are trophic levels? Using an example of a food chain, explain why the number of trophic levels is generally limited.

13. State the primary function of the following parts of the human brain:
(i) Cerebrum
(ii) Cerebellum
(iii) Medulla

14. In a cross between a pure-breeding round-seeded pea plant and a pure-breeding wrinkled-seeded pea plant:
(i) What will be the phenotype of the F1 generation?
(ii) If the F1 generation is self-pollinated, what will be the genotypic ratio in the F2 generation?
(iii) State the Mendelian law that this cross helps to illustrate.

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15. Refer to the schematic diagram of the human heart to the following questions.



A. Why are the walls of the atria (auricles) thinner than the walls of the ventricles?

OR

B. Name the largest artery in the human body. Which chamber of the heart does it arise from and what kind of blood does it carry?

C. Explain the significance of the double circulation system in warm-blooded animals like mammals.

16. Students to attempt either option A or B

A. (i) What is spore formation? Give an example of an organism that uses this method of reproduction.
(ii) How does this method help the organism to survive harsh environmental conditions?
(iii) Draw a neat, labelled diagram showing spore formation in Rhizopus.

OR

B. (i) Differentiate between a zygote and an embryo.
(ii) What is the role of the cervix and vagina during childbirth (parturition)?
(iii) Describe the changes the uterus undergoes each month in preparation for a possible pregnancy.

SECTION-B

17. When iron powder is heated with sulphur powder, iron(II) sulphide is formed: $Fe + S \rightarrow FeS$. In this reaction:

(a) Iron is reduced and Sulphur is oxidized.
(b) Iron is oxidized and Sulphur is reduced.
(c) Both Iron and Sulphur are oxidized.
(d) This is not a redox reaction.

18. A person suffering from indigestion due to acidity is often advised to take an antacid. An antacid contains a:

(a) Strong acid
(b) Strong base
(c) Neutral salt
(d) Mild base

19. Metals can be drawn into thin wires. This property is known as:

(a) Malleability
(b) Sonority
(c) Ductility
(d) Lustre

20. What colour change is expected when a few drops of a liquid soap solution are added to a pinch of turmeric powder?
(a) The yellow colour of turmeric remains unchanged.
(b) The yellow colour turns reddish-brown.
(c) The yellow colour turns blue.
(d) The yellow colour disappears.

21. A drain cleaning solution is highly corrosive and effective at dissolving grease. Its pH is most likely to be:
(a) 1 (b) 5
(c) 7 (d) 13

22. When a small amount of quicklime (calcium oxide) is added to a beaker of water, the primary observations are:
(a) The beaker becomes cold and a clear solution is formed.
(b) A hissing sound is heard and the beaker becomes hot.
(c) A yellow precipitate is formed.
(d) A colourless gas is evolved with effervescence.

23. When water is added to Plaster of Paris, it sets into a hard solid mass. This process is an example of a:
(a) Decomposition reaction (b) Displacement reaction
(c) Hydration reaction (Combination) (d) Redox reaction

24. **Assertion (A) :** All members of the alkane homologous series are saturated hydrocarbons.
Reason (R) : They contain only carbon-carbon and carbon-hydrogen single covalent bonds.
(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 true but R is false.
(d) A is false but R is true.

25. Gold is one of the most prized metals for making jewellery. State any two properties of gold that make it highly suitable for this purpose.

26. Attempt either option A or B.
(a) Roasting and Calcination are two common processes used in metallurgy to convert concentrated ores into metal oxides.
(i) What is the main difference between roasting and calcination in terms of the air supply?
(ii) Write a balanced chemical equation for the roasting of zinc blende (ZnS).
(iii) Write a balanced chemical equation for the calcination of calamine ($ZnCO_3$).

OR

(b) Explain the following terms related to metals and their properties:
(i) Malleability
(ii) Ductility
(iii) Sonority

27. A student places a clean magnesium ribbon in a test tube containing a blue solution of copper(II) sulphate.
(a) Describe two visible changes that would occur in the test tube after a few minutes.
(b) What type of chemical reaction is taking place?
(c) Write a balanced chemical equation for the reaction.

