Sample Paper 23

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 digestive system, the breakdown of which food component begins in the stomach?
(a) Carbohydrates
(b) Proteins
(c) Fats
(d) Vitamins

2. What is the function of receptors in an organism's nervous system?
(a) To transmit commands from the brain to muscles.
(b) To detect specific types of stimuli from the environment.
(c) To form a protective sheath around the axon.
(d) To release chemical messengers into a synapse.

3. The unicellular organism Amoeba reproduces by splitting into two identical daughter cells when it reaches its full size. This common method of asexual reproduction is called:
(a) Budding
(b) Regeneration
(c) Spore formation
(d) Binary fission

4. In the study of heredity, what is the correct term for a specific, observable characteristic of an individual, such as height or seed colour?
(a) Gene
(b) Allele
(c) Trait
(d) Genotype

5. Why are synthetic materials like plastic considered non-biodegradable?
(a) Because they are too hard to be broken physically.
(b) Because they are man-made and not natural.
(c) Because the enzymes of decomposer microorganisms cannot break them down.
(d) Because they are soluble in water and wash away.

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6. Consider the following statements about human blood vessels:
(i) Arteries have thick, elastic walls and carry blood away from the heart.
(ii) Veins have thinner walls than arteries and carry blood towards the heart.
(iii) The pulmonary artery is a unique artery that carries deoxygenated blood.
(iv) Capillaries are thick-walled vessels that connect arteries and veins.
Which of the above statements are correct?
(a) (i) and (iv) only
(b) (i), (ii), and (iii)
(c) (ii) and (iv) only
(d) All are correct.

7. Which of the following plant hormones is known as a growth inhibitor and is responsible for effects like the wilting of leaves and promoting seed dormancy?
(a) Auxin
(b) Gibberellin
(c) Cytokinin
(d) Abscisic acid (ABA)

8. **Assertion (A) :** Green plants form the first trophic level and are called producers.
Reason (R) : They can synthesize their own food from inorganic raw materials using light energy.
(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 testes in human males are located inside the main abdominal cavity.
Reason (R) : The scrotum maintains a temperature slightly lower than the body temperature, which is necessary for sperm production.
(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 movement of the diaphragm muscle is essential for breathing. Explain the role of the diaphragm during the process of inhalation and exhalation.

11. Student to attempt either option A or B.
A. Differentiate between blood and lymph.

OR

B. How do plants get rid of their gaseous waste products?

12. What does the Ten Percent Law state about the transfer of energy in an ecosystem? Why does this law limit the number of trophic levels in a food chain?

13. What is phototropism? Explain the mechanism by which it occurs in a plant shoot.

14. In a cross between a heterozygous tall pea plant (Tt) and a homozygous dwarf pea plant (tt):
(i) Show the possible genotypes of the offspring using a Punnett square.
(ii) What will be the phenotypic ratio of the offspring?
(iii) What will be the genotypic ratio of the offspring?

15. A person is advised to drink plenty of water to ensure the proper functioning of their excretory system. The following questions related to this system.

A. What is the main function of the kidneys?

OR

B. Describe the three main steps involved in the formation of urine in a nephron.

C. What is the role of the urinary bladder and urethra in the excretory system?

16. Attempt either option A or B.

A. (i) How does Plasmodium (the malarial parasite) reproduce asexually? Name the process.
(ii) How is this method advantageous fthe organism?
(iii) How does this method differ from binary fission in Amoeba?

OR

B. (i) What are the functions of the testes in the human male reproductive system?
(ii) What is the role of the placenta during pregnancy?
(iii) Name two barrier methods of contraception.

SECTION-B

17. In the reaction $ZnO + C \rightarrow Zn + CO$, which substance undergoes reduction?

(a) C (b) CO
(c) Zn (d) ZnO

18. Which one of the following is true for an acidic solution?

(a) pH 7 (b) pH < 7
(c) pH $= 7$ (d) pH $= 14$

19. The ability of metals to be drawn into thin wires is known as:

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

20. Which of the following organic compounds contains a carbon-carbon triple bond?

(a) Ethene (b) Ethane
(c) Ethyne (d) Ethanol

21. The chemical name for washing soda, a salt used for softening hard water, is:

(a) Sodium carbonate (b) Sodium chloride
(c) Sodium hydrogencarbonate (d) Sodium carbonate decahydrate

22. Roasting is a process in metallurgy primarily used for converting:

(a) Sulphide ores into oxides. (b) Carbonate ores into oxides.
(c) Oxide ores into metals. (d) Sulphide ores into sulphates.

23. The decomposition of vegetable matter into compost is an example of:

(a) An endothermic reaction (b) A displacement reaction
(c) An exothermic reaction (d) A neutralisation reaction

24. **Assertion (A) :** Ethanoic acid is considered a weak acid.
Reason (R) : It does not ionise completely when dissolved in an aqueous 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. Differentiate between metals and non-metals on the basis of their
(i) malleability and
(ii) electrical conductivity.

