

Total No. of printed pages = 6

Sc-103/Chem-I/1st Sem(N)/2018/J/A

CHEMISTRY – I

(New Course)

Full Marks – 70

Time – Three hours

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

PART – A

Marks – 25

1. Fill in the blanks : 1×5=5

- (i) 32 grams of methane contains ——— number of molecules.
- (ii) Conjugate acid of H_2O is ——— .
- (iii) A set of d-orbitals can accommodate maximum of ——— electrons.

[Turn over

- (iv) Ionisation energy of elements — along a period from left to right.
- (v) Temporary hardness of water is due to presence — of Ca and Mg.

2. Write true or false of the following : $1 \times 5 = 5$

- (i) Drinking water should be deionised water.
- (ii) Quantum theory is used in Bohr's model of atom.
- (iii) Chemical equilibrium is proportional to electro chemical equivalent.
- (iv) Angular quantum number indicates shape of the atomic orbitals.
- (v) Nitric acid is reducing agent.

3. Give your answer in one word/one sentence each : $1 \times 5 = 5$

- (i) State Dalton's law of partial pressure.
- (ii) Give one example of an acidic salt.
- (iii) What is catalyst promoter ?

(iv) State Pauli's exclusion principle.

(v) What is reversible reaction ?

4. Choose the correct answer :

1×5=5

(i) At STP, 32 grams of oxygen gas occupies

(a) 22.4 litre

(b) 44.8 litre

(c) 11.2 litre

(D) 2 litre

(ii) Sodium carbonate is a

(a) Basic salt

(b) Acidic salt

(c) Amphoteric salt

(d) Complex salt

(iii) Dual nature of electrons was discovered by

(a) J. J. Thomson

(b) Nell Bohr

(c) Chadwick

(d) De-Broglie

(iv) In STP the value of pressure is

(a) 100 mm

(b) 1 atm

(c) 76 atm

(d) 760 cm

- (v) Covalent bond is
- (a) Primary bond
 - (b) Secondary bond
 - (c) Stronger than ionic bond
 - (d) Formed by electron transfer.

5. Match the following :

1×5=5

(a) Hund's rule	(i) Electrolysis
(b) Atomic structure	(ii) Salt
(c) Electro refining	(iii) Catalyst
(d) Rate of chemical reaction	(iv) Pairing of electrons
(e) Hardness of water	(v) Neil Bohr.

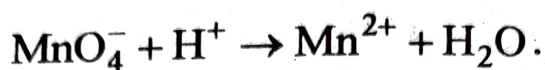
PART – B

Marks – 45

Answer any *five* questions

6. (a) For an ideal gas, prove $P_1 V_1 = P_2 V_2$. 4
- (b) Calculate the number of molecules present in 90 grams of water. 3
- (c) State Graham's law of diffusion. 2

7. (a) Balance the following by Ion exchange method : 3



- (b) Calculate the amount of hydrogen gas produced from the reaction of 65 grams of pure zinc with dil H_2SO_4 . 3

- (c) Give one example each of the following : 3

Oxidizing agent, Auto catalyst, Neutralisation reaction.

8. (a) Discuss the drawbacks of Rutherford's Model of atom. 4

- (b) Write the significances of Quantum numbers. 3

- (c) What is Aufbau principle ? 2

9. (a) Discuss with example how ionic compounds are formed. 4

- (b) Why sigma bond is stronger than pi bond ? 2

- (c) 5.3 gram of sodium carbonate is dissolved in one litre of water. Calculate the normality of the solution. 3

10. (a) Write the characteristics of catalyst. 3
- (b) Give one example of each of Arrhenius acid, Lewis acid, weak alkali. 3
- (c) What is common ion effect ? 3
11. (a) Discuss the Permutit process for removal of hardness of water. 4
- (b) What is the difference between soft water and deionised water ? 3
- (c) Mention two Boiler problems. 2