Sample Paper 24

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. The trachea (windpipe) is supported by rings of cartilage. What is the primary function of these cartilaginous rings?
(a) To filter dust from inhaled air.
(b) To warm the air before it reaches the lungs.
(c) To secrete mucus to trap foreign particles.
(d) To ensure that the air passage does not collapse.

2. Which part of the human brain is responsible for coordinating voluntary movements and maintaining the body's posture and balance?
(a) Cerebrum
(b) Cerebellum
(c) Medulla
(d) Pons

3. In a flower, the male gametes are contained within a specific microscopic structure that is transferred during pollination. This structure is the:
(a) Ovule
(b) Sepal
(c) Stigma
(d) Pollen grain

4. A genetic cross that involves studying the inheritance of a single pair of contrasting traits is known as a:
(a) Test cross
(b) Monohybrid cross
(c) Dihybrid cross
(d) Reciprocal cross

5. The depletion of the ozone layer is a significant environmental problem. It is primarily caused by the release of which man-made chemicals into the atmosphere?
(a) Carbon dioxide
(b) Chlorofluorocarbons (CFCs)
(c) Sulphur dioxide
(d) Methane

6. Consider the following statements about the reflex arc:
(i) It is the neural pathway that controls a reflex action.
(ii) Its components typically include a receptor, sensory neuron, spinal cord, motor neuron, and effector.
(iii) The brain is the main processing center for a simple reflex arc.
(iv) It enables a rapid and involuntary response to a stimulus.
Which of the above statements are correct?
(a) (i), (ii), and (iv)
(b) (ii) and (iii) only
(c) (i) and (iv) only
(d) All are correct.

7. What is the functional unit of the lung where the exchange of gases between the air and the blood occurs?
(a) Alveolus
(b) Nephron
(c) Neuron
(d) Bronchiole

8. **Assertion (A) :** When a pure tall pea plant is crossed with a pure dwarf pea plant, all the plants in the F1 generation are tall.
Reason (R) : The allele for tallness is dominant over the recessive allele for dwarfness.
(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 transport of water upwards through the xylem in plants is a passive process.
Reason (R) : Xylem transport is an active process that requires the plant to expend energy in the form of ATP.
(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. The inner lining of the small intestine is not smooth but has millions of tiny, finger-like projections. What are these projections called, and what is their primary advantage?

11. Student to attempt either option A or B.
A. Differentiate between arteries and veins based on two distinct features.

OR

B. What is transpiration? List two factors that can increase the rate of transpiration.

12. Using the following organisms, construct a food web with at least two interconnected food chains.
Organisms: Grass, Grasshopper, Frog, Snake, Hawk, Rabbit

13. Draw a neat diagram showing the location of the following endocrine glands in the human body:
(i) Thyroid gland
(ii) Pancreas
(iii) Adrenal glands

14. A homozygous tall pea plant (TT) is crossed with a homozygous dwarf pea plant (tt).
(i) What will be the genotype and phenotype of the F1 generation?
(ii) If the F1 plants are self-pollinated, what will be the phenotypic and genotypic ratios in the F2 generation?

15. A person undergoes a medical examination of their respiratory system. The following questions based on this system.
A. What happens to the air as it passes through the nasal cavity before entering the lungs?

OR

B. Describe the process of anaerobic respiration that occurs in human muscle cells during strenuous exercise and its consequence.
C. How is oxygen transported from the lungs to the various tissues of the body?

16. Attempt either option A or B.
A. (i) What is tissue culture?
(ii) List two main advantages of propagating plants using this technique.
(iii) Name one ornamental plant commonly grown using tissue culture.

OR

B. (i) What is meant by implantation? Where does this event take place in the human female?
(ii) Describe the structure and function of the placenta.
(iii) Why is it important for a woman to have a balanced diet during pregnancy?

