CBSE

Class X Science

Sample Paper 9

Time: 3 hrs **Total Marks: 80**

General Instructions:

1. The question paper comprises three sections – A, B and C. Attempt all the sections.
2. All questions are compulsory.
3. Internal choice is given in each section.
4. All questions in Section A are one-mark questions comprising MCQ, VSA type and assertion-reason type questions. They are to be answered in one word or in one sentence.
5. All questions in Section B are three-mark, short-answer type questions. These are to be answered in about 50–60 words each.
6. All questions in Section C are five-mark, long-answer type questions. These are to be answered in about 80–90 words each.
7. This question paper consists of a total of 30 questions.

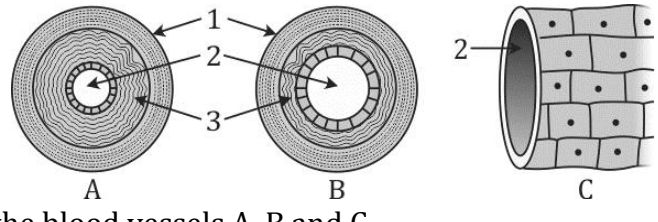
Section A

1. Name the fluid which is present in the space between the cornea and the eye lens. (1)

2. What is the nature of the image when an object is placed at the centre of curvature in front of a convex lens?

(1)

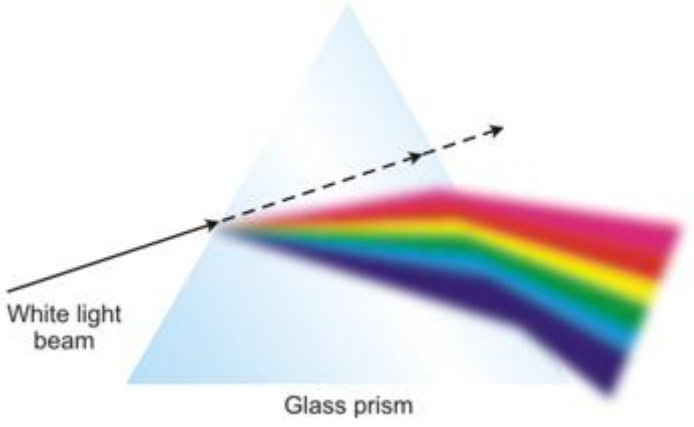
3. (a) The diagrams given below are cross-sections of blood vessels:



(i) Identify the blood vessels A, B and C. (1)

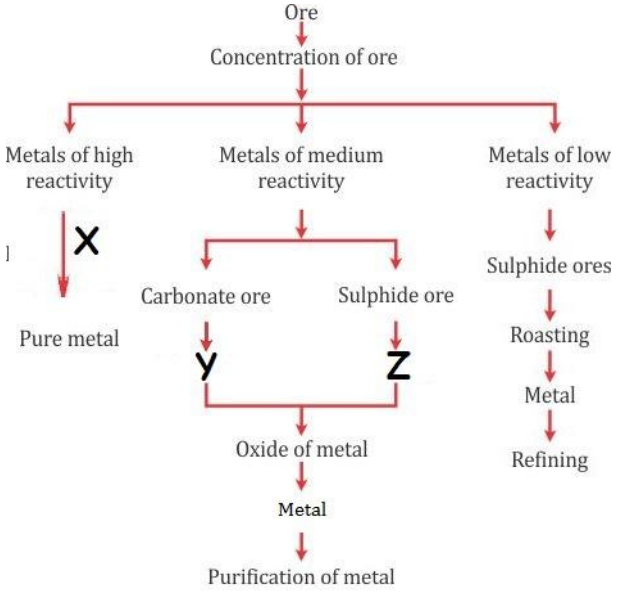
(ii) Mention one structural difference between A and B. (1)

3. (b)



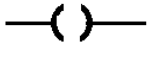
(i) Name the phenomenon which takes place in the above diagram. (1)
(ii) Which colour travels with minimum speed in a glass prism? (1)

4. On the basis of reactivity, metals are grouped into three categories—metals of low reactivity, metals of moderate reactivity and metals of high reactivity. Several steps are involved in the extraction of pure metals from their ores. A summary of these steps is given in the figure below. Observe the figure and answer the following questions:



(a) Sodium is a very reactive metal. It is obtained by using process 'X'.
Name the process 'X'. (1)
(b) Some ores are converted to oxides by heating strongly in the presence of excess air and some are converted to oxides by heating strongly in the presence of limited air. Identify the processes 'Y' and 'Z'. (1)
(c) What chemical process is used for obtaining a metal from its oxide? (1)
(d) Name the reducing agent used in the extraction of zinc. (1)

