Total No. of printed pages = 5

Sc-103/Chem-I/1st Sem (New)/Common/2017/N

CHEMISTRY – I

(New Course)

Full Marks – 70

Time – Three hours

The figures in the margin indicate full marks for the questions.

PART – A

1. Fill in the blanks : 1×5=5

   (i) 16 grams of oxygen occupies —— litre at STP.

   (ii) Conjugate base of water is ——.

   (iii) Angular quantum numbers indicate the —— of atomic orbitals.

   (iv) The melting and boiling points of covalent compounds are ——— than those of ionic compounds.

   (v) Ionization energy of elements ——— from top to bottom of a group in periodic table.

[Turn over

2. Give the correct answer of the following : $1 \times 5 = 5$

(i) Deionised water is free from cations / anions / all types of ions / heavy metal ions.

(ii) Faraday is a unit of current / charge / voltage / resistance.

(iii) Sodium carbonate is a neutral / acidic / basic / complex salts.

(iv) The value of magnetic quantum number of the last electron of sodium is 0/1/2/3.

(v) Absolute zero temperature is 0°C / 0K / -273K /273°C.

3. Answer the following in one word / sentence each : $1 \times 5 = 5$

(i) How many moles are present in 28 grams of nitrogen ?

(ii) Give one example of an oxydising agent.

(iii) Who proposed the Dual nature of electron ?

(iv) How is electron affinity of elements changed in a period ?

(v) How many electrons can be accommodated in a set of d-orbitals ?

4. Match the following correctly : 1×5=5

(a) Heisenberg	(i) abnormal behavior of water
(b) Faraday	(ii) hydrogen ion concentration
(c) Hydrogen bonding	(iii) biological catalyst
(d) PH	(iv) uncertainty principle
(e) Enzyme	(v) charge

5. State true or false for the following statements : 1×5=5

(i) Fe is used as catalyst in the Haber process of manufacturing ammonia.

(ii) Electroplating is an application of electrolysis.

(iii) Ionic bond is weaker than sigma bond.

(iv) De-ionised water is sterilised water.

(v) According to Pauli's exclusion principle an atomic orbital can accommodate maximum of two electrons.

PART – B

Answer any *five* questions.

6. (a) Balance the following reaction by partial method. 3

$$P + HNo_3 \rightarrow H_3PO_4 + H_2O + NO_2$$

(b) Explain with example the Lewis theory of acid-base. 3

(c) Classify salts with example. 3

7. (a) Write the postulates of Bohr's model of atom. 4

(b) Deduce De-Broglie equation. 3

(c) State Hund's rule of Maximum multiplicity. 2

8. (a) Explain how is hydrogen molecule (H_2) formed by covalent bond. 4

(b) Write the important characteristics of transitional elements. 3

(c) What is semi conductor ? 2

9. (a) State law of Mass Action. Derive an expression for equilibrium constant for the reversible reaction 4

$$aA + bB \leftrightarrow cC + dD$$

(b) What is Buffer solution ? Give example of different types of buffer solution. 3.

(c) Give the differences of electrolytic and electro-chemical cell. 2

10. (a) For one mole of ideal gas deduce 3

$$P_1V_1/T_1 = P_2V_2/T_2$$

(b) Using Avogadro's hypothesis prove that $M=2D$. 3

(c) Calculate the amount of carbon required to burn to produce 132 gram of CO_2. 3

11. (a) How is permanent hard water soften by Permutit Process ? 4

(b) What are the problems faced in boiler when hard water is used ? 3

(c) How deionised water differs from soft water ? 2