Sample Paper 28

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. Autotrophic nutrition is the mode of nutrition where an organism :
(a) Depends on other organisms for food.
(b) Synthesizes its own food from simple inorganic sources.
(c) Breaks down dead and decaying organic matter.
(d) Lives on or inside another organism to derive nutrition.

2. Besides acting as a pathway for nerve signals between the brain and the rest of the body, what is another major function of the spinal cord?
(a) To control conscious thought and memory.
(b) To serve as the coordinating center for reflex actions.
(c) To regulate body temperature and hunger.
(d) To produce essential hormones for growth.

3. The microorganism yeast reproduces asexually by forming a small protuberance on the parent cell, which then grows and detaches. This method is known as :
(a) Fragmentation
(b) Budding
(c) Spore formation
(d) Fission

4. To ensure he began his genetic experiments with pure-bred (homozygous) pea plants, what initial step did Gregor Mendel take?
(a) He crossed different varieties of pea plants.
(b) He self-pollinated the plants for several generations.
(c) He only used the plants that grew the fastest.
(d) He imported seeds from different regions.

5. What does a food chain illustrate in an ecosystem?
(a) The total number of species present.
(b) The interaction between living and non-living components.
(c) The linear pathway of energy and nutrient transfer between organisms.
(d) The complete life cycle of the top predator.

6. Consider the following statements about digestive enzymes in humans :
(i) Salivary amylase begins the chemical digestion of starch in the mouth.
(ii) Pepsin is an enzyme in the stomach that initiates the digestion of proteins.
(iii) Lipase is the main enzyme responsible for the breakdown of emulsified fats.
(iv) Trypsin is an enzyme found in the stomach that digests carbohydrates.
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. Which plant hormone, synthesized at the shoot tip, is responsible for the phenomenon of phototropism (the bending of the plant towards light)?
(a) Gibberellin
(b) Cytokinin
(c) Abscisic acid
(d) Auxin

8. **Assertion (A) :** The placenta forms a vital connection between the mother's body and the developing foetus.
Reason (R) : It facilitates the exchange of nutrients, oxygen, and waste products between the maternal and foetal blood.
(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) :** An ecosystem with a complex food web is generally more stable than one with a few simple food chains.
Reason (R) : A food web is composed of a single, linear pathway for energy transfer.
(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 wall of the small intestine has numerous finger-like projections called villi, which are richly supplied with blood vessels. What is the advantage of this structural feature?

11. Student to attempt either option A or B.
A. What is the function of haemoglobin in our body? What is the majconsequence of its deficiency?

OR

B. How do plants transport water from the soil to the leaves?

12. What is a food chain? Give an example of a four-step food chain that might operate in a grassland ecosystem.

13. What are plant hormones? Name the plant hormone responsible for phototropism and briefly explain its mechanism.

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14. In a dihybrid cross between a pea plant with round yellow seeds (RRYY) and a plant with wrinkled green seeds (rryy), the following :

(i) What will be the phenotype of the F1 generation?

(ii) What will be the genotype of the F1 generation?

(iii) What phenotypic ratio is expected in the F2 generation upon selfing the F1 plants?

15. The human body needs to filter waste from the blood. The following questions related to the excretory system.

A. What is the basic filtration unit of the kidney called?

OR

B. What is meant by selective reabsorption, and why is it important?

C. A person's kidneys have failed. What is the medical procedure used to filter their blood, and what is its basic principle?

16. Attempt either option A or B.

A. (i) What is meant by vegetative propagation?

(ii) List two benefits for a farmer using this method.

(iii) Give two examples of plants that are commonly grown using this method.

OR

B. (i) What is the role of the placenta during pregnancy?

(ii) What is the menstrual cycle?

(iii) List two contraceptive methods and state their basic working principle.

SECTION-B

17. In the reaction $H_2(g) + Cl_2(g) \rightarrow 2HCl(g)$, which of the following statements is correct?

(a) Hydrogen is oxidized, and Chlorine is reduced.

