Sample Paper 22

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 liver is the largest gland in the human body and performs many vital functions. Which of the following is NOT a function of the liver?

(a) Production of bile juice
(b) Detoxification of harmful substances
(c) Production of the hormone insulin
(d) Regulation of blood sugar levels

2. The secretion of hormones is often regulated in a way that the final product controls its own production. This type of self-regulating control is known as a:

(a) Reflex arc
(b) Feedback mechanism
(c) Voluntary action
(d) Nerve impulse

3. In flowering plants, where is the male gamete located before pollination occurs?

(a) Inside the ovule
(b) Inside the pollen grain
(c) On the surface of the stigma
(d) Inside the ovary

4. An organism's genetic constitution is called its genotype. What is the term for its observable physical appearance?

(a) Phenotype
(b) Genome
(c) Allele
(d) Karyotype

5. The "3 R's" principle is a widely promoted strategy for effective waste management. This principle stands for:

(a) Rebuild, Repair, Restore
(b) Remove, Replace, Replant
(c) Rely, Restrict, Regulate
(d) Reduce, Reuse, Recycle

6. Consider the following statements about the human menstrual cycle:

(i) It is a recurring cycle in females that involves the shedding of the uterine lining if pregnancy does not occur.
(ii) Ovulation, the release of a mature egg from the ovary, occurs during the cycle.
(iii) The cycle is regulated by hormones like oestrogen and progesterone.
(iv) The breakdown of the thickened uterine wall leads to bleeding, known as menstruation.

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. What is the molecule that serves as the main energy currency of the cell, produced during cellular respiration?
(a) ADP (Adenosine Diphosphate)
(b) ATP (Adenosine Triphosphate)
(c) DNA (Deoxyribonucleic Acid)
(d) NADP (Nicotinamide adenine dinucleotide phosphate)

8. **Assertion (A) :** Blood clotting is a mechanism that prevents excessive loss of blood from an injury.
Reason (R) : Blood platelets aggregate at the site of the injury to form a temporary plug, initiating the clotting process.
(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 forelimbs of a frog and a lizard have a similar basic bone structure.
Reason (R) : This is an example of analogous organs.
(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 separation of the right side and the left side of the heart is useful to keep oxygenated and deoxygenated blood from mixing. How does this separation benefit birds and mammals?

11. Student to attempt either option A or B.
A. How many chambers are there in the heart of a fish? How does blood circulate in its body?

OR

B. Explain the mechanism by which water is transported upwards in plants.

12. What are the problems caused by the non-biodegradable waste that we generate? Suggest one method for its effective disposal.

13. How does chemical coordination in plants differ from that in animals?

14. In a Mendelian experiment, a pea plant with pure round green seeds (RRyy) was crossed with a plant with pure wrinkled yellow seeds (rrYY).
(i) What will be the phenotype of the F1 generation?
(ii) If F1 plants are self-pollinated, what phenotypic ratio would be observed in the F2 generation?
(iii) State the law of inheritance that explains this ratio.

15. A person's diet consists of rice, dal (lentils), and ghee. Based on this, the following questions about the process of digestion.
A. The digestion of which food component will begin in the mouth? Name the enzyme responsible.

OR

B. Lentils are rich in protein. Where does the digestion of protein begin, and which enzyme is involved?
C. Ghee is primarily fat. Describe how fats are digested in the small intestine.

16. Attempt either option A or B.

A. (i) A farmer wants to grow banana plants. Which method of reproduction should he use, seeds or vegetative propagation? Justify your answer.

(ii) What is the main advantage and disadvantage of this method?

OR

B. (i) What are the changes that occur in a flower after fertilization? (List any three)

(ii) Differentiate between self-pollination and cross-pollination.

SECTION-B

17. The reaction $2H_2O(l) \xrightarrow{\text{Electrolysis}} 2H_2(g) + O_2(g)$ is an example of a:

(a) Combination reaction
(b) Displacement reaction
(c) Double displacement reaction
(d) Decomposition reaction

18. Which of the following is a strong base?

(a) Ammonium hydroxide (NH_4OH)
(b) Calcium hydroxide ($Ca(OH)_2$)
(c) Potassium hydroxide (KOH)
(d) Magnesium hydroxide ($Mg(OH)_2$)

19. Which of the following elements would form an acidic oxide upon reacting with oxygen?

(a) Sodium
(b) Magnesium
(c) Sulphur
(d) Aluminium

20. How many structural isomers can be drawn for pentane (C_5H_{12})?

(a) 2
(b) 3
(c) 4
(d) 5

21. The chemical formula for Plaster of Paris, which is used for setting fractured bones, is:

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

22. According to the reactivity series, what will happen when a strip of lead metal is placed in a solution of copper(II) chloride?

(a) No reaction will occur.
(b) Lead will displace copper from the solution.
(c) Copper will displace lead from the solution.
(d) Both metals will dissolve.

23. In the balanced chemical equation for the formation of magnesium oxide from magnesium and oxygen, $aMg + bO_2 \rightarrow cMgO$, the coefficients a, b, and c are respectively:

(a) 1, 1, 1
(b) 2, 1, 2
(c) 1, 2, 1
(d) 2, 2, 2

24. **Assertion (A) :** Sanctification is the alkaline hydrolysis of esters.
Reason (R) : Saponification is used for the commercial preparation of soaps.

(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 rancidity? Suggest one method that can be used to prevent it.

26. Attempt either option A or B.

A. (i) What is meant by the reactivity series of metals?
(ii) Arrange the following metals in order of their decreasing reactivity: Potassium (K), Silver (Ag), Copper (Cu), Iron (Fe).