SECTION-B

17. When silver chloride is placed in a transparent bottle and exposed to sunlight, it turns grey. This is an example of a:
(a) Combination reaction
(b) Photolytic decomposition reaction
(c) Displacement reaction
(d) Precipitation reaction

18. Which of the following solutions will turn blue litmus paper red?
(a) Sodium hydroxide solution
(b) Pure water
(c) Dilute hydrochloric acid
(d) Baking soda solution

19. Which of the following metals is considered the most ductile?
(a) Aluminium
(b) Copper
(c) Silver
(d) Gold

20. A hydrocarbon has the molecular formula C_3H_4. It belongs to the homologous series of:
(a) Alkanes
(b) Alkenes
(c) Alkynes
(d) Alcohols

21. The characteristic blue colour of copper sulphate crystals is due to the presence of:
(a) Copper ions (b) Sulphate ions
(c) Water of crystallisation (d) Covalent bonds

22. An element 'X' is soft and can be easily cut with a knife. It reacts explosively with cold water. The element 'X' is most likely:
(a) Magnesium (b) Aluminium
(c) Potassium (d) Iron

23. The reaction of calcium oxide (quicklime) with water to form calcium hydroxide (slaked lime) is a/an:
(a) Endothermic and combination reaction
(b) Exothermic and combination reaction
(c) Endothermic and decomposition reaction
(d) Exothermic and decomposition reaction

24. **Assertion (A) :** An alloy is a homogeneous mixture of two or more metals, or a metal and a non-metal.
Reason (R) : Alloys are prepared to improve the properties of metals, such as their hardness or resistance to corrosion.
(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 happens when an aqueous solution of lead(II) nitrate is mixed with an aqueous solution of potassium iodide? Write the balanced chemical equation for the reaction involved.

26. Attempt either option A or B.
A. Describe one chemical test to distinguish between an alcohol and a carboxylic acid.

OR

B. Differentiate between ethanol and ethanoic acid based on the following properties:
(i) Litmus test
(ii) Reaction with sodium carbonate
(iii) Odour

27. Explain the following metallurgical terms with one example for each.
(a) Roasting
(b) Calcination
(c) Reduction (Smelting)

28. The pH scale is crucial in understanding many biological and environmental processes. For instance, the human body works within a narrow pH range of 7.0 to 7.8, and acid rain is defined as rain with a pH of less than 5.6.
(a) Explain why acid rain is considered harmful to aquatic life.
(b) If a farmer finds the soil in his field to be too acidic, what can you infer about its pH? Why would he add slaked lime to the soil?

or

(c) During indigestion, what happens to the pH of the stomach?
(d) The sting of a honeybee contains an acid. What is a traditional remedy often applied to the area, and why does it provide relief?

29. Attempt either option A or B.

A. (a) Draw the electron-dot structure for a molecule of ethyne (C_2H_2).

(b) Give the IUPAC names for the following compounds:

(i) $CH_3 - CO - CH_2 - CH_3$

(ii) $CH_3CH_2CH_2OH$

(c) What is the molecular formula of the next homologue of propene (C_3H_6)?

OR

B. (a) What is saponification?

(b) Describe the cleansing action of soap with the help of a labelled diagram of a micelle.

(c) Why do soaps form a sticky precipitate (scum) when used in hard water?

SECTION-C

30. A student is analyzing the relationship between object distance and image formation for a concave mirror and makes the following statements:

I. When the object is placed at infinity, the image is formed at the focus.

II. When the object is placed at the center of curvature, the image is formed at the same position.

III. When the object is placed between the pole and focus, the image is formed behind the mirror.

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. A person cannot see objects far away. What is this defect of vision called, and what kind of lens is used for correction?

(a) Hypermetropia, Concave lens

(b) Hypermetropia, Convex lens

(c) Myopia, Concave lens

(d) Myopia, Convex lens

32. **Assertion (A) :** The focal length of a convex lens is positive.

Reason (R) : The principal focus of a convex lens lies on the same side as the incident light, and distances are measured from the optical center.

(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 mirror of focal length 15 cm is used to obtain an erect image.

