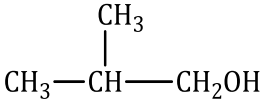
CBSE
Class X Science
Sample Paper 4

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

General Instructions:

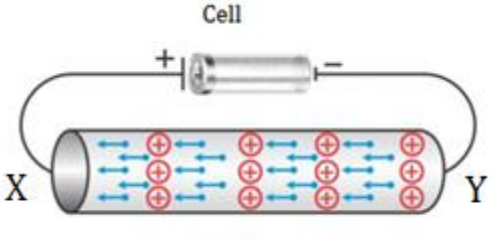
1. The question paper comprises three sections – A, B and C. Attempt all the sections.
2. All questions are compulsory.
3. Internal choice is given in each section.
4. All questions in Section A are one-mark questions comprising MCQ, VSA type and assertion-reason type questions. They are to be answered 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

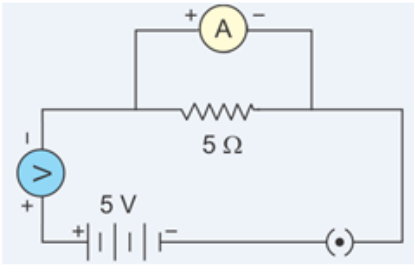
1. Write the IUPAC name of  (1)

2. Name two metals which react with very dilute HNO_3 to evolve hydrogen gas. (1)

3. Observe the diagrams (A) and (B) and answer the questions from 3(a) to 3(d) on the basis of related studied concepts.



(A)



(B)

(a) State the direction of current in metal wire XY. (1)
(b) What happens when the cell across the metal wire XY is removed? (1)
(c) Which devices are connected incorrectly in circuit diagram 3(B)? Why? (1)
(d) Draw the correct circuit diagram for replacing the incorrect circuit connections. (1)

4. Study the daily commuting style of Richa's family members and answer the questions based on the data.

Family member	Distance travelled	Mode of travel
Father	30 km	Private car
Mother	25 km	Private car
Brother	5 km	Bicycle
Richa	15 km	Bus

(a) On an average, for every 10 km, a car produces 2.4 kg of carbon dioxide on per litre consumption of fuel. How much carbon dioxide does Richa's family add to the environment? (1)

(b) An average-sized tree can absorb 7 kg of CO_2 per year. How many trees would be required to absorb CO_2 produced by Richa's family? (1)

(c) Which family member saves a lot fuel while commuting? (1)

(d) Which option is the best while commuting? Why? (1)

5. A device which reverses the direction of current through a circuit of an electric motor is called a (1)

i) brush
ii) commutator
iii) coil
iv) magnet

OR

Which of the following factors does not affect the strength of an electromagnet?

i) Increasing the number of turns in the coil
ii) Increasing the magnitude of the current in the coil
iii) Reversing the direction of current
iv) Reducing the air gap between the poles of the magnet

6. Natural gas consists mainly of (1)

i) Methane
ii) Ethane
iii) Propane
iv) Butane

7. The image of an object is formed on the (1)

i) cornea
ii) iris
iii) pupil
iv) retina

8. Among the statements given below, select the ones that correctly describe the concept of sustainable development. (1)

(a) Planned growth with minimum damage to the environment.
(b) Growth irrespective of the extent of damage caused to the environment.
(c) Stopping all developmental work to conserve the environment.
(d) Growth that is acceptable to all stakeholders.

i) (a) and (d)
ii) (b) and (c)
iii) (b) and (d)
iv) (c) only

OR

Which of the following limits the numbers of trophic levels in a food chain?

i) Decrease in energy availability at higher trophic levels
ii) Sufficient food supply
iii) Polluted air
iv) Stagnant water

9. Which one of the following is the correct matching of the events occurring during the menstrual cycle? (1)

i) Menstruation: Breakdown of the myometrium and the ovum is not fertilised.
ii) Ovulation: LH and FSH attain peak level and a sharp fall in the secretion of progesterone.
iii) Proliferative phase: Rapid regeneration of the myometrium and maturation of the Graafian follicle.
iv) Development of the corpus luteum: Secretory phase and increased secretion of progesterone.

10. Which of the following pairs of metals are extracted electrochemically? (1)

i) Zinc and potassium
ii) Copper and zinc
iii) Sodium and potassium
iv) Copper and sodium

11. Which of the following are members of the same homologous series? (1)

i) $HCOOH$ and $HCOOCH_3$
ii) C_2H_5OH and CH_3OCH_3
iii) CH_3COCH_3 and CH_3CHO
iv) $HCOOCH_3$ and CH_3COOCH_3

12. Final oxidation product of a primary alcohol is (1)

i) Ketone
ii) Carboxylic acid
iii) Aldehyde
iv) None of these

OR

In the conversion from ethanol to ethene, concentrated sulphuric acid is used as a/an

i) Drying agent
ii) Dehydration agent
iii) Oxidising agent
iv) Reducing agent

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: Aluminium displaces iron from iron oxide.
Reason: Metals placed at the top of the reactivity series can displace metals placed below them. (1)

14. Assertion: The blind spot is a small area of the retina insensitive to light.
Reason: At the junction of the optic nerve and the retina in the eye, there are many light-sensitive cells. (1)

Section B

15. In the electrolysis of water, [3]

(a) Name the gas collected at the anode and the cathode.
(b) Why is the volume of the gas collected at one electrode double than that collected at the other?
(c) What would happen if dil. H_2SO_4 is not added to water?

16. List three distinguishing features between sexual and asexual reproduction in the tabular form. (3)

OR

State in brief the function of the following parts of the human male reproductive system:

(a) Scrotum

(b) Testes

(c) Vas deferens

17. (3)

(a) Draw the structure of propanoic acid (C_2H_5COOH).

(b) Why does the bottom of a cooking vessel blacken?

(c) What is a micelle? Draw a labelled diagram of a micelle.

18. How can a magnetic field be produced without using a magnet? Describe an experiment to show that a magnetic field exerts a force on a current-carrying conductor. (3)

19. (3)

(a) Which phenomenon makes us see the Sun a few minutes before and after actual sunrise and sunset?

(b) How many minutes before sunrise or after sunset can we actually see the Sun?

(c) By how many minutes is the day lengthened? What would have happened if there was no atmosphere around the Earth?

20. The image of an object placed at 30 cm in front of a lens is obtained on a screen at a distance of 60 cm from it. Find the focal length of the lens. What would be the height of the image if the object is 2 cm high? (3)

OR

Two thin lenses of power +2.5 D and −1.5 D are placed in contact. Find the power and focal length of the lens combination.

21. A brown substance 'X' on heating in air forms a compound 'Y'. When hydrogen gas is passed over 'Y', it changes to 'X' again. (3)

(a) Name substances 'X' and 'Y'.

(b) Name the processes occurring during the two changes.

(c) Write the chemical equations involved.

OR

Identify the following reactions:

(a) $AgNO_{3(aq)} + NaCl_{(aq)} \rightarrow AgCl_{(s)} + NaNO_{3(aq)}$

(b) $CaO_{(s)} + H_2O \rightarrow Ca(OH)_2$

(c) $2KCl_3 \xrightarrow{\Delta} 2KCl + 3O_2$

22. What are chromosomes? Explain how the number of chromosomes in the progeny of sexually reproducing organisms is maintained. (3)

23. List four points of significance of reproductive health in society. Name any two areas related to reproductive health which have improved over the past 50 years in our country. (3)

24. A pea plant with blue flowers denoted by BB is cross-bred with a pea plant with white flowers denoted by ww. (3)

(a) What is the expected flower colour in the F_1 progeny?

(b) What will be the percentage of plants bearing white flowers in the F_2 generation when the flowers of F_1 plants are self-pollinated?
State the expected ratio of the genotypes BB and Bw in the F_2 progeny.

Section C

25.

(a) How does control and coordination occur in plants? How does this function in plants differ from that in animals?

(b) Name five stimuli which act on plants. Name the type of tropic movement produced by each of these stimuli.

(c) Define hydrotropism with the help of an example. Explain hydrotropism with the help of a diagram. (5)

OR

How does the hypothalamus control the production of hormones?

26. What is myopia? What are the causes of myopia?
One student uses a lens of focal length +50 cm and another of −50 cm. State the nature of each lens and find their powers. Which of the two lenses will always give a virtual, erect and diminished image irrespective of the position of the object? (5)

27. (5)

(a) You are provided with three test tubes A, B, C which contain distilled water, an acidic solution and a basic solution. If you are only given blue litmus paper, how will you identify the nature of the solutions in the three test tubes?

(b) How is plaster of Paris prepared from gypsum? For what purpose is it used in hospitals?

OR

(a) Write the chemical formula of washing soda and baking soda. Which of these two is an ingredient of antacids? How does an antacid provide relief from a stomach ache?

(b) What is roasting and calcination? What is the difference between them?

28. (5)

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

(b) A 4-kW heater is connected to a 220-V power source. Calculate

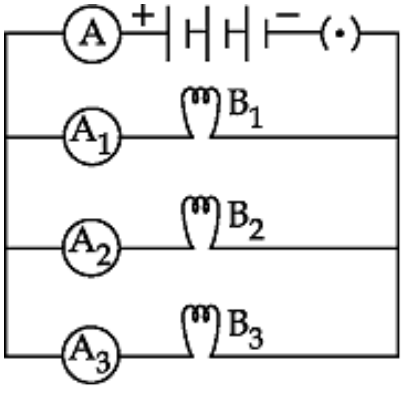
(i) Electric current passing through the heater

(ii) Resistance of the heater

(iii) Electric energy consumed in a 2-hour use of the heater

OR

What is meant by the statement 'the potential difference between two points is 1 V'? Study the circuit shown in which three identical bulbs B1, B2 and B3 are connected in parallel with a battery of 4.5 V.



(a) What will happen to the glow of the other two bulbs if bulb B_3 gets fused?

(b) If the wattage of each bulb is 1.5 W, what readings will the ammeter A show when all the three bulbs glow simultaneously?

(c) Find the total resistance of the circuit.

29. What are fossils? How are they formed? Describe in brief two methods of determining the age of fossils. State any one role of fossils in the study of evolution.(5)

30. A part of the modern periodic table is given below. Answer the following questions based on the table. (5)

H							He
Li	Be	B	C	N	O	F	Ne
Na	Mg	Al	Si	P	S	Cl	Ar

(a) Why do H, Li and Na show similar properties?

(b) Mg atom is bigger than Be atom. Why?

(c) Why are He, Ne and Ar called noble gases?

(d) Write a common name of the family to which F and Cl belong.

(e) Write the trend of non-metallic character in the horizontal row from Na to Cl.

(f) How does the atomic size vary as we move from Li to F in the second period of the periodic table?