5. What does the following symbol mean in the circuit diagram?



i) Rheostat
ii) Closed switch
iii) Open switch
iv) Lamp

(1)

OR

Which of the following is incorrect?

i) $P = \frac{V^2}{R}$

ii) $P = \frac{E}{t}$

iii) $P = IR^2$

iv) $P = I^2R$

6. Burning of fossil fuels does not produce
i) nitrogen oxide
ii) sodium oxide
iii) carbon oxide
iv) sulphur oxide (1)

7. When an object is placed at infinity from a convex mirror, the image formed is
i) virtual, erect, diminished
ii) real, inverted, diminished
iii) virtual, erect, magnified
iv) real, inverted, same size as that of the object (1)

8. The first link in any food chain is usually green plants because (1)
i) They are widely distributed.
ii) They are fixed at one place in the soil.
iii) They alone have the capacity to synthesise food using sunlight.
iv) There are more herbivores than carnivores.

OR

Ozone blanket is present in which of the following layers of the atmosphere?
i) Troposphere
ii) Stratosphere
iii) Mesosphere
iv) Atmosphere

9. During the ventricular systole in a mammalian heart, the (1)
i) Ventricular volume increases.
ii) Bicuspid valve opens.

iii) Ventricular pressure increases and becomes more than the atrial pressure.
iv) Ventricular pressure increases and becomes equal to the atrial pressure.

10. Choose the correct option for the given reaction: (1)

$CuSO_4 + Fe \rightarrow FeSo_4 + Cu$

i) $CuSO_4$ and Fe are oxidising agents.
ii) $CuSO_4$ and Fe are reducing agents.
iii) $CuSO_4$ is an oxidising agent, and Fe is a reducing agent.
iv) Fe is an oxidising agent, and $CuSO_4$ is a reducing agent.

11. The equation

$CuO_{(s)} + Mg_{(s)} \rightarrow MgO_{(s)} + Cu_{(s)}$ represents (1)

i) Combination as well as double displacement reaction
ii) Redox as well as displacement reaction
iii) Decomposition as well as displacement reaction
iv) Double displacement as well as redox reaction

12. Length of the pollen tube depends on the distance between the (1)

i) Pollen grain and the upper surface of the stigma
ii) Pollen grain on the upper surface of the stigma and the ovule
iii) Pollen grain in the anther and the upper surface of the stigma
iv) Upper surface of the stigma and the lower part of the style

OR

In the list of organisms given below, those that have asexual mode of reproduction are
(a) banana
(b) cat
(c) yeast
(d) *Amoeba*
i) (b) and (d)
ii) (a) and (d)
iii) (a), (c) and (d)
iv) (b), (c) and (d)

For question numbers 13 and 14, two statements are given—one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (i), (ii), (iii) and (iv) as given below.

(i) Both A and R are true, and R is the correct explanation of the assertion.
(ii) Both A and R are true, but R is not the correct explanation of the assertion.
(iii) A is true, but R is false.
(iv) A is false, but R is true.

13. **Assertion**: Equal distribution of genes occurs because these genes are located on pairs of homologous chromosomes.
Reason: Acquired variations in somatic traits are not passed from generation to generation. (1)

14. **Assertion**: Steel is used in making the core of the electromagnet.
Reason: The core of the electromagnet must lose all its magnetism when the current in the coil is switched off. (1)

Section B

15. (3)
(a) Draw a schematic labelled diagram of a closed circuit which connects all the given components in series and connected across a 12-V battery:
(i) 20 W lamp
(ii) An ammeter
(iii) A switch
(iv) 10 Ω/100 W resistor
(b) How much current will be shown by the ammeter in the above circuit if the lamp power is rated as 20 W at 12 V?

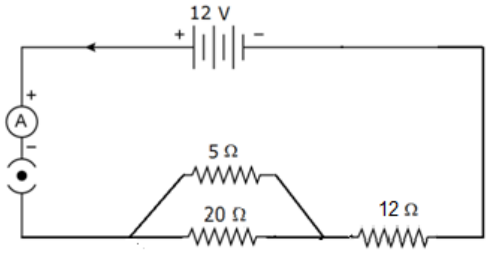
16. If you consume butter during lunch, how will it get digested in your body? (3)

17. What is regeneration? Explain regeneration in *Planaria* with the help of a diagram. (3)

18. (3)
(a) How does the metallic character of elements change along a period of the periodic table from the left to the right and why?
(b) In the modern periodic table, the element calcium (atomic number = 20) is surrounded by elements with atomic numbers 12, 19, 21 and 38. Which of these elements have physical and chemical properties resembling those of calcium and why?

