

Total No. of printed pages = 5

Sc-103/Ch-I/1st Sem/2016/N

## CHEMISTRY - I

Full Marks – 70

Pass Marks – 21

Time – Three hours

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

Answer question No.1 and any six from the rest.

1. Fill in the blanks :  $1 \times 10 = 10$

(i) E.C.E of Ag is \_\_\_\_\_.

(ii) Conjugate acid of  $\text{SO}_4^{\text{--}}$  is \_\_\_\_\_.

(iii) Isotones are atoms of different atomic number but same number of \_\_\_\_\_.

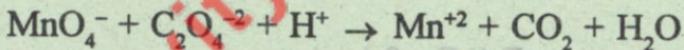
(iv) The oxidation number of Fe in  $\text{Fe}_3\text{O}_4$  is \_\_\_\_\_.

(v) The energy of first Bohr's orbit is \_\_\_\_\_ erg / atom.

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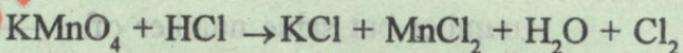
- (vi) 0.5 mole of oxygen occupies \_\_\_\_\_ ml volume at NTP.
- (vii) The vapour density of  $\text{SO}_2$  gas is \_\_\_\_\_.
- (viii) Number of protons present in  $\text{O}^{-2}$  is \_\_\_\_\_.
- (ix) \_\_\_\_\_ is an example of acidic oxide.
- (x) The equivalent weight of  $\text{CaCO}_3$  is \_\_\_\_\_.

2. (a) Balance the following equation by ion-exchange method : 3



Or

Balance the following equation by partial method :



- (b) What do you mean by Lewis acid ? Give example. 2
- (c) State Le Chatellier's principle and describe the effect of pressure, temperature and concentration in the manufacture of  $\text{H}_2\text{SO}_4$  acid by contact process. 2+3=5

3. (a) State and explain Faraday's first law of electrolysis. 1+2=3
- (b) What do you mean by basicity of an acid and acidity of a base ? 2
- (c) What do you mean by decinormal solution ?  
What volume of 0.5(N) NaOH is required to neutralize 50 ml of 1.5(N) HCl solution ? 1+3=4
- (d) What is indicator ? 1
4. (a) What are postulates of Bohr's atomic model ? 3
- (b) Prove that  $M = 2D$  3
- (c) Prove that  $\frac{r_1}{r_2} = \sqrt{\frac{M_2}{M_1}}$  3
- (d) What is Pauli's exclusion principle ? 1
5. (a) What is modern periodic law ? 1
- (b) Derive De-Broglie's equation. 3
- (c) Write down the characteristics of transition elements. 3

(d) Calculate the pH of 0.0001(M) NaOH solution. 3

Or

Calculate the E.C.E of Zn (Atomic wt of Zn = 65).

6. (a) Calculate the number of moles and molecules present in 100 ml of CO<sub>2</sub> gas at NTP. 4

(b) Write down three industrial applications of catalyst. 3

(c) Write down the estimation of hardness of water by EDTA method. 3

7. (a) What do you mean by hydrolysis ? Why an aqueous solution of Na<sub>2</sub>CO<sub>3</sub> is alkaline ? 2+2=4

(b) Write down the electron dot structure of N<sub>2</sub> molecule. 2

(c) How does ionisation energy vary in a period and in a group ? 2

(d) Identify the hardness causing salts among the following : 2

NaHCO<sub>3</sub>, Ca(HCO<sub>3</sub>)<sub>2</sub>, Al<sub>2</sub>(SO<sub>4</sub>)<sub>3</sub>, MgSO<sub>4</sub>, NH<sub>4</sub>Cl, Na<sub>2</sub>CO<sub>3</sub>.

8. Write short notes on any *four* :  $2\frac{1}{2} \times 4 = 10$

- (i) Common ion effect
- (ii) Quantum numbers
- (iii) Heisenberg's uncertainty principle
- (iv) Solubility product
- (v) Electrovalency.

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