CHEMISTRY (CODE - 043)

CHAPTER TEST - QUESTION PAPER

Class XI (2026-27) | Chapter 1: Some Basic Concepts of Chemistry

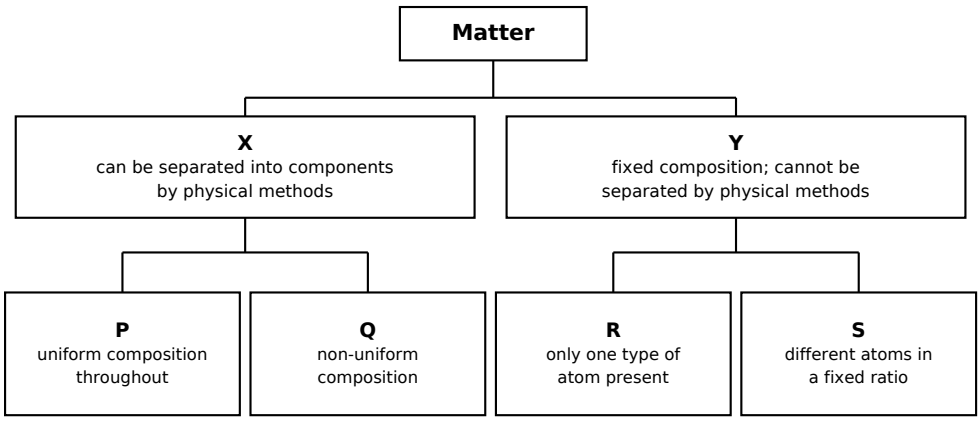
Time: 1 hour 30 minutes | Max. Marks: 35

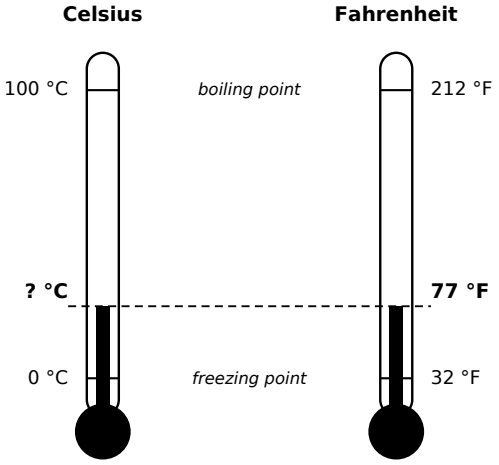
GENERAL INSTRUCTIONS:

1. Read the following instructions carefully.
2. There are 20 questions in this question paper with internal choice.
3. SECTION A consists of 12 questions carrying 1 mark each (Q. 1 to 9 are multiple-choice questions and Q. 10 to 12 are Assertion–Reason questions).
4. SECTION B consists of 4 very short answer questions carrying 2 marks each.
5. SECTION C consists of 2 short answer questions carrying 3 marks each.
6. SECTION D consists of 1 case-based question carrying 4 marks.
7. SECTION E consists of 1 long answer question carrying 5 marks.
8. All questions are compulsory. Internal choice is provided in Q. 16 (Section B) and Q. 20 (Section E).
9. Use of log tables and calculators is not allowed.
10. Avogadro constant $N_A = 6.022 \times 10^{23}$ mol^{-1}.

SECTION A

Questions 1 to 9 are multiple-choice questions. Only one of the choices is correct. Questions 10 to 12 are Assertion–Reason questions.

