Total No. of printed pages = 6

**Sc-103/Chem-I(N)/1st Sem/2018/M**

# 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) 90 grams of water contains ——— number of molecules.

   (ii) Conjugate base of $H_2SO_4$ is ———.

   (iii) An atomic orbital can contain maximum of ——— electrons.

   (iv) Atomic radius ——— along a period from left to right.

   (v) Presence of bicarbonate salt makes water ——— hard.

[Turn over

2. Write true or false of the following : 1×5=5

(i) Rain water is sterilized water.

(ii) Quantum theory is used in Bohr's model of atom.

(iii) Chemical equivalent = e.c.ex Faraday.

(iv) Magnetic quantum number indicates shape of the atomic orbitals.

(v) Nitric acid is an oxidizing agent.

3. Give your answer in one word/one sentence each : 1×5=5

(i) State Graham's law of diffusion.

(ii) Give one example of a neutral salt.

(iii) What is electro-chemical equivalent ?

(iv) State Hund's rule of maximum multiplicity.

(v) How is $K_p$ related to $K_c$ ?

4. Choose the correct answer : 1×5=5

(i) At STP, 32 gram of methane occupies

(a) 22.4 litre (b) 44.8 litre

(c) 11.2 litre (d) 2 litre

(ii) Ammonium chloride is a

(a) Basic salt (b) Acidic salt

(c) Amphoteric salt (d) Complex salt

(iii) Neutron was discovered by

(a) J. J. Thomson (b) Neil Bohr

(c) Chadwick (d) De-Broglie

(iv) In STP the value of temperature is

(a) 0°C (b) 0 K

(c) 100°C (d) –273°C

(v) Hydrogen bond is

(a) Primary bond

(b) Secondary bond

(c) Stronger than covalent bond

(d) Stronger than ionic bond

5. Match the following : 1×5=5

| | |
|---|---|
| (a) Dual nature of electron | (i) Aufbau Priniple |
| (b) Atomic structure | (ii) Salt |
| (c) Electronic configuration | (iii) Catalyst |
| (d) Rate of chemical reaction | (iv) De-Broglie |
| (e) Neutralisation reaction | (v) Rutherford |

## PART – B

Answer any *five* questions.

6. (a) For an ideal gas, prove PV = nRT 4

(b) Show that Molar volume of all gases is 22.4 litre at STP. 3

(c) State Dalton's law of Partial pressure. 2

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

$Cr_2O_7^{2-} + H^+ \rightarrow Cr^{3+} + H_2O$

(b) Calculate the amount of carbon dioxide produced from the burning of 24 gram of pure carbon in presence of oxygen. 3

(c) Give one example of the following :

oxidizing agent, reducing agent, redox reaction. 3

8. (a) Discuss Rutherford's model of atom. 4

(b) Write the significances of Quantum numbers. 4

(c) What is Heisenberg's uncertainity principle ? 1

9. (a) Give the differences between ionic compounds and covalent compounds. 3

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

(c) Calculate the amount of water required to be added to 20 ml 0.13N acid solution to make it 0.10n. 4

10. (a) Give one example each of the following : 3

Homogenius catalysis, Catalyst promoter, Enzyme catalyst.

(b) Explain Lowry-Bronsted concept of acid-base. 3

(c) What is Buffer solution ? Give examples. 3

11. (a) Discuss the Resin method of De-ionisation of water. 5

(b) How we can sterilize water ? 3

(c) What is EDTA ? 1