VINAYAK CLASSES
DEGREE & DIPLOMA ENGINEERING

Sub: Chemistry

Standard: 12th (Science) **Date: 25.1.2019**

Time : 3 Hours **Total Marks: 70**

Note:

1) All questions are compulsory.
2) **Section-A** contains Q.No.1 to 4 of Multiple Choice type of questions carrying **one** mark each. Q.No.5 to 8 of Very short Answer type of questions carrying one mark each.
3) **Section B** contains Q.No.9 to 15 of short answer type questions carrying **two** marks each. Internal choice is provided to only one question.
4) **Section C** contains Q.No.16 to 26 of short answer type questions carrying **three** marks each. Internal choice is provided to only one question.
5) **Section D** contains Q.No.27 to 29 of long answer type questions carrying **five** marks each. Internal choice is provided to each questions.
6) Use of log-table, if necessary is allowed. Use of calculator is not allowed.

Section-A (8 marks)

Q.1 A solar cell is constructed by connecting the semiconductors of

(a) n-type and n-type (b) n-type and p-type

(c) p-type and p-type (d) n-type and n-p-type

Q.2 The molality of pure water is

(a) 1 (b) 18 (c) 55.55 (d) 0.0555

Q.3 A pink coloured salt turns blue on heating. The presence of which cation is most likely?

(a) Co^{2+} (b) Cu^{2+} (c) Zn^{2+} (d) Fe^{2+}

Q.4 Magnetic moment 2.84 BM is given by (At No. Ni= $28, Ti = 22, Cr = 24, Co = 27$)

(a) Ni^{2+} (b) Ti^{3+} (c) Cr^{3+} (d) Co^{2+}

Answer the following questions in one sentence each:

Q.5 Predict the sign of ΔS in the given process

$N_2O_{4(g)} \rightarrow 2NO_{2(g)}$

Q.6 Identify the term which is the ratio of the distance between the electrodes and the area of cross-section of the electrode.

Q.7 Identify the following molecule is chiral or achiral $CH_3 - \underset{\underset{\text{Br}}{|}}{CH} - CH_2 - CH_3$

Q.8 Predict the product.

Acetic acid $\xrightarrow[H_3O^+]{LiAlH_4}$?

Section-B (14 marks)

Q.9 Define integrated rate law and give the unit of rate of reaction

Q.10 Give the name (with formula) of the ores of zinc and mention two important physical properties.

Q.11 Explain the action of aqua regia on gold and platinum elements.

Q.12 Identify the alcohol in given reactions:

(a) $2^0\ Alcohol \xrightarrow{Oxidation} Butanone.$ (b) $3^0\ Alcohol \xrightarrow{Oxidation} Propanone$

Q.13 What happen when-

(a) Phenylamine is treated with a metal nitrite and HCl in cold?

(b) N-Methyl aniline is treated with nitrous acid in cold?

Q.14 What is peptide bond? Explain the formation of a dipeptide in proteins.

Q.15 Explain- (a) Addition polymers and (b) Condensation polymers with examples

OR

Q.15 What are homopolymers and heteropolymers? Give examples.

Section-C (33 marks)

Q.16 How many unit cells are present in

(a) 2.5 g cubic crystal of KCl (b) with each edge of crystal?

(Given: KCl=74.5, Cell constant=4)

Q.17 What are preservatives? Explain the chemical methods of food preservation.

Q.18 Name the oxides of nitrogen and write the uses of inert gases.

Q.19 Find the number of moles of zinc metal liberated on cathode, during the electrolysis of $ZnSO_4$ solution, when 2.5 A current was passed through the solution for 30 minutes

[Molar mass of $Zn = 64\ gmol^{-1}, F = 96500\ C$]

Q.20 Calculate the standard enthalpy of formation of liquid ethanol from the following. Standard enthalpy of combustion of liquid ethanal is $-1160\ kJ\ mol^{-1}$. Standard enthalpy of formation of $CO_{2(g)}$ and $H_2O_{(l)}$ $are - 390\ kJ\ mol^{-1}\ and - 280\ kJ\ mol^{-1}$ respectively.

Q.21 Explain the effect of substituents on the acidity of carboxylic acids.

Q.22 Name the product of the given reaction and write the structure of product.

(a) Cumene hydroperoxide $\xrightarrow[dil.\ H_2SO_4]{\Delta}$?

(b) Anisole $\xrightarrow[Conc.\ H_2SO_4]{Conc.HNO_3}$?

(c) Diazomethane + propan-1-01$\xrightarrow{Warm}$?

Q.23 Report the important general characteristics of transtition elements.

Q.24