

- NOTE: i) All the questions are compulsory.
 ii) Figures to the right indicate full marks
 iii) Use of non-programmable calculator / log table is allowed.

Q.1. Attempt any Twelve from MCQ:

A. Multiple choice questions

[12]

- The principle of lead silver system is used for _____.
 a) Polymerization b) plating c) desilverisation d) neutralization
- Galvanic cell consists of _____ half cell.
 a) One b) two c) three d) four
- In the amalgam, concentration cell metal is with _____.
 a) Cu b) Cd c) Hg d) Ag
- Standard electrode potential is denoted by _____.
 a) E b) E^0 c) E_{red} d) E_{oxi}
- NH_4NO_3 is used in the salt bridge is because _____.
 a) It forms jelly material with agar agar b) It is weak electrolyte
 c) It is good conductor of electricity d) transport number of NH_4^+ & NO_3^- are almost equal
- In the phase diagram at triple point the system is _____.
 a) Invariant b) mono variant c) bi variant d) tri variant
- Which is not a transition metal out of following
 a. Vanadium b. Chromium c. Cesium d. Iron
- EDTA combines with cations to form _____.
 a. Chelates b. Clathrates c. Polymers d. Ion Exchange resins
- EDTA is a _____.
 a. monodentate ligand b. Bidentate ligand c. Tetradentate ligand d. Hexadentate ligand
- Which of the following has magnesium?
 a. Chlorophyll b. Haemocyanin c. Vitamin B12 d. Carbonic anhydrate
- The number of unpaired electrons in $Ni(CO)_4$
 a. Zero b. One c. Four d. Five
- Which of the following ions is expected to be colourless?
 a) Cu^+ b) Ti^{+4} c) V^{+3} d) Fe^{+2}
- Salt of carboxylic acid is called as _____.
 a) Sulfoxylate b) carboxylate c) hydrates d) oxaltes
- Which of the following is sulphonating agent?
 a. NO_2 b) SO_3 c) CO_3 d) NH_4
- The formula for oleum is _____.
 a) H_2SO_4 b) $H_2S_2O_7$ c) $H_2S_2O_4$ d) $H_2S_2O_6$
- Among the following which is compound is most acidic.
 a) $ClCH_2COOH$ b) $BrCH_2COOH$ c) ICH_2COOH d) FCH_2COOH
- Dehydration of two molecules of carboxylic acid produce _____.
 a) Acid anhydride b) Acid chloride c) Amide d) Ester
- Identify the correct IUPAC name of the following compound
 $CH_3-(CH_2)_8-COOH$
 a) Decanoic acid b) Decan carboxylic acid c) Octanoic acid d) Decandioic acid

B. Match the following.

[5]

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|----------------------------|--|
| i) Salt bridge | i) $RCOOR$ |
| ii) Quinhydrone Electrode | ii) elimination of liquid junction potential |
| iii) Ester | iii) Mn |
| iv) Acid amide | iv) pH determination |
| v) Highest Oxidation State | v) $RCONH_2$ |

C. Write true or false.

[3]

1. Oxidation is a loss of electron
2. Salicylic acid is weaker than Benzoic acid
3. The ore of aluminium is pyrolusite.

Q.2 Answer the following (Attempt any four):

[20]

- A. what are the conventions to represent the galvanic cell.
- B. Explain the type of ion specific electrode.
- C. Describe the phase diagram of water system with suitable phase diagram.
- D. State Gibb's phase rule and explain any two terms involve in it with suitable example
- E. a) Write the functions of salt bridge (3)
b) give the cell reaction of given cell- $\text{Zn} | \text{Zn}^{+2} || \text{Cu}^{+2} | \text{Cu}$ (2)
- F. Calculate the potential of following electrode
 $\text{Pt} | \text{Sn}^{+2} (a=0.03), \text{Sn}^{+4} (a=0.02)$

Q.3 Answer the following. Attempt any four:

[20]

- A. Define the ligand? Write the types of ligands with suitable examples
- B. Write the EAN rule and eighteen electron rule with two examples of each rule.
- C. Explain sp^3 hybridization in $[\text{NiCl}_4]^{2-}$ and dsp^2 in $[\text{Ni}(\text{CN})_4]^{2-}$.
- D. Write the significance of special stability of d^0 , d^5 and d^{10}
- E. Explain Werner's theory of coordination compounds.
- F. Name the following complexes:

- a) $\text{K}_4[\text{Fe}(\text{CN})_6]$ b) $\text{Ni}(\text{CO})_4$ c) $\text{Li}[\text{AlH}_4]$ d) $[\text{Co}(\text{NH}_3)_6]\text{Cl}_3$ e) $[\text{Ag}(\text{NH}_3)_2]$

Q.4 Answer the following Attempt any four:

[20]

- A. What is Dieckmann condensation? Write its mechanism.
- B. Write down any two methods for preparation of carboxylic acid
- C. What is Hell-Volhard Ziehl reaction? Explain with mechanism.
- D. How is the picric acid prepared from phenol
- E. what is Claisen condensation? Give its mechanism
- F. What is ipso substitution? Explain with suitable example

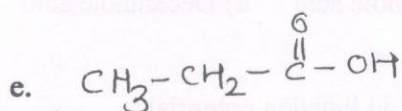
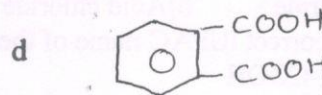
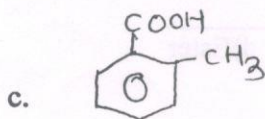
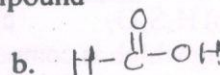
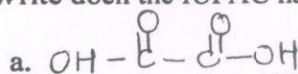
Q.5 Answer the following. Attempt any four:

[20]

- A. Derive the Nernst's equation for EMF of cell and single electrode potential.
- B. Describe the Eutectic system with suitable phase diagram
- C. Explain various applications of coordination compounds
- D. Write the formula of the following complex compound:-

- a) Hexamine cobalt (III) chloride. b) Diamine silver (I) chloride.
c) Pentammine choro cobalt (III) ion. d) Sodium tetrachloro zincate (II).
e) Tetracarbonyl nickel(0).

- E. Write down the IUPAC name of the following compound



- F. What is nucleophilic acyl substitution? Give mechanism in alkaline and acidic medium