(b) Hydrogen is reduced, and Chlorine is oxidized.

(c) Both Hydrogen and Chlorine are oxidized.

(d) Both Hydrogen and Chlorine are reduced.

18. The sting of a wasp is basic in nature. Which of the following would be suitable to apply to the affected area for relief?

(a) Baking soda solution

(b) Soap solution

(c) Vinegar

(d) Milk of Magnesia

19. Which of the following non-metals is renowned for its extreme hardness?

(a) Sulphur (b) Graphite

(c) Iodine (d) Diamond

20. The alkene with the molecular formula C_4H_8 is known as butene. How many hydrogen atoms are present in one molecule of butene?

(a) 4 (b) 6

(c) 8 (d) 10

21. Gypsum is a soft sulphate mineral used as a fertilizer and as the main constituent in many forms of plaster. Its chemical formula is :

(a) $CaSO_4 \cdot \frac{1}{2}H_2O$ (b) $CaSO_4 \cdot 2H_2O$

(c) $CaSO_4 \cdot H_2O$ (d) $CaCO_3$

22. Which of the following metals is so unreactive that it does not react with oxygen, even at very high temperatures?

(a) Zinc (b) Iron

(c) Copper (d) Gold

23. When balancing the chemical equation $Mg + O_2 \rightarrow MgO$, what is the stoichiometric coefficient for magnesium (Mg) in the final balanced equation?

(a) 1 (b) 2

(c) 3 (d) 4

24. **Assertion (A) :** Covalent compounds generally have low melting and boiling points.
Reason (R) : The forces of attraction between the molecules of covalent compounds are very strong.

(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 observed when a solution of potassium iodide is added to a solution of lead(II) nitrate? Name the type of reaction.

26. Attempt either option A or B.

A. An ore on being heated in the air produces sulphur dioxide gas.
   (i) What kind of ore is this?
   (ii) Describe the steps involved in its conversion into the corresponding metal.

OR

B. Show the formation of magnesium chloride ($MgCl_2$) from its constituent elements using electron-dot structures.

27. Give a chemical test to distinguish between the following pairs of compounds :

(a) Ethane and Ethene
(b) An alcohol and a Carboxylic acid

28. Indicators are substances that show a distinct colour change in acidic and basic media. A student tests three solutions X, Y, and Z. Solution X turns blue litmus red. Solution Y turns red litmus blue. Solution Z shows no change on either litmus paper.

(a) What is the chemical nature of solutions X, Y, and Z?
(b) Which of these solutions would have a pH value of 7?

OR

(c) What colour change would be observed if phenolphthalein is added to solution Y?
   (i) What colour change would be observed if methyl orange is added to solution X?
   (ii) What would happen to the pH of solution Y if some of solution X is added to it?

29. Attempt either option A or B.

A. (a) What is a homologous series?
(b) Identify the functional group in the compound CH_3COCH_3.
(c) Write the name and chemical formula of the fourth member of the alcohol homologous series.
(d) What is the difference in molecular mass (in 'u') between any two adjacent homologues?

OR

B. (a) What are substitution reactions?
(b) Why are substitution reactions a characteristic property of saturated hydrocarbons?
(c) Describe what happens when methane reacts with chlorine in the presence of sunlight. Write the chemical equation for the formation of the first product.

SECTION-C

30. A student is studying the image formation by a concave lens and makes the following statements :

I. The image is always formed on the same side of the object.
II. The image is always virtual and erect.
III. The image is always magnified.

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 ray of light passes from air to a medium of refractive index 'n'. What is the correct relationship between the angle of incidence 'i' and the angle of refraction 'r'?

(a) $\sin(i) = n \cdot \sin(r)$
(b) $\sin(i) = \sin(r)/n$
(c) $\sin(r) = n \cdot \sin(i)$
(d) $\sin(i) = \sin(r) \cdot n^2$

32. **Assertion (A) :** The image formed by a convex mirror is always diminished.
Reason (R) : The convex mirror diverges the parallel rays of light, causing them to appear to originate from a point behind the mirror.

