INTER B. SC. EXAMINATION, 2017

(2nd Semester)

CHEMISTRY (SUBSIDIARY)

PAPER - VII S

Time : Two hours Full Marks : 50

Use a separate answerscript for each group.

GROUP - A

1. a) Explain the term 'specific conductance'. 2

   b) The resistance of a conductivity cell when filled with 0.02M KCl solution is 164 ohm at 298 K. However, when filled with 0.05 M $AgNO_3$ solution, its resistance is found to be 78.5 ohm. If specific conductance of 0·02 M KCl is 2.768×10^{-3} ohm^{-1} cm^{-1}, calculate specific conductance of 0·05 M $AgNO_3$ solution and the molar conductance of $AgNO_3$ solution. 3

2. a) How can you calculate the solubility of AgCl solution by measuring conductance ? 3

   OR

   The specific conductance of saturated solution of AgCl 25^oC after subtracting the specific conductance of water is $2\cdot28\times10^{-4}$ S m^1. Calculate the solubility of AgCl in grams per dm^3 at this temperature.

[$\Lambda^{o}_{m(AgCl)} = 138{\cdot}3 \times 10^{-4}$ S m^2 mol^{-1} and $M_{(AgCl)}$ = 143·5 g mol^{-1}] 3

b) What is the effect of dilution on equivalent conductance ? 1

c) Draw and explain the conductometric titration curve for acetic acid by NaOH. 2

3. a) Derive Nernst equation for measuring EMF of a cell. 3

OR

Represent schematically the cell made up of the following half cell reactions and information :

$Mg \rightarrow Mg^{2+}$ (0·01 M) + $2e^{-}$, E^{o} = + 2.34 volts

Sn^{2+}(0·1M) + $2e^{-} \rightarrow$ Sn, E^{o} = – 0·136volts

Calculate the EMF of the above cell at 25°C. 3

b) How can you determine pH of a solution by EMF measurement using quinhydrone electrode ? 3

OR

Calculate the free energy change of the following cell at 25°C.

$$Sn \mid Sn^{2+}(a = 0\cdot6) \parallel Pb^{2+}(a = 0\cdot3) \mid Pb$$

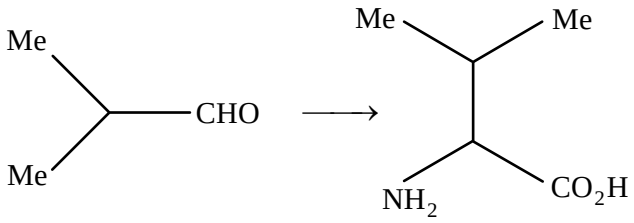
Standard EMF of the cell is 0·014 volt. 3

i) $[NiCl_4]^{2-}$ (paramagnetic corresponds to 2 unpaired electrons)

ii) $[CoF_6]^{3-}$ (paramagnetic corresponds to 4 unpaired electrons) 3

e) Give a brief account on (i) linkage and (ii) hydrate isomerism. 3

f) Draw an optically active coordination complex devoid of any C atom. 1

iii) 

c) Why do amino acids have high melting points ? 1

d) What is meant by isotactic polymer ? Explain with an example. 2

e) Describe the steps involved in polymerisation of vinyl chloride (Cl) via free radical mechanism. 3

GROUP - C

5. a) Classify the ligands based on their denticity and cite one example for each case. Draw the structure of a complex compound containing a hexa-dentate ligand. 3

b) Write the IUPAC nomenclature of the following complexes ***(any three)*** :

$[Pt(NH_3)_4][PtCl_4]$, $[CoF_3(NMe_3)_3]$, $[Fe(CO)_5]$, $[Al(H_2O)_5(OH)]^{2+}$

3

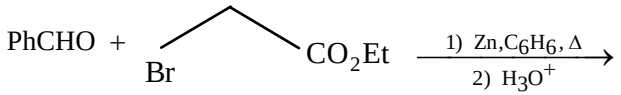
c) Draw all possible stereoisomers of $[MA_2B_2C_2]$. 3

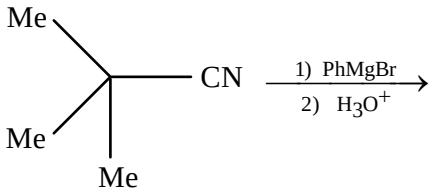
d) Applying Valence Bond theory, predict the geometry of

GROUP - B

Answer ***all the*** questions

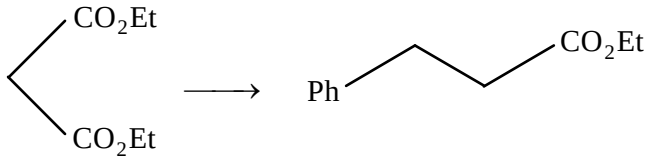
4. a) Predict the products of the following reactions and explain with mechanism. $2\frac{1}{2}+2\frac{1}{2}$

i) 

ii) 

b) How can you carry out following transformations ?

2+2+2

i) 

ii)