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28. Yeast is added to dough to make bread. The yeast carries out a process called fermentation, where it breaks down sugar (glucose) present in the dough to produce a gas 'X' and an alcohol 'Y'. The gas 'X' causes the dough to rise.

(a) Name the biological process carried out by the yeast.
(b) Identify the gas 'X' and explain its role in making the bread soft and spongy.
(c) The alcohol 'Y' evaporates during baking. Name this alcohol.
(d) Sometimes, if too much fermentation occurs, the bread may taste slightly sour. Suggest a reason for this.

OR

A student has two acidic solutions of the same concentration: Hydrochloric acid (HCl) and Acetic acid (CH_3COOH).

(a) Which of the two is considered a strong acid and which is a weak acid?
(b) Explain why a strong acid is a better conductor of electricity than a weak acid of the same concentration.
(c) If an equal amount of magnesium powder is added to both solutions, in which solution will the reaction be more vigorous? Justify your answer.

29. Attempt either option A or B.

(A) Soaps are salts of long-chain fatty acids, and their cleansing action is related to their unique molecular structure.
  (a) What is saponification?
  (b) Name the two main raw materials required for preparing soap in a laboratory.
  (c) Explain why soap does not work effectively in hard water.
  (d) What is the main by-product of the saponification reaction? State one of its uses.
  (e) Will a solution of soap in water be acidic, basic, or neutral?

OR

(b) Ethanol (C_2H_5OH) is an important industrial compound.
  (a) Write a balanced chemical equation for the complete combustion of ethanol.
  (b) What happens when ethanol is heated with excess concentrated sulphuric acid at 443 K? Name the reaction and write the chemical equation.
  (c) What happens when ethanol is warmed with ethanoic acid in the presence of a few drops of concentrated sulphuric acid? Name the product formed.
  (d) State two important uses of ethanol.

SECTION-C

30. A student is analyzing the types of images formed by spherical mirrors and makes the following statements:

I. A convex mirror can form a real image if the object is placed at its focus.
II. A concave mirror can form a virtual image if the object is placed between the pole and focus.
III. A concave mirror forms a magnified image when the object is at the center of curvature.

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 only

31. The twinkling of stars in the night sky is attributed to a phenomenon of light. Choose the correct option that explains this phenomenon.

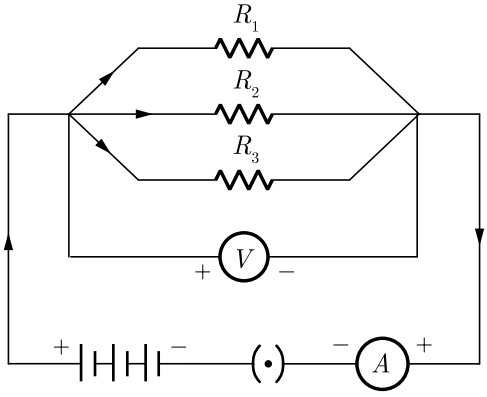
(a) Atmospheric reflection of starlight
(b) Atmospheric scattering of starlight
(c) Atmospheric refraction of starlight
(d) Atmospheric dispersion of starlight

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32. **Assertion (A) :** The color of the sky is blue due to the scattering of light by dust particles.
Reason (R) : Blue light has a shorter wavelength and scatters more than other colors.
(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. Half of a convex lens is covered with black paper.
A. State whether this lens will still produce an image of the object.
B. Explain how the brightness of the image will be affected.
C. Suggest an experiment to verify your answer.

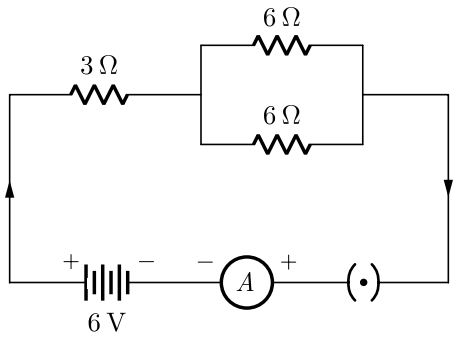
34. Attempt either option A or B
A. In the circuit given below, the resistors R_1, R_2 and R_3 have the values $10\,\Omega$, $20\,\Omega$ and $30\,\Omega$ respectively, which have been connected to a battery of 12 V.