(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. Describe image formation by concave lens for any position of object.

A. Where is image formed?
B. State nature and size.
C. Draw ray diagram.

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34. Attempt either option A or B.

A. An electric heater connected to a 220 V line has two resistance coils of 22 Ohms each. Calculate the current if these coils are used
   (a) Separately
   (b) In series
   (c) In parallel.

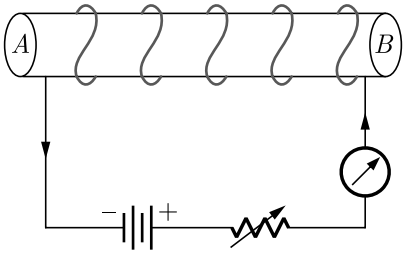
OR

B. (i) Why are electric bulbs filled with chemically inactive nitrogen or argon ?
   (ii) What is meant by the statement that the rating of a fuse in a circuit is 5 A ?

35. With the help of ciliary muscles the human eye can change its curvature and thus alter the focal length of its lens. State the changes that occur in the curvature and focal length of the eye lens while viewing (i) a distance object, (ii) nearby object.
Explain, why a normal eye is not able to the distinctly the objects placed closer than 25 cm, without putting any stain on the eye.

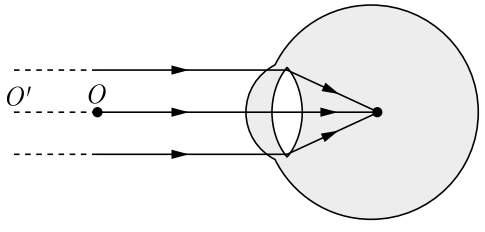
36. Two electric lamps rated 100 W, 220 V and 25 W, 220 V are connected in parallel. Calculate the total electric current in the circuit.

37. Diagram below shows a circuit containing a coil wound over a long and thin hollow cardboard tube. Copy the diagram.



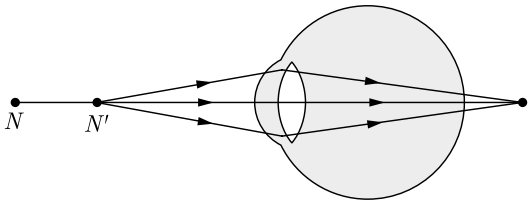
(i) Show the polarity acquired by each face of the solenoid.
(ii) Draw the magnetic field lines of force inside the coil and also show their direction.
(iii) Mention two methods to increase the strength of the magnetic field inside the coil.

38. Figure A and B show the ray diagrams related to defects of vision. Study the diagrams and answer the questions :



A : Defect of vision in patient X

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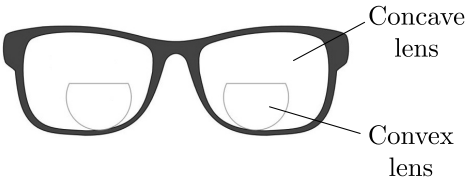


B : Defect of vision in patient Y

(i) Refer to fig. B and fig. A, showing the defects of vision in patients Y and X. Infer the defects which can be diagnosed from the given ray diagrams.

(ii) Identify the eye defect resulting due to the eye lens becoming cloudy.

(iii) Based on the spectacles given below, infer the eye defect which can be diagnosed from it. Also List two causes of this defect.



OR

(iv) The patient X needs a lens of power –4.5D for correction of his vision.
   (a) What is the focal length of the corrective lens?
   (b) What is the nature of corrective lens?

39. Attempt either option A or B.

A. With the help of a diagram of experimental setup, describe an activity to show that the force acting on a current carrying conductor placed in a magnetic field increases with increase in field strength.

OR

B. What is a solenoid? Draw the pattern of magnetic field lines of
   (i) a current carrying solenoid and a bar magnet.
   (ii) List two distinguishing features between the two fields.

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