26. Attempt either option A or B.
A. (i) What is hydrogenation?
(ii) State the industrial application of this process.
(iii) Write a balanced chemical equation for a typical hydrogenation reaction.

OR

B. (i) Why are detergents considered better cleansing agents than soap, especially in hard water?
(ii) Briefly explain the cleansing action of detergents.

27. A science student takes a small amount of quicklime in a beaker and slowly adds water to it.
(a) What two noticeable observations will the student make?
(b) Name the product formed and write its chemical formula.
(c) What is the chemical nature of the product formed (acidic/basic/neutral)?

28. Corrosion is a natural process that gradually deteriorates refined metals. The rusting of iron is a prominent example of corrosion.
(a) What is rust? Write its general chemical formula.
(b) List the two essential conditions required for the rusting of iron.

OR

(c) Suggest two different methods that can be used to prevent the rusting of iron articles.
(d) When a copper object is left exposed to moist air for a long time, it acquires a dull green coating. What is the chemical name of this green substance?

29. Attempt either option A or B.
A. (a) Draw the electron-dot structure for a molecule of nitrogen (N_2). How many covalent bonds are there between the two nitrogen atoms?
(b) What are the two unique properties of carbon that lead to the formation of a very large number of organic compounds?
(c) Write the name and draw the structure of the saturated hydrocarbon containing 3 carbon atoms.

OR

B. An organic compound 'A' (a liquid) on heating with excess concentrated H_2SO_4 at 443 K forms an unsaturated compound 'B'. Compound 'B' on addition of one mole of hydrogen in the presence of a nickel catalyst forms a saturated compound 'C'.
(a) Identify the compounds A, B, and C, assuming they all contain two carbon atoms.
(b) Write the chemical equation for the conversion of A to (b)
(c) Write the chemical equation for the conversion of B to (c)

SECTION-C

30. A student makes the following statements about image formation by spherical mirrors:

I. A concave mirror can form a real, inverted, and magnified image.

II. A convex mirror can form a real, inverted, and diminished image.

III. A concave mirror can form an erect, virtual image.

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. Which of the following phenomena is responsible for the splitting of white light into its constituent colors by a prism?

(a) Refraction
(b) Reflection
(c) Dispersion
(d) Scattering

32. **Assertion (A) :** The rainbow is a natural spectrum appearing in the sky after a rain shower.
Reason (R) : The raindrops act as a prism and an internal reflection occurs which causes dispersion of light.

(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. Two identical resistors of $24\,\Omega$ each are connected to a battery of 6 V. Calculate the ratio of the power consumed by the resulting combinations with
   (a) minimum resistance and
   (b) maximum resistance.

OR

B. Write the importance of electricity in our everyday life.

35. The apparent altitude of stars appears to be generally more than their true altitudes. Explain, how.

36. (i) What is meant by resistance of a conductor? Define its SI unit.

(ii) List two factors on which the resistance of a rectangular conductor depends.

(iii) How will the resistance of a wire be affected if its.
   (1) length is doubled, and
   (2) radius is also doubled ?
   Give justification for your answer.

37. 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.

38. After coming from playground, Tanu feels very hungry. But still some more time was required by her mother to cook food. While waiting on dining table Tanu was playing with her spoon. All of sudden she observed two different orientations of her face when she looked her face from both sides of spoon.

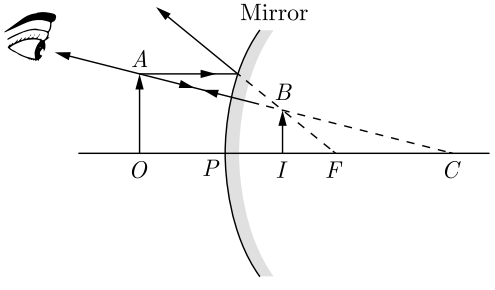
She was confused why the orientation of her face changed in two cases. She was curious to know why her reflected image appears upside down in the one surface of a spoon but the correct way up in the opposite surface.



(i) Which type of image is formed on the both surface of spoon?

(ii) As tanu move concave surface of spoon towards her face, again she find that there comes a point (provided the spoon is big enough) where her image flips from inverted to upright. State the condition under which it happens ? Is this image real or virtual?

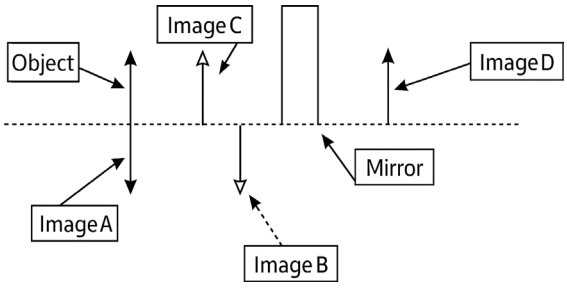
(iii) The given ray diagram depict the correct explanation of the image formed by one surface of the spoon. Name the surface which can form the image as depicted in given ray diagram?



OR

(iv) Tanu was trying to form image using a concave mirror. She got an inverted and real image of same size of the object. Given figure shows four possible positions of the image formed. Figure out the correct position and justify it.

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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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