Total No. of printed pages = 7

END SEMESTER / RETEST EXAMINATION – 2019

Semester : 1st (New & Old)

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 on 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) Volume of any gas theoretically becomes zero at ———.

   (b) 22 grams of carbon dioxide occupies ——— litres at STP.

   (c) The values of magnetic quantum number give the ——— of orbitals.

[Turn over

(d) Basicity of sulphuric acid is ———.

(e) Conjugate acid of H_2O is ———.

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

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

(h) pH of acidic buffer is less than ———.

(i) In Haber's process of manufacturing ammonia, ——— is used as catalyst promoter.

(j) During electrolysis metal is deposited at ———.

2. Write true or false : 1×10=10

(a) At STP, value of temperature is 273°C.

(b) Oxidation and reduction take place simultaneously.

(c) Alpha scattering experiment was performed by Neil Bohr.

(d) Nitric acid is an oxidising agent.

(e) 1M HCl solution is a standard solution.

(f) Transitional elements have only one valency.

(g) At equilibrium, both forward and backward reactions stop.

(h) Bicarbonates of Ca and Mg make water permanently hard.

(i) During electroplating no chemical change takes place.

(j) Hydrolysis of ammonium chloride gives acidic solution.

3. Choose the correct answer : 1×5=5

(a) One mole hydrogen gas is equal to

(i) 1 gram H_2

(ii) 2 gram H_2

(iii) 1 molecule of H_2

(iv) 1 litre H_2 at STP

(b) Dual nature of electron was proposed by

(i) Einstein (iii) De-Broglie

(ii) J. J Thomson (iv) Rutherford

(c) Covalent compounds are

(i) hard (ii) high melting

(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 phenolphthalein in alkali medium is

(i) pink (ii) yellow

(iii) purple (iv) colourless.

PART – B

Marks – 45

4. (a) State and explain Boyle's law. 2

(b) Using Avogadro's hypothesis prove that M = 2D. 4

(c) At 27°C temperature and 152 cm pressure calculate the volume occupied by 132 grams of carbon dioxide. 3

5. (a) Give the limitations of a balance chemical reaction. 3

(b) Balance the following reaction by partial method :

$Cu + HNO_3 = Cu(NO_3)_2 + NO + H_2O$. 3

(c) 30 grams of carbon when is burnt in presence of oxygen produces 88 grams of carbon di-oxide. Calculate the purity of carbon. 3

6. (a) What is Acidimetry ? 2

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

(c) 30 ml of 0.12N acid solution is diluted to make it 0.1N solution. Calculate the amount of water added. 3

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

(b) State and explain Hund's rule with example. 3

(c) Give the significances of quantum numbers. 3

8. (a) What are periodic properties ? 2

(b) Compare the characteristics of ionic and covalent compounds. 4

(c) Discuss how a covalent bond is formed. 3

9. (a) What is law of Mass action ? 2

(b) Derive an expression for equilibrium constant of reversible reaction. 4

(c) What is homogeneous catalysis ? Give example. 3

10. (a) Draw an electrolytic cell with suitable labelling. 3

(b) 50 amps current is passed through a silver nitrate cell for 6 hours. Calculate the amount of silver deposited at cathode. 3

[At. wt Ag=108]

(c) What is electro-chemical equivalent (e.c.e) ? 3

11. (a) Give the reasons of temporary hardness of water. 2

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

(c) Discuss the Permutit Process of softening of water. 5