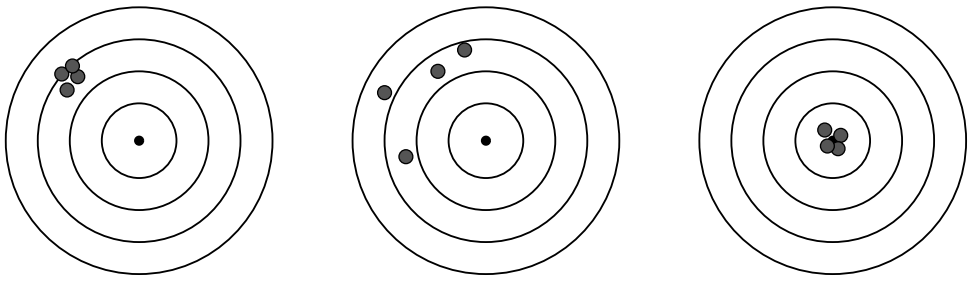
1	The number of significant figures in 0.04050 and 2.0034, respectively, is: A. 4 and 5 B. 5 and 5 C. 4 and 4 D. 3 and 5	1
2	Study the classification chart of matter given below.  Which option correctly matches the four samples: sugar solution, a mixture of salt and sugar, copper and ammonia, with the boxes P, Q, R and S? A. P – mixture of salt and sugar; Q – sugar solution; R – copper; S – ammonia B. P – sugar solution; Q – mixture of salt and sugar; R – ammonia; S – copper C. P – sugar solution; Q – mixture of salt and sugar; R – copper; S – ammonia D. P – copper; Q – ammonia; R – sugar solution; S – mixture of salt and sugar	1
3	The mass of 3.011×10^{23} molecules of water (molar mass = 18 g mol^{-1}) is: A. 18 g B. 9 g C. 36 g D. 4.5 g	1

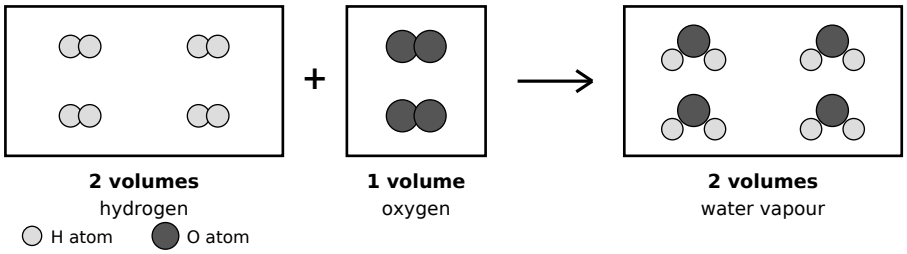
4	The figure shows two thermometers dipped in the same water bath. The Fahrenheit thermometer reads 77 °F.  The temperature of the bath on the Kelvin scale is (K = °C + 273.15): A. 310 K B. 273.15 K C. 350 K D. 298.15 K	1
5	The volume of 250 mL of a liquid, expressed in SI base units (m^3), is: A. 2.5×10^{-2} m^3 B. 2.5×10^{-3} m^3 C. 2.5×10^{-4} m^3 D. 0.25 m^3	1
6	Two oxides of carbon, X and Y, were analysed and the following data were obtained: **Oxide** / **Mass of carbon (g)** / **Mass of oxygen (g)** X / 3 / 4 Y / 3 / 8 The data illustrate: A. Law of Multiple Proportions B. Law of Conservation of Mass C. Law of Definite Proportions D. Avogadro's Law	1
7	For the reaction $A + B_2 \rightarrow AB_2$, a reaction mixture contains 200 atoms of A and 100 molecules of B_2. Which statement is correct? A. A is the limiting reagent B. B_2 is the limiting reagent C. Both A and B_2 are completely consumed D. There is no limiting reagent	1
8	The number of atoms present in 0.5 mol of ammonia (NH_3) is: A. 6.022×10^{23} B. 3.011×10^{23} C. 2.4×10^{24} D. 1.2×10^{24}	1
9	The molality of a solution prepared by dissolving 5.85 g of NaCl (molar mass = 58.5 g mol^{-1}) in 500 g of water is: A. 0.1 m B. 0.02 m C. 0.2 m D. 2.0 m	1

10	Questions 10 to 12 are Assertion (A) and Reason (R) type questions. Select the correct option. **Assertion (A):** The molality of a solution does not change with temperature, whereas its molarity does. **Reason (R):** Molality involves the mass of the solvent, while molarity involves the volume of the solution, which depends on temperature. 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.	1
11	**Assertion (A):** The average atomic mass of chlorine is taken as 35.5 u. **Reason (R):** Chlorine exists as a single isotope, ^{35}Cl. 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.	1
12	**Assertion (A):** Zeros at the end of a number without a decimal point, such as 100, are always significant. **Reason (R):** Zeros preceding the first non-zero digit only indicate the position of the decimal point and are not significant. 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.	1

SECTION B

Questions 13 to 16 are very short answer questions carrying 2 marks each.

13	Three students A, B and C each made four measurements of a quantity. The centre of the board represents the true value and each dot represents one measurement.  **Student A** **Student B** **Student C** (i) Differentiate between precision and accuracy. [1] (ii) Classify the results of A, B and C as precise, accurate, both or neither. [1]	2
14	(i) Express 0.0000786 in scientific notation and state the number of significant figures in it. [1] (ii) Add 6.35 + 1.2 + 0.042 and report the answer to the correct number of significant figures. [1]	2

15	Naturally occurring copper has two isotopes: **Isotope** | **Relative abundance (%)** | **Atomic mass (u)** ^{63}Cu | 69.15 | 62.93 ^{65}Cu | 30.85 | 64.93 Calculate the average atomic mass of copper.	2
16	The figure shows the reaction between hydrogen and oxygen gases to form water vapour. *All gases at the same temperature and pressure*  (i) Name the law illustrated by the volume relationship shown and state it. [1] (ii) How many mL of oxygen are needed to react completely with 60 mL of hydrogen, and what volume of water vapour is formed? [1] **OR** Sulphur forms two oxides whose composition is given below: **Oxide** | **Mass of sulphur (g)** | **Mass of oxygen (g)** Sulphur dioxide | 32 | 32 Sulphur trioxide | 32 | 48 Show that the data illustrate the Law of Multiple Proportions and state the law.	2

SECTION C

Questions 17 and 18 are short answer questions carrying 3 marks each.

17	A compound of carbon, hydrogen and oxygen contains 40.00% carbon, 6.71% hydrogen and 53.29% oxygen by mass. Its molar mass is 180 g mol^{-1}. Determine its (i) empirical formula and (ii) molecular formula. (Atomic masses: C = 12.01, H = 1.008, O = 16.00)	3
18	Aluminium reacts with chlorine according to the balanced equation: $2\ Al\ (s) + 3\ Cl_2\ (g) \rightarrow 2\ AlCl_3\ (s)$ 5.4 g of aluminium is made to react with 14.2 g of chlorine. (Atomic masses: Al = 27, Cl = 35.5) (i) Identify the limiting reagent. [1] (ii) Calculate the mass of $AlCl_3$ formed. [1] (iii) Calculate the mass of the excess reagent left unreacted. [1]	3

SECTION D

Question 19 is a case-based question carrying 4 marks.

19	**Concentration of a solution** A student prepared an aqueous solution of glucose ($C_6H_{12}O_6$) for a stoichiometry experiment. The data recorded are given below: Mass of glucose dissolved: 90 g Mass of water (solvent): 500 g Density of the solution: 1.18 g mL^{-1} Molar mass of glucose: 180 g mol^{-1} Answer the following questions: (i) Calculate the mass per cent of glucose in the solution. [1] (ii) Calculate the molality of the solution. [1] (iii) Calculate the molarity of the solution. [1] (iv) If the solution is heated to a higher temperature, which of the two, molality or molarity, would change? Give a reason. [1]	4

SECTION E

Question 20 is a long answer question carrying 5 marks.

20	Propane (C_3H_8) burns in oxygen to give carbon dioxide and water. C_3H_8 (g) + O_2 (g) → CO_2 (g) + H_2O (l) (i) Balance the equation step by step. [2] (ii) If 44 g of propane is burnt completely, calculate the masses of CO_2 and H_2O formed. (Atomic masses: C = 12, H = 1, O = 16) [2] (iii) Show that the data obey the Law of Conservation of Mass. [1] **OR** 49 g of sulphuric acid, H_2SO_4 (molar mass = 98 g mol^{-1}), is taken. (N_A = 6.022 × 10^{23} mol^{-1}, O = 16) (i) Calculate the number of moles of H_2SO_4. [1] (ii) Calculate the number of molecules present. [1] (iii) Calculate the number of atoms of hydrogen, sulphur and oxygen. [2] (iv) Calculate the mass of oxygen present in it. [1]	5

***** END OF QUESTION PAPER *****