OR

B. (i) Explain why ionic compounds generally have high melting points.
(ii) Why do ionic compounds conduct electricity in the molten state but not in the solid state?

27. Give a scientific reason for each of the following statements:

(a) Carbon forms a very large number of compounds.
(b) Diamond is extremely hard, whereas graphite is soft.
(c) Ethene undergoes addition reactions, while ethane does not.

28. Common salt (NaCl) is an essential part of our diet and also an important raw material for various chemicals.

(a) Name two important chemicals that are prepared using sodium chloride as a raw material.
(b) When electricity is passed through a concentrated aqueous solution of NaCl (brine), it decomposes to form three products. What is this process called?

OR

(c) Write the balanced chemical equation for the process mentioned in part (b)
(d) In the process mentioned in part B, name the product obtained at the anode and the product obtained at the cathode.

29. Attempt either option A or B.

A. (a) What is a homologous series?
(b) To which homologous series do C_3H_4 and C_4H_6 belong?
(c) Write the name and formula of the first member of this series.
(d) Draw the electron-dot structure for the first member of this series.

OR

B. (a) What is the main structural difference between saturated and unsaturated hydrocarbons?
(b) How can you test chemically if a given sample of cooking oil is saturated or unsaturated? Describe the procedure and expected observation.
(c) Between saturated and unsaturated fats, which one is generally considered healthier for human consumption?

SECTION-C

30. A student is studying the types of mirrors and makes the following statements:

I. A concave mirror is used in solar cookers to concentrate sunlight.
II. A convex mirror is used by dentists to get a magnified view of teeth.
III. A plane mirror is used in periscopes.

Choose from the following the correct option that lists the correct statements.

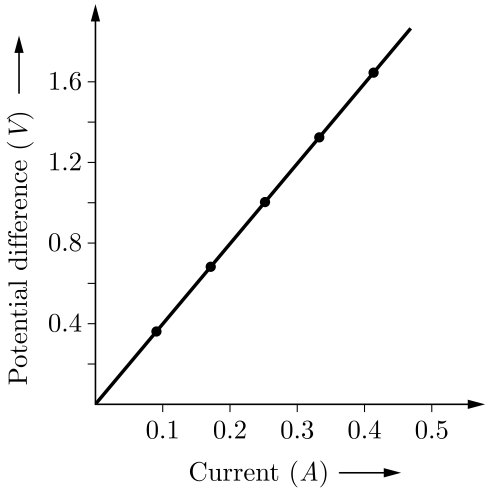
(a) I and II
(b) I and III
(c) I, II and III
(d) II and III

31. What is the least distance of distinct vision for a normal human eye?
(a) 15 cm (b) 25 cm
(c) 30 cm (d) 50 cm

32. **Assertion (A) :** The focal length of a concave lens is negative.
Reason (R) : A concave lens is a converging lens.
(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. State Snell's law of refraction.
A. Write the relation between angle of incidence and angle of refraction.
B. Define refractive index using Snell's law.
C. Draw the ray diagram showing refraction.

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.



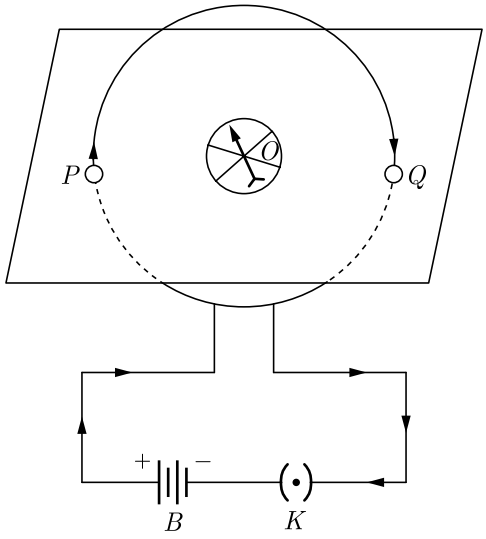
OR

B. Give reasons for the following :
(i) What do you understand by the term fuse in an electric circuit ?
(ii) Fuse wire is placed in series with the device.

35. What are the causes of the following defects of vision and how can they be corrected ?
(a) Cataract
(b) Presbyopia.

36. (a) List the factors on which the resistance of a conductor in the shape of wire depends.
(b) Why are metals good conductors of electricity whereas glass is a bad conductor of electricity? Give reason.
(c) Why are alloys commonly used in electrical heating devices? Give reason.

37. The flow of current in a circular loop of wire creates a magnetic field at its center. How may existence of this field be detected ? State the rule which helps to predict the direction of this magnetic field.



38. Analyse the following observation table showing variation of image distance (v) with object distance (u) in case of convex lens and answer the questions that follow, without doing any calculations.

	Object distance u (cm)	**Image distance v (cm)**
1.	-90	$+18$
2.	-60	$+20$
3.	-30	$+30$
4.	-20	$+60$
5.	-18	$+90$
6.	-10	$+100$

(i) What is the focal length of the convex lens ? Give reason in support of your answer.

(ii) Write the serial number of that observation which is not correct. How did you arrive at this conclusion?

OR

(iii) Take an appropriate scale to draw ray diagram for the observation at S. No. 4 and find the approximate value of magnification.

39. Attempt either option A or B.

A. Briefly explain an activity to plot the magnetic field lines around a bar magnet. Sketch the field pattern for the same specifying field directions.

A region A has magnetic field lines relatively closer than another region B. Which region has stronger magnetic field ? Give reason to support your answer.

OR

B. State the formula co-relating the electric current flowing in a conductor and the voltage applied across it. Also show this relationship by drawing a graph.

What would be the resistance of a conductor if the current flowing through it is 0.35 ampere when the potential difference across it is 1.4 volt ?

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