

4/10/19

**NOTE: i) All the questions are compulsory.**

**ii) Figures to the right indicates full marks.**

**iii) Use of non-programmable calculator/ log table is allowed.**

**Q.1 A) Multiple choice Questions.**

**(12M)**

1. The cell in which the redox reaction which takes place gets reversed by applying emf slightly greater than emf of the cell is said to be ..... Cell.  
a) Reversible b) irreversible c) equilibrium
2. A saturated solution of sodium chloride is ..... phase system  
a) One b) two c) three
3. The no. of components present in  $\text{CaCO}_3(s) = \text{CaO}(s) + \text{CO}_2(g)$  are .....  
a) 1 b) 2 c) 3
4. The condensed phase rule is given by relation .....  
a)  $F = P - C + 1$  b)  $F = C - P + 1$  c)  $F = C + P + 1$
5. Diethylamine is ..... Type of ligand.  
a) Tridentate b) monodentate c) bidentate
6. Spin only magnetic momentum for  $\text{V}^{2+}$  ion is..... BM.  
a) 3.86 b) 4.90 c) 5.92
7. .... among the following transition elements shows special stability due to half filled level.  
a) Zirconium b) Niobium c) Molybdenum
8. Reaction of acetic anhydride with  $\text{PCl}_5$  gives.....  
a) Acetic acid b) acetaldehyde c) acetyl chloride
9. Sulphonation of benzene proceeds through.....  
a) Electrophilic substitution b) Nucleophilic substitution c) Both

10. Cinnabar is an ore of ....

- b) Cd    b) Zn    c) Hg

11. .... is the strongest acid among the followings

- a)  $\text{CF}_3\text{COOH}$     b)  $\text{CCl}_3\text{COOH}$     c)  $\text{CBr}_3\text{COOH}$

12. Carboxylic acids are converted into acid chlorides using..... in pyridine

- a)  $\text{SOCl}_2$     b)  $\text{Cl}_2$     c)  $\text{HCl}$

**B) Match the following.**

**(05M)**

- |                             |                                       |
|-----------------------------|---------------------------------------|
| 1) Electrochemical cell     | a) 4d series                          |
| 2) Claisen condensation     | b) $3d^1, 4s^2$                       |
| 3) Salt used in salt bridge | c) $\Delta G = -nFE$                  |
| 4) Scandium                 | d) self condensation of two molecules |
| 5) Molybdenum               | e) $\text{NH}_4\text{Cl}$             |

**C) State whether the following statements are True or False.**

**(03M)**

- 1) In phase diagram along the curves the system is bi-variant.
- 2) Sulfonation of benzene is a nucleophilic substitution reaction.
- 3) Zinc atom cannot show any oxidation state higher than +2.

**Q.2 Attempt ANY FOUR of the following questions.**

**(20M)**

- 1) Give any five advantages of quinhydrone electrode.
- 2) Write a note on liquid junction potential. How it is eliminated?
- 3) Derive Nernst equation for the determination of an emf of a voltaic cell in which the following reaction takes place :  $aA + bB = cC + dD$
- 4) Explain the application of phase rule to sulphur system.
- 5) State phase rule and explain the terms involved in it.
- 6) Calculate the molar heat of vapourisation of water between 363K and 373K. The vapour pressure of water are  $0.706 \times 10^5 \text{ Nm}^{-2}$  at 363K and  $1.013 \times 10^5 \text{ Nm}^{-2}$  at 373K

Q.3 Attempt ANY FOUR of the following questions.

(20M)

- 1) Explain in detail Werner's theory.
- 2) Write a note on physical properties and application of Vanadium peroxide.
- 3) Give analytical applications of co-ordination compounds.
- 4) State postulates of VBT.
- 5) Write a note on magnetic property of transition metals.
- 6) Give evidences for the formation of co-ordination compounds.

Q.4 Attempt ANY FOUR of the following questions.

(20M)

- 1) What is meant by sulphonation and sulphonating agents? Give two examples of sulphonating agents. How will you synthesize  $\alpha$  and  $\beta$ -Naphthalene sulphonic acids?
- 2) Write a note on HVZ reaction.
- 3) What is nucleophilic Acyl substitution? explain with mechanism.
- 4) Write a note on Dieckmann condensation.
- 5) Write a note on Claisen condensation.
- 6) Complete the following reactions:

