Sample Paper 17

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. During photosynthesis, plants convert light energy into chemical energy stored in glucose. Which gas is released into the atmosphere as a major by-product of this vital process?

(a) Carbon Monoxide (b) Oxygen
(c) Nitrogen (d) Hydrogen

2. Which gland in the human body has a dual function, acting as both an endocrine gland (releasing hormones into the blood) and an exocrine gland (releasing enzymes into a duct)?

(a) Thyroid Gland (b) Adrenal Gland
(c) Pituitary Gland (d) Pancreas

3. The protozoan Leishmania, which causes the disease kala-azar, reproduces asexually by binary fission. What is a distinguishing feature of its division process?

(a) It divides into multiple daughter cells at once.
(b) It occurs in a definite longitudinal plane due to its whip-like flagellum.
(c) It can divide in any plane, similar to Amoeba.
(d) It only divides after forming a protective cyst around itself.

4. In genetics, what is the fundamental unit of heredity that is transferred from a parent to offspring and determines some characteristic of the offspring?

(a) Allele (b) Genotype
(c) Gene (d) Trait

5. What is considered the most effective and environmentally sound method for managing non-biodegradable wastes such as plastics, glass, and metals?

(a) Burying them deep underground in landfills.
(b) Burning them at high temperatures in incinerators.
(c) Following the principle of Reduce, Reuse, and Recycle.
(d) Disposing of them in oceans and large water bodies.

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6. Consider the following statements about the mechanism of breathing in humans :
(i) During inhalation, the diaphragm contracts and moves downwards.
(ii) The contraction of rib muscles during inhalation lifts the ribs and expands the chest cavity.
(iii) During exhalation, the diaphragm and rib muscles relax, decreasing the chest cavity volume.
(iv) The decrease in chest volume during exhalation increases the pressure inside, forcing air out of the lungs.
Which of the above statements are correct?
(a) (i) and (ii) only
(b) (iii) and (iv) only
(c) (i), (ii), and (iii) only
(d) All are correct.

7. The central nervous system is protected by a fluid that fills the space between the meninges (membranes). What is a primary function of this cerebrospinal fluid?
(a) To generate nerve impulses.
(b) To provide cushioning and act as a shock absorber for the brain.
(c) To produce hormones that regulate sleep cycles.
(d) To connect the brain to the spinal cord.

8. **Assertion(A) :** A flower is the reproductive unit of an angiosperm.
Reason (R) : It contains the reproductive organs : the stamen (male part) and the pistil (female part).
(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 wing of a bird and the wing of an insect are considered analogous organs.
Reason (R) : Analogous organs are structures that have the same evolutionary origin but perform different functions.
(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. Herbivorous animals like cows have a longer small intestine than carnivorous animals like tigers. Provide a biological reason for this difference.

11. Student to attempt either option A or B.
A. What is the composition of blood plasma?

OR

B. List two key differences between autotrophic and heterotrophic nutrition.

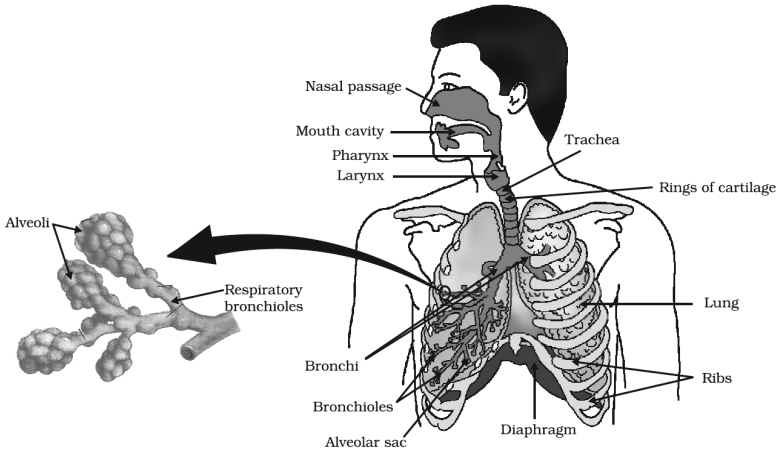
12. What is ozone? How does the ozone layer protect organisms on Earth? Name a class of synthetic chemicals responsible for its depletion.

13. Draw a neat diagram of the human brain and label the following parts :
(i) Cerebrum
(ii) Cerebellum
(iii) Medulla

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14. "Evolution should not be equated with progress from 'lower' to 'higher' forms." Justify this statement.