19. How is sex determined in human beings? (3)

20. Three resistors of 5Ω, 10 Ω and 20Ω, respectively, are connected to a battery of 12 V as shown in the circuit given below. (3)



Calculate:

(a) Current through each resistor

(b) Total current in the circuit

(c) Total resistance of the circuit

OR

An electrical appliance is rated 240 V–500 W. How much current will this appliance draw? It is planned to spend Rs 200 for running this appliance in a month. If the per unit cost is Rs 4.60, how many hours can this appliance be operated in a month of 30 days?

21. (3)

(a) What is an ecosystem? List the two main components of an ecosystem.

(b) We do not clean ponds or lakes on a regular basis, but an aquarium needs to be cleaned regularly. Explain.

OR

(a) Give two examples of decomposers present in an ecosystem.

(b) How is the presence of decomposers crucial in the ecosystem?

22. Mercury is the only metal found in the liquid state. It is largely used in thermometers to measure temperature. But mercury is a very dangerous metal as its density is very high. What two precautions would you take while handling equipment containing mercury? (3)

23. Answer the following: (3)

(a) What according to you suggests that the human eye behaves like a camera?

(b) Suggest the type of corrective lens to be used for a person with a myopic eye.

(c) How do you determine the nature and power of the lens required for a person with myopia if the far point of the myopic eye is 80 cm?

24. Write chemical equations to show what happens when (3)

(a) Ethanol is heated with concentrated sulphuric acid at 443 K.

(b) Ethanol reacts with ethanoic acid in the presence of an acid acting as a catalyst.

(c) An ester reacts with a base.

OR

(a) On dropping a small piece of sodium into an organic compound 'A' with molecular formula C_2H_6O in a tube, a brisk effervescence is observed. On bringing a burning

splinter, the gas evolved burns with a pop sound. Identify 'A' and write the chemical equation.

(b) What will happen when you heat organic compound 'A' at 443 K with excess of concentrated sulphuric acid?

Section C

25. (5)

(a) What is electromagnetic induction? How is the direction of induced current determined?

(b) Draw some field lines around a current-carrying circular loop wire and mark the field directions on them by showing arrows. Assume current flowing in the loop is in an anti-clockwise direction.

(c) List a device working on the principle of electromagnetic induction. Also, list a device working on the principle of generation of force on a current-carrying conductor in the magnetic field.

OR

(a) Draw the magnetic field pattern produced by the current-carrying solenoid.

(b) On which factors do the magnitude of the magnetic field due to a circular coil depend?

(c) Which rule is used to determine the direction of magnetic field due to a current-carrying circular coil? Explain the rule.

26. (5)

(a) What is a salt? Give the names and formulae of any two salts. Also, name the acids and bases from which these salts may be obtained.

(b) What is meant by 'a family of salts'? Explain with examples.

(c) What is meant by 'hydrated' and 'anhydrous' salts? Explain with examples.

(d) Write the names, formulae and colours of any two hydrated salts.

(e) What will be the colour of litmus in an aqueous solution of ammonium chloride salt?

OR

(a) Write word equations and then balanced equations for the reaction taking place when

(i) Dilute sulphuric acid reacts with zinc granules.

(ii) Dilute hydrochloric acid reacts with magnesium ribbon.

(b) What is a neutralisation reaction?

(c) Give two important uses of washing soda.

27. (5)

(a) What are fossils? What do they tell us about the process of evolution?

(b) Explain with examples how the following provide evidence in favour of evolution in organisms.

(i) Homologous organs

(ii) Analogous organs

(iii) Fossils

OR

(a) State the role of the placenta in the development of the embryo.

(b) List four ways of preventing pregnancy. State two advantages of using such preventive methods.

28. An organic compound A is widely used as a preservative in pickles and has the molecular formula $C_2H_4O_2$. This compound reacts with ethanol to form a sweet-smelling compound B. (5)

(a) Identify compound A.

(b) Write the chemical equation for its reaction with ethanol to form compound B.

(c) How can we get compound A back from B?

(d) Name the process.

(e) Which gas is produced when compound A reacts with washing soda?

29. (5)

(a) Cigarette smoke produces carbon monoxide. If a non-smoker smoked one pack of cigarettes a day continuously for a few weeks, what would happen to the number of red blood cells?

(b) Predict the effect on the heart if the blood flow through the anterior inter-ventricular artery is restricted or completely blocked.

30. Name the type of mirrors used in (a) a search light and (b) rear-view mirror. Draw labelled diagrams to show the formation of an image in each of these two cases. Which of these mirrors could also form a magnified and virtual image of an object? Illustrate with the help of a ray diagram. (5)