5/10/19 ATKT

**CHEMISTRY P-I S.Y.B.Sc SEM-IV MARKS 100 TIME 3 HRS**

**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. Gibb's phase rule is given by relation .....

   a) F = C-P +2 b) F= P-C+2 c) F= C+P -2

2. 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

3. The no. of components present in $CaCO_{3\,(s)} = CaO_{\,(s)} + CO_{2\,(g)}$ are

   a) 1 b) 2 c) 3

4. Water system has ..... No. of degrees of freedom

   b) Zero b) one c) _two

5. Diethylamine is ..... Type of ligand.

   a) Tridentate b) monodentate c) bnidentate

6. Spin only magnetic momentum for V2+ 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. ..... is the strongest acid among the followings

   a) $CF_3COOH$ b) $CCl_3COOH$ c) $CBr_3COOH$

9. Sulphonation of benzene proceeds through.....

   a) Electrophilic substitution b) Nucleophilic substitution c) Both

**10.** Carboxylic acids are converted into acid chlorides using…….. in pyridine

a) $SOCl_2$ b) $CL_2$ c) HCl

**11.** Reaction of acetic anhydride with $PCl_5$ gives……..

a) Acetic acid b) acetaldehyde c) acetyl chioride

**12.** Cinnabar is an ore of ….

b) Cd b) Zn c) Hg

**B) Match the following.** **(05M)**

| | |
|---|---|
| **1)** $Cu^{2+}$ | a) F = 0 |
| **2)** Replacement of $-SO_3H$ group | b) Outer orbital complex |
| **3)** Electrolytic cell | c) IPSO reaction |
| **4)** $[CoF_6]^{3-}$ | d) Blue |
| **5)** Triple point | e) Anode carries +ve charge |

**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)** Derive Clapeyron equation.

**2)** Calculate the molar heat of vapourisation of water between 363K and 373K. The vapour pressure of water are $0.706 \times 10^5$ $Nm^{-2}$ at 363K and $1.013 \times 10^5$ $Nm^{-2}$ at 373K

**3)** Explain the application of phase rule to sulphur system.

**4)** Derive Nernst equation for the determination of an emf of a voltaic cell in which the following reaction takes place : $aA + bB = cC + dD$

**5)** Give any five disadvantages of quinhydrone electrode.

**6)** Calculate the potential of electrode,

$Ag/ AgCl_{(s)}, Cl^-$ (a = 0.01).

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**Q.3 Attempt ANY FOUR of the following questions.** **(20M)**

1) Give analytical applications of co-ordination compounds.
2) State postulates of VBT.
3) Write a note on magnetic property of transition metals.
4) Give evidences for the formation of co-ordination compounds.
5) Name the different oxides of Titanium. Give any four chemical properties of $TiO_2$
6) Explain different types of ligands.

**Q.4 Attempt ANY FOUR of the following questions.** **(20M)**

1) Write structures of following compounds:

   a) Oxalic acid b) α- naphthoic acid c) Phalic acid d) Terephalic acid e) Benzoic acid

2) What is nucleophilic Acyl substitution ? explain with mechanism.
3) Write a note on Dieckmann condensation.
4) Write a note on Claisen condensation.
5) What is meant by sulphonation and sulphonating agents? Give two examples of sulphonating agents. How will you synthesize α and β- Naphthalene sulphonic acids?
6) Write a note on Claisen condensation

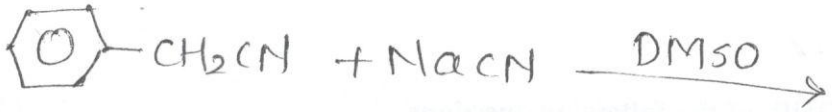
**.Q.5 Attempt ANY FOUR of the following questions.** **(20M)**

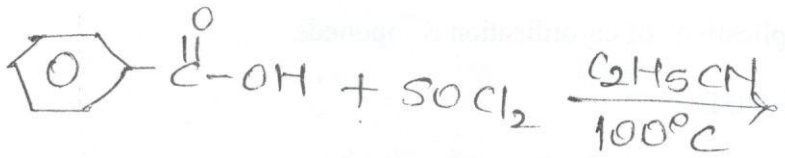
1) Derive Clapeyron-Clausius equation.
2) Give application of phase rule to Lead- Silver system.
3) Explain in detail Werner's theory.
4) Write a note on physical properties and application of Vanadium peroxide.
5) Write a note on HVZ reaction.
6) Complete the following reactions

i) 

$\xrightarrow[\text{Desulphonation}]{H^+, H_2O}$

ii) $C_2H_5Cl + KCN \xrightarrow{\text{alcohol}}$

iii) 

iv) 

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