15. A patient visits a doctor complaining of shortness of breath. The doctor examines his respiratory system.



A. Name the primary site of gaseous exchange in the lungs. Describe two structural features of this site that facilitate this exchange.

OR

B. Explain the mechanism of inhalation, mentioning the roles of the rib cage and diaphragm.

C. Why does the air get warmed and moistened as it passes through the nasal passage?

16. A. (i) What is meant by grafting in plants?
(ii) Name two plants that are commonly propagated using this technique.
(iii) List two desirable characteristics that can be combined in a plant through grafting.

OR

B. (i) What is puberty? List two changes common to both boys and girls during this period.
(ii) What is the function of the scrotum in the human male?
(iii) Differentiate between a zygote and a fetus.
(iii) A zygote is the single diploid cell formed by the fusion of a sperm and an egg. A fetus is a later stage of embryonic development, where all the major body parts are recognizably developed, typically from about the 8th week of pregnancy until birth.

SECTION-B

17. A chemical reaction in which a single compound breaks down to give two or more simpler substances is known as a :
(a) Combination reaction
(b) Decomposition reaction
(c) Displacement reaction
(d) Redox reaction

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18. Which gas is typically produced when a dilute acid, such as hydrochloric acid, reacts with an active metal like zinc?

(a) Oxygen (b) Hydrogen
(c) Chlorine (d) Carbon dioxide

19. The property of metals by which they can be beaten into thin sheets is called :

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

20. Vinegar is a commonly used condiment in kitchens and for food preservation. It is a dilute aqueous solution of :

(a) Formic acid (b) Ethanoic acid
(c) Sulphuric acid (d) Tartaric acid

21. A sample of soil is mixed with water and allowed to settle. The clear supernatant solution turns the pH paper yellowish-orange. Which of the following would change the colour of this pH paper to greenish-blue?

(a) Lemon juice (b) Vinegar
(c) Common salt (d) An antacid

22. The most abundant metal in the earth's crust is aluminium. Its chief ore, from which it is extracted, is :

(a) Cinnabar (b) Calamine
(c) Haematite (d) Bauxite

23. For the rusting of an iron object to occur, the presence of which of the following is essential?

(a) Air only (b) Water only
(c) Both air (oxygen) and water (d) Either air or water

24. **Assertion (A) :** Detergents are more effective cleaning agents than soaps when used in hard water.
Reason (R) : The charged ends of detergents do not form insoluble precipitates with the calcium and magnesium ions in hard water.

(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 is the main difference between a displacement reaction and a double displacement reaction? Write one example equation for each.

26. Attempt either option A or B.

(A) An element 'X' has an atomic number of 12, and an element 'Y' has an atomic number of 17.
  (i) Write the electronic configuration for both 'X' and 'Y'.
  (ii) Show the formation of a bond between 'X' and 'Y' using electron-dot structures.
  (iii) What is the nature of the bond formed?

OR

(B) What is an ionic bond? List any two properties of compounds formed by ionic bonds.

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27. A solution of a substance 'X' is used for whitewashing.
(a) Name the substance 'X' and write its chemical formula.
(b) Write the balanced chemical equation for the reaction of substance 'X' with water.
(c) Explain why a shiny finish appears on the walls two to three days after whitewashing.

28. Ethanol is a colourless liquid, soluble in water, and has various industrial and commercial uses. It is often produced by the fermentation of sugars.
(a) What happens when ethanol is heated with an alkaline solution of potassium permanganate? Name this type of reaction.
(b) What is observed when a small piece of sodium is dropped into ethanol? Write the corresponding chemical equation.

OR

(b) The consumption of alcohol can have serious health consequences. List any two harmful effects of drinking alcohol.

29. Attempt either option A or B.
(A) (a) What is a homologous series?
(b) Write the name and formula of the fourth member of the alkane homologous series.
(c) Write the name and draw the structure of an aldehyde with 4 carbon atoms.
(d) Name the process by which vegetable oils are converted into solid fats (vanaspati ghee).

OR

(B) (a) Draw a neat, labelled diagram showing the electrolytic refining of an impure copper rod.
(b) In this process, what is used as the anode, the cathode, and the electrolyte?

SECTION-C

30. A student is analyzing the relationship between object distance, image distance, and focal length for spherical mirrors and makes the following statements:
I. The mirror formula is given by $1/f = 1/v + 1/u$
II. The magnification formula is $m = h'/h = -v/u$
III. Both formulas are valid for plane mirrors as well.
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 reason for the advanced sunrise and delayed sunset phenomenon?
(a) Scattering of light (b) Total internal reflection
(c) Atmospheric refraction (d) Dispersion of light

32. **Assertion (A) :** The power of a concave lens is negative.
Reason (R) : A concave lens is a diverging lens, which means its focal length is negative.
(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. A doctor prescribes a corrective lens of power +1.5 D.