Calculate
(a) the current through each resistor,
(b) the total circuit resistance, and

OR

B. In the given circuit, find :



(a) Total resistance of the network of resistors
(b) Current through ammeter A, and

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35. (i) Least distance of distinct vision of a long-sighted person is 40 cm. He wishes to reduce it to 25 cm by using spectacles. Find the power and nature of the lens used by him.

(ii) Draw a ray diagram to show the correction of the defect by using an appropriate lens.

36. Two identical resistors, each of resistance $50\,\Omega$ are connected

(i) in series

(ii) in parallel, in turn, to a battery of 10 V.

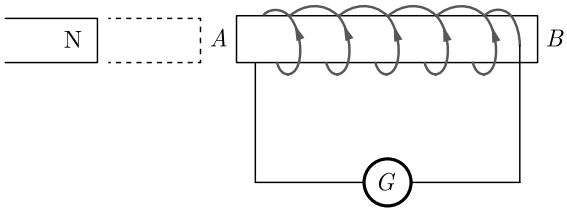
Calculate the ratio of power consumed in the combination of resistors in the two cases.

37. The diagram below shows a coil connected to a center zero galvanometer G. The galvanometer shows a deflection to the right when the N pole of a powerful magnet is moved to the right as shown.

(i) Explain why the deflection occurs in the galvanometer.

(ii) Does the direction of current in the coil appear clockwise or anti-clockwise when viewed from end A?

(iii) State the observation in G when the coil is moved away from N.



38. Student took three concave mirrors of different focal lengths and formed the experiment to see the image formation by placing an object different distances with these mirrors as shown in the following table:

Case No.	**Object-distance**	**Focal length**
I.	45 cm	20 cm
II.	30 cm	15 cm
III.	20 cm	30 cm

Now answer the following questions:

(a) List two properties of the image formed in Case I.

(b) In which one of the cases given in the table the mirror will form real image of same size and why? Attempt either subpart C or D.

(c) Name the type of mirror used by dentists. Give reason why do they use such type of mirrors.

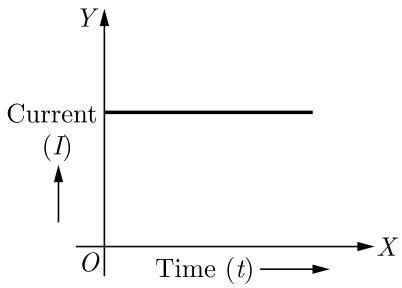
OR

(d) Look at the table and identify the situation (object distance and focal length) which resembles the situation in which concave mirrors are used as shaving mirrors? Draw a ray diagram to show the image formation in this case.

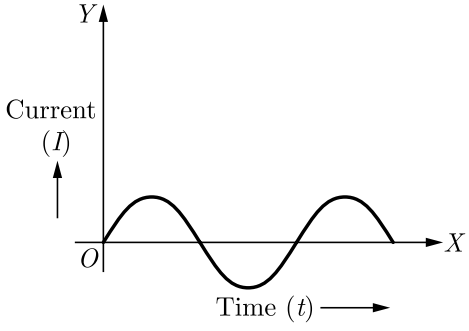
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39. Attempt either option A or B

A. In our daily life, we use two types of electric current whose current-time graphs are given below:



(I)



(II)

(i) Identify the types of current in each case.
(ii) Identify any one source of each type of current.
(iii) What is frequency of current used in domestic supply in India?
(iv) On the basis of graphs, write difference between the two currents.
(v) Out of two, which one is used in transmitting electric power over Long distance and why?

OR

B. (i) What is the function of earth wire in electrical instruments?
(ii) Explain what is short circuiting of an electric supply?
(iii) What is the usual current rating of the fuse wire in the line to feed:
(a) lights and fans?
(b) appliances of 2 kW or more power?

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