

IX (ICSE)

Chemistry Full Syllabus Test

Full Marks : 80

Topic: Full Syllabus

Time : 2 hrs.

PART – A [Marks 40]

(Compulsory)

1. (a) Why are anode rays also known as ‘canal rays’? (1)
 (b) How does cathode rays differ from anode rays? (1)
 (c) Which part of atom was discovered by Rutherford. (1)
 (d) State one drawback of Rutherford’s model. (1)
 (e) Give the postulates of Bohr’s atomic model. (1)
 (f) Draw the atomic structure of the following molecules / ions :
 (i) NH_4^+ , MgCl_2 , Al_2O_3 (3)
 (g) Use Mendeleev’s Periodic Table to predict the formula of : (2)
 (i) hydrides of carbon and silicon
 (ii) oxides of potassium, aluminium and barium.
 2. (a) Write down the word that will correctly complete the following sentence : (4)
 (i) Relative atomic mass of a light element up to calcium is approximately _____ its atomic number.
 (ii) The horizontal rows in a periodic table are called _____.
 (iii) Going across a period left to right, atomic size _____.
 (iv) Moving left to right in the second period, number of valence electrons _____.
 (b) The position of elements A, B, C, D and E in the periodic table are shown below : (4)
- | Group 1 | Group 2 | Group 17 | Group 18 |
|---------|---------|----------|----------|
| – | – | – | D |
| – | B | C | – |
| A | – | – | E |
- (i) State which are metals, non – metals and noble gas in this table.
 (ii) State which is most reactive (I) and metal (II) non – metal.
 (iii) Which type of ion will be formed by element A, B and C.
 (iv) Which is larger in size (I) D or E (II) B or C.
 - (c) Which one has greater in size : (2)
 (i) Na or Na^+
 (ii) Cl or Cl^-
 3. (a) Choose terms from the options given in brackets to complete these sentences. (5)
 (i) When CuO reacts with hydrogen, _____ is reduced and _____ is oxidized to _____.
 (CuO, H_2 , Cu, H_2O)
 (ii) Hydrogen is _____ soluble in water. (sparingly, highly, moderately)
 (iii) Sodium _____ reacts smoothly with cold water. (metal, amalgam, in the molten state)
 (iv) Metals like _____, _____ and _____ give H_2 with steam.
 (iron, magnesium, aluminium, sodium, calcium)
 (v) A metal _____ hydrogen in the activity series gives hydrogen with _____ acid or _____ acid. (above, below, dilute sulphuric, dilute, hydrochloric).

- (b) (i) For the reaction $\text{PbO} + \text{H}_2 \rightarrow \text{Pb} + \text{H}_2\text{O}$, which of the following statements is wrong? (3)
- (I) H_2 is the reducing agent.
 - (II) PbO is the oxidized agent.
 - (III) PbO is oxidized to Pb .
 - (IV) H_2 is oxidized to H_2O .
- (ii) Which metal gives hydrogen with all of the following : water, acids, alkalis?
- (I) Fe
 - (II) Zn
 - (III) Mg
 - (IV) Pb
- (iii) Which of the following metals does not give hydrogen with acids?
- (I) Iron
 - (II) Copper
 - (III) Lead
 - (IV) Zinc
- (c) *Bosch Process* is used for large – scale production of hydrogen. Give necessary : (2)
- (i) Balanced equations
 - (ii) Conditions
4. (a) Explain : (3)
- (i) When ammonium nitrate is dissolved in water contained in a beaker, the water becomes cold.
 - (ii) When a little sulphuric acid is added to water in a beaker, the water becomes hot.
 - (iii) Silver nitrate solution is kept in a laboratory in coloured reagent bottles.
- (b) (i) The chemical reaction between two substances is characterised by a change in colour from orange to green. These two substances are most likely to be : (5)
- (a) potassium dichromate solution and sulphur dioxide.
 - (b) potassium permanganate solution and sulphur dioxide.
 - (c) potassium permanganate solution and lemon juice.
 - (d) potassium dichromate solution and carbon dioxide.
- (ii) The chemical reaction between quicklime and water is characterised by :
- (a) evolution of hydrogen gas
 - (b) formation of slaked lime precipitate
 - (c) change in temperature of mixture
 - (d) change in colour of the product
- (iii) Which of the following is not an endothermic reaction?
- (a) $\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$
 - (b) $2\text{H}_2\text{O} \rightarrow 2\text{H}_2 + \text{O}_2$
 - (c) $6\text{CO}_2 + 6\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$
 - (d) $\text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 \rightarrow 6\text{CO}_2 + 6\text{H}_2\text{O}$
- (iv) One of the following is an exothermic reaction. This is :
- (a) electrolysis of water
 - (b) conversion of limestone into quicklime
 - (c) process of respiration
 - (d) process of photosynthesis
- (v) The chemical equations are balanced to satisfy one of the following laws in chemical reactions. This law is known as :
- (a) law of conservation of momentum
 - (b) law of conservation of mass
 - (c) law of conservation of motion
 - (d) law of conservation of magnetism

- (c) Name : (2)
- (i) A substance that will reduce aqueous Iron (III) ions to Iron (II) ions.
- (ii) A liquid that is an oxidizing as well as a reducing agent.