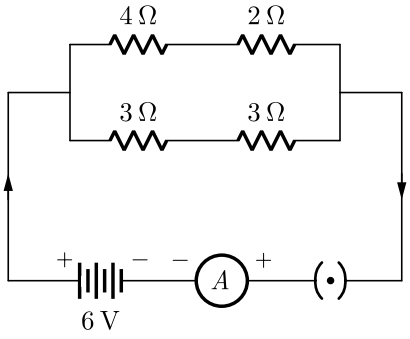
A. Find the focal length.

B. Identify whether the lens is converging or diverging.

C. State which eye defect it corrects.

34. Attempt either option A or B

A. n the given circuit, find :



(a) Total resistance of the network of resistors

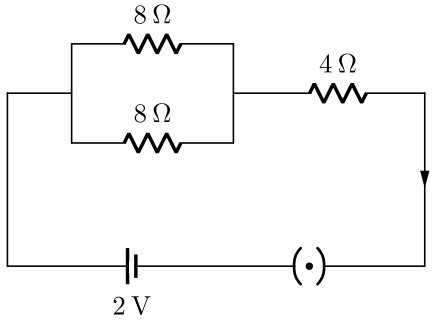
(b) Current through ammeter A

OR

B. Study the given electric circuit and calculate:

(i) the current flowing through the 4 Ω resister and

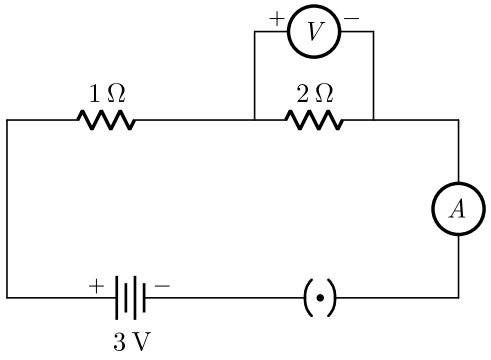
(ii) potential difference across the combination of two resistor of 8 Ω each.



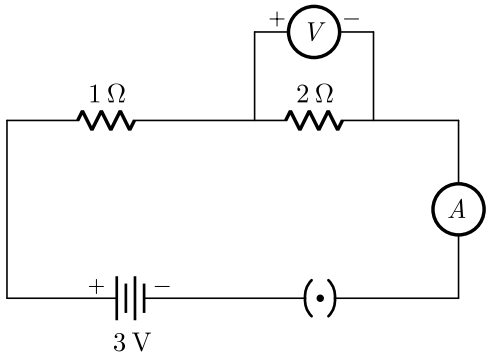
35. A star appears on the horizon. What is the true position of the star ? Explain with the help of a diagram.

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36. What would be the reading of ammeter and voltmeter in the given circuit?



37. What would be the reading of ammeter and voltmeter in the given circuit?



38. Is there a relationship between the radius of curvature R, and focal length f, of a spherical mirror ? For spherical mirrors of small apertures, the radius of curvature is found to be equal to twice the focal length. We put this as $R = 2f$. This implies that the principal focus of a spherical mirror lies midway between the pole and centre of curvature.

(i) Write relation between radius of curvature and focal length.

(ii) For which type of mirrors above relation is verified?
Attempt either subpart C or D.

(iii) What should be size of the aperture ?

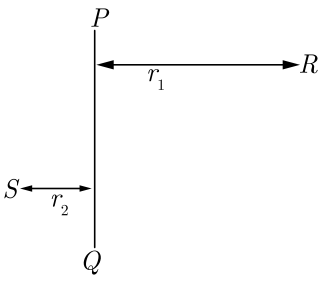
OR

(iv) Where is the principle focus of a spherical mirror lies?

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39. Attempt either option A or B.

A. PQ is a current carrying conductor in the plane of the paper as shown in the figure below.



(i) Find the directions of the magnetic fields produced by it at points R and S? Given $r_1 > r_2$, where will the strength of the magnetic field be larger? Give reasons.

(ii) Field strength at which point will be greater?

(iii) If the polarity of the battery connected to the wire is reversed, how would the direction of the magnetic field be changed?

(iv) Explain the rule that is used to find the direction of the magnetic field for a straight current carrying conductor.

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