Total No. of printed pages = 6

END SEMESTER EXAMINATION, NOVEMBER-2018

Semester : 1st

Subject Code : Sc–103

CHEMISTRY–I

Full Marks – 70

Time – Three hours

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

Instructions :

1. *All* questions of PART – A are compulsory.
2. Answer any *five* questions from PART – B.

PART – A

Marks – 25

1. Fill in the blanks : 1×10=10

   (a) Boyle's law gives the relation between volume and _____.

   (b) 28 grams of nitrogen is equal to _____ mole.

[Turn over

(c) The value of angular quantum no. of S-orbital is ———.

(d) Basicity of sulphuric acid is _____.

(e) Conjugate acid of HSO_4^- is _____.

(f) Atomic size of elements ——— along the period from left to right.

(g) Ionic bond is formed by ——— of electrons.

(h) pH of acidic solution is ——— than 7.

(i) In Haber process of manufacturing ammonia ——— is used as catalyst.

(j) Electrochemical equivalent × ——— = Chemical equivalent.

2. Write true or false : 1×10=10

(a) Absolute zero temperature means 0°C.

(b) Losing of electron is Oxidation.

(c) Thomson discovered neutron.

(d) Conc. HCl is strong but dil. HCl is weak acid.

(e) Volume of one mole gas is always 22.4 litres.

(f) In an atomic orbital both the electrons must have same spin.

(g) Presence of a common ion decreases dissociation of weak electrolyte.

(h) Both temporary and permanent hardness of water can be removed by Permutit process.

(i) Principles of electrolytic cell and electro-chemical cell are same.

(j) Aqueous solution of sodium carbonate is alkaline.

3. Choose the correct answer : 1×5=5

(a) In STP the value of temperature is

(i) 0°C (ii) 25°C

(iii) 0K (iv) 100°C

(b) Angular quantum no. gives

(i) size (ii) orientation

(iii) shape (iv) spin of orbitals.

(c) Covalent compounds are

(i) superconductor (ii) semiconductor

(iii) good conductor (iv) non conductor

(d) Sterilized water is

(i) soft water

(ii) hard water

(iii) deionised water

(iv) bacteria free water

(e) Colour of methyl orange in acid medium is

(i) pink (ii) yellow

(iii) orange (iv) colourless

PART – B

Marks – 45

4. (a) State Avogadro's hypothesis. 2

(b) Using Avogadro's hypothesis prove that molar volume of any gas is 22.4 litre at STP. 4

(c) At 27°C temperature and 152 cm pressure the volume of a gas is 600 ml. Calculate the volume of the gas at STP. 3

5. (a) Give the electronic concept of oxidation and reduction. 3

(b) Balance the following reaction by partial method

$Cu + HNO_3 = Cu(NO_3)_2 + NO_2 + H_2O$. 3

(c) Calculate the amount of carbon that should be burnt in presence of oxygen to produce 88 grams of carbon dioxide. 3

6. (a) What is standard solution ? Give one example of a standard solution. 2

(b) State and explain with example the Arrhenius theory of acid-base. 4

(c) 15 ml of 0.1N solution of HCl is neutralised by 20 ml of Na_2CO_3. Calculate the strength of Na_2CO_3 in g/l. 3

7. (a) Write the postulates of Bohr's model of atom. 3

(b) State and explain the Pauli's Exclusion principle. 3

(c) Write the electronic configuration of Cr, Mg^{++} and Cl^-. 3

8. (a) What is Ionisation energy ? How it changes in periods of periodic table ? 2

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

(c) Differentiate ionic and covalent compounds. 4

9 (a) What is semiconductor ? Give one example. 2

(b) Define buffer solution. Give one example of each of acidic and basic buffer. 4

(c) Name the catalysts used in synthesis of ammonia and sulphuric acid. 3

10. (a) State and explain Faraday's Second law of electrolysis. 3

(b) 5 amps current is passed through a silver nitrate cell for 3 hours. Calculate the amount of silver deposited at cathode.
[At. wt Ag=108] 3

(c) Give the differences of electrolytic and electrochemical cell. 3

11. (a) Give the reasons of temporary and permanent hardness of water. 4

(b) Discuss the resin exchange method for deionisation of water. 5