A. Explain the condition under which a concave mirror forms an erect and magnified image.

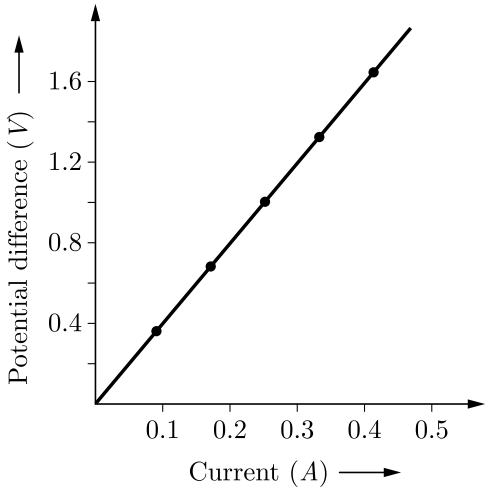
B. State the range of object distances for which this condition is satisfied.

C. Draw the ray diagram for this case.

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34. Attempt either option A or B.

A. A V-I graph for a nichrome wire is given below. What do you infer from this graph? Draw a labelled circuit diagram to obtain such a graph.

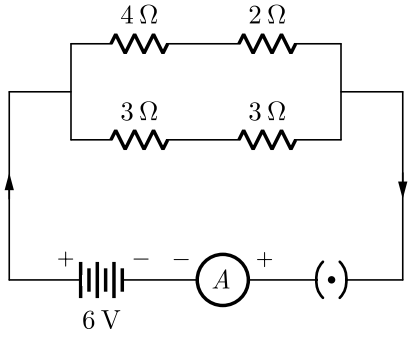


OR

B. Calculate the number of electrons that would flow per second through the cross-section of a wire when 1 A current flows in it.

35. While sitting in the last row, a student has difficulty in reading the blackboard clearly. State the defect of vision the student is suffering from. Mention two causes of this defect. Suggest a suitable lens for the correction of this defect.

36. In the given circuit, find :



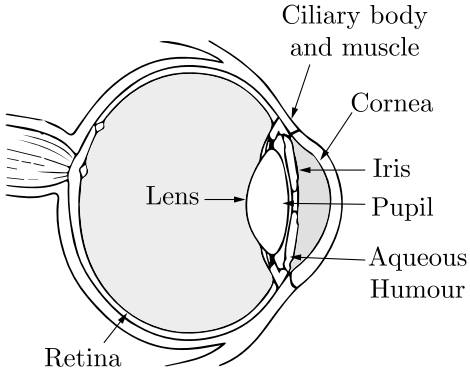
(a) Total resistance of the network of resistors

(b) Current through ammeter A

37. Explain two ways to induce current in a coil. When is the induced current produced highest ? State the rule used to find direction of induced current.

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38. The human eye is like a camera. Its lens system forms an image on a light-sensitive screen called the retina. Light enters the eye through a thin membrane called the cornea. It forms the transparent bulge on the front surface of the eyeball as shown in the figure. The crystalline lens merely provides the finer adjustment of focal length required to focus objects at different distances on the retina. We find a structure called iris behind the cornea. Iris is a dark muscular diaphragm that controls the size of the pupil. The pupil regulates and controls the amount of light entering the eye.



The Human Eye

There are mainly three common refractive defects of vision. These are

(a) myopia or near-sightedness,

(b) hypermetropia or far-sightedness, and

(c) Presbyopia. These defects can be corrected by the use of suitable spherical lenses.

(i) What is the function of pupil in the human eye ?

(ii) What is the far point and near point of human eye with normal vision ?
Attempt either subpart C or D.

(iii) A student has difficulty reading the blackboard while sitting in the last row. What could be the defect the child is suffering from ?

OR

(iv) What is the function of iris in human eye?

39. Attempt either option A or B.

A. (i) Derive the relation for the equivalent resistance when three resistors of resistances R_1, R_2 and R_3 are connected in parallel.

(ii) Find the minimum resistance that can be made using four resistors, each of $20\,\Omega$.

OR

B. (i) List the factors on which the resistance of a conductor in the shape of wire depends.

(ii) Why are metals good conductors of electricity whereas glass is a bad conductor of electricity? Give reason.

(iii) Why are alloys commonly used in electrical heating devices? Give reason.

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