FIRST TERMINAL EXAMINATION, 2016
CHEMISTRY

Time : 3 hrs. **Class - XII** **M.M. : 70**

Date – 14.9.2016

General instructions :
- *Answer all questions.*
- *Question nos. **1 to 5** are very short answer question carrying **1 mark** each.*
- *Question nos. **6 to 10** are short answer question carrying **2 marks** each.*
- *Question nos. **11 to 22** are short answer question carrying **3 marks** each.*
- *Question no. **23** is a value based question carrying **4 marks**.*
- *Question nos. **24 to 26** are long answer question carrying **5 marks** each.*
- *Use of calculator is strictly prohibited.*
- *Use log table if necessary.*

Q.1 What does the +ve sign in the expression $E^0_{Cu^{2+}/Cu} = + 0.34V$ mean? (1)

Q.2 Give an example of auto-catalysis reaction. (1)

Q.3 Write the balanced reaction when copper reacts with dilute nitric acid. (1)

Q.4 How can you convert methyl bromide to methyl isocyanide? (1)

Q.5 Why is bithional added to soap? What type of compound is it ? (1)

Q.6 Calculate the freezing point depression expected for 0.0711m aqueous solution of Na_2SO_4. If this solution freezes at -0.320^0C, what would be the value of Van't Hoff factor? (2)

Q.7 Write the reactions taking place at various layers during the reduction of oxide of Iron to Iron. (2)

Q.8 Write short notes on : (2)

a) Tyndal effect   b) Electro osmosis

Q.9 Draw the structure of the following molecules indicating their shape. (2)

a) $XeOF_4$ b) ClF_3

Q.10 The product obtained by SN^1 reaction is racemised. Give reason? (2)

Q.11 Write short notes on the following : (3)

a) F-centre   b) Anisotropy   c) n-type semiconductor

Q.12 The CsCl has cubic structure of Cl^- ions in which Cs^+ ions are at the body centre of the cube. Its density is 3.998 gm cm^{-3}. (3)

  i)   Calculate the length of the edge of unit cell.

  ii) What is the distance between Cs^+ and Cl^- ions?

  iii) What is the radius of Cs^+ ions if the radius of Cl^- ion is 180 pm.

OR

Iron has a body centred cubic unit cell with a cell edge of 296.65 pm. The density of iron is 7.8488gm cm^{-3}. If the atomic weight of iron is 56u, what will be the Avogadro number?

Q.13 What are ideal and non-ideal solutions? With the help of neat diagram explain the characteristics of ideal and non-ideal solutions giving one example from each. (3)

Q.14 A solution of urea containing 30 gm/L of solution in water has the same osmotic pressure (3) as a solution of sucrose. Calculate the mass of sucrose present per litre of solution? (Urea = 60u, Sucrose = 342u)

Q.15 a) A zinc rod is dipped in 0.1M solution of $ZnSO_4$. The salt is 95% dissociated at (2+1) this dilution at 298K. Calculate the electrode potential. ($E^0_{Zn^{2+}/Zn}$ = -0.76V).

b) State and explain faradays 2nd law of electrolysis.

Q.16 a) Derive the relation and show the slope of the equation? (2+1)

$$\log\left(\frac{K_2}{K_1}\right) = \frac{Ea}{2.303R}\left[\frac{T_2 - T_1}{T_1 T_2}\right]$$

b) Define molecularity of a complex reaction.

Q.17 a) Write the mechanism of heterogeneous catalysis. (2+1)

b) Why delta is formed when river meet the sea.

Q.18 Write short notes on the following with reactions with an example. (3)

a) Zone refining   b) Hydrometallurgy   c) Electrolytic reduction

Q.19 Give reasons for the following – (3)

     a) PCl_5 exist as ionic solid?

     b) HI is a stronger acid than HCl.

     c) $Fe(OH)_3$ in used during the preparation of sulphuric acid in contact process.

Q.20 Write the polymerization reaction of the following polymers mentioning the names of the (3) monomer.

a) Nylon 2, 6   b) Glyptal   c) Buna–S

Q.21 Write any two differences between – (3)

     a) Thermoplastic and thermosetting polymer.

     b) Addition and condensation polymer.

     c) High density and low density polyethene.

Q.22 Write short notes on the following with one example from each. (3)

a) Tranquilizers   b) Broad spectrum antibiotic   c) Anti histamines

Q.23 Corrosion of copper, silver and rusting of iron are very common. Both cause enormous (4) damage, rusting of iron in particular results in the loss of crores of rupees every year and major accidents occur because of this.

a) What is chemical formula of rust?

b) Why silver articles becomes black when exposed to air for a long time.

c) How is copper affected by corrosion?

d) Suggest three ways to check rusting of iron so as to check national wastage of money.

Q.24 Write balanced reaction for the following after completion. (5)

     a) $I_2 + HNO_3$ Conc. $\rightarrow$ b) $Ca_3P_2 + H_2O \rightarrow$ c) $XeF_4 + H_2O$ (excess)$\rightarrow$

     d) $KI + O_3 \rightarrow$ e) $SiO_2 + HF \rightarrow$

OR

Arrange the following as directed :

a) *$HClO_2$, $HClO_3$, $HClO_4$, HClO* increasing order of acidic strength.

b) *F – F, Cl – Cl, Br – Br, I – I* increasing order of (ΔH) X – X bond

c) *H_2O, H_2S, H_2Se, H_2Te* decreasing bond angle

d) *NH_3, PH_3, AsH_3, SbH_3*, increasing reducing nature

e) *F_2, Cl_2, Br_2, I_2* (decreasing oxidising power)

Q.25 The following results have been obtained – (3+2)

a) During kinetic studies of the reaction :

$$2A + B \rightarrow C + D$$
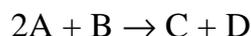
Expt.	(A)	(B)	Initial rate of formation
1	0.1	0.1	6×10^{-3}
2	0.3	0.2	7.2×10^{-2}
3	0.3	0.4	2.88×10^{-1}
4	0.4	0.1	2.4×10^{-2}

Determine the rate law and rate constant for reaction.

b) Show that the time required for 99% completion is twice the time required for completion of 90% of reaction.

OR

a) The time required for 10% completion of a 1st order reaction at 300K is equal to that required for 30% completion at 310K. The value of A is $4 \times 10^{10} S^{-1}$. Calculate K at 318K and E_a.

b) The following data obtained during 1st order thermal decomposition of $SO_2 Cl_2$ at constant volume –

$$SO_2Cl_2 \rightarrow SO_2(g) + Cl_2(g)$$

Expt.	time/S^{-1}	Total pressure
1	0	0.5
2	100	0.6

Calculate the rate of reaction when total pressure is 0.65 atm.

Q.26 Answer the following. (5)

a) $CH_3 CH_2 Br + KCN \rightarrow$

b) $C_6H_5ONa + C_2H_5Cl \rightarrow$

c) Carry out the conversion of the following :

i) Ethylchloride to propanoic acid

ii) Toluene to benzyl alcohol

iii) Benzene to 4-bromo nitrobenzene

OR

Write short notes on the following with an example.

a) Swarts reaction

b) Fridel Craft acylation reaction

c) Anti Markovnikoff's rule

d) Nucleophilic substitution reaction in chlorobenzene

e) Sandmeyers reaction