PART – B [Marks 40]

(optional any four)

5. (a) Sulphur has an atomic number 16 and a mass of 32. (3)
State the number of protons and neutrons in the nucleus of sulphur. Give a simple diagram to show the arrangement of electrons in an atom of sulphur.
- (b) How does the Modern atomic theory contradict and correlate with Dalton's atomic theory? (2)
- (c) Ordinary chlorine gas has two isotopes $^{35}_{17}\text{Cl}$ and $^{37}_{17}\text{Cl}$ in the ratio of 3 : 1. Calculate the relative atomic mass (atomic weight) of chlorine. (2)
- (d) Elements X, Y, Z have atomic numbers 6, 9 and 12 respectively. Which one : (3)
- (i) forms anion – negative ion.
- (ii) forms cation – positive ion.
- (iii) has 4 electrons in the outermost orbit.
6. (a) Did Dobereiners triads also exist in the columns of Newland's Octaves? Compare and find out. (2)
- (b) Which group of elements was missing from Mendeleev's original periodic table? (1)
- (c) The atomic number of an element is more important to the chemist than its relative atomic mass. Why? (2)
- (d) (3)
- (i) Name an element whose properties were predicted on the basis of its position in Mendeleev's periodic table.
- (ii) Name two elements whose atomic weights were corrected on the basis of their positions in Mendeleev's periodic table.
- (iii) How many elements were known at the time of Mendeleev's classification of elements?
- (e) An element belongs to the 3rd period and Group IIIA (13) of the periodic table. State : (2)
- (i) number of valence electrons.
- (ii) valency.
- (iii) metal or non – metal.
- (iv) name of the element.
7. (2 × 5 = 10)
- (a) 561 dm³ of a gas at S.T.P. is filled in a 748 dm³ container. If temperature is constant, calculate the percentage change in pressure required. (1)
- (b) A gas at 240K is heated to 127°C. Find the percentage change in the volume of the gas (pressure remaining constant). (2)
- (c) A cylinder of 20 litres capacity contains a gas at 100 atmospheric pressure. How many flasks of 200 cm³ capacity can be filled from it at 1 atmosphere pressure, temperature remaining constant? (1)
- (d) 800 cm³ of gas is collected at 650 mm pressure. At what pressure would the volume of the gas reduce by 40% of its original volume, temperature remaining constant? (1)
- (e) A gas occupies 3 litres at 0°C. What volume will it occupy at – 20°C, pressure remaining constant? (1)
8. (a) (i) Define atomic mass unit. (1)
- (ii) Calculate the molecular mass of the following : (2)
- (I) $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$
- (II) $(\text{NH}_4)_2\text{CO}_3$
- (iii) Choose the correct answer from the options given below : (2)
- (I) Modern atomic symbols are based on the method proposed by :
- (i) Bohr (ii) Dalton (iii) Berzelius (iv) Alchemist
- (II) In water, the hydrogen-to-oxygen mass ratio is

(i) 1 : 8

(ii) 1 : 16

(iii) 1 : 32

(iv) 1 : 64

- (b) **Balance the following equations:** (5)
- (i) Iron pyrites (FeS_2) + oxygen $\rightarrow$ ferric oxides + sulphur dioxide
 - (ii) Aluminium + sodium hydroxide + water $\rightarrow$ sodium meta aluminate + hydrogen
 - (iii) Sulphur + nitric acid $\rightarrow$ sulphuric acid + nitrogen dioxide + water
 - (iv) Ammonia + oxygen $\rightarrow$ nitric oxide + water
 - (v) Copper + nitric acid $\rightarrow$ copper nitrate + nitric oxide + water
9. (a) **Answer the following questions:** (2 + 2 = 4)
- (i) Define
 - (I) Henry's Law
 - (II) Crystallization
 - (ii) State the different methods of crystallization.
- (b) (i) What is the effect of temperature on the solubility of KNO_3 and CaSO_4 in water? (1 + 1 + 2 = 4)
- (ii) The solubility of NaCl at 40°C is 36.5g. What is meant by this statement?
 - (iii) What are solubility curves. Give their uses.
- (c) Difference between Drying agent and Dehydrating agent. (2)
10. (a) Write your observation and balanced chemical equation in each case (where necessary) : (1 × 6 = 6)
- (i) Red lead is heated.
 - (ii) SO_2 is passed through acidified KMnO_4 solution.
 - (iii) H_2S is passed through lead acetate solution.
 - (iv) Sulphur dioxide is passed through lime water then in excess.
 - (v) Chlorine is passed through moist starch iodide paper.
 - (vi) A rod dipped in ammonia solution is brought near HCl gas.
- (b) Give a chemical test to distinguish between the following gases. (2)
- (i) NH_3 and HCl
 - (ii) SO_2 and Cl_2
- (c) Name the gas that : (2)
- (i) turns moist red litmus blue.
 - (ii) affects acidified $\text{K}_2\text{Cr}_2\text{O}_7$ paper and also turns lime water dirty milky.
11. (a) Fill in the blanks : (5)
- (i) Ozone absorbs the harmful _____ rays coming from the sun.
 - (ii) Carbon dioxide enters into atmosphere due to _____.
 - (iii) The rise in the average temperature of earth's surface is called _____.
 - (iv) Taj Mahal is made up of _____ which is chemically _____.
 - (v) The particulate pollutants include _____, _____, _____, _____ and _____.
- (b) What is smog? How is classical smog different from photochemical smog? (2)
- (c) What are the harmful effects of oxides of nitrogen in atmosphere? (1)
- (d) Discuss the water pollution caused by industrial water? (1)
- (e) What is the role of ozone layer in the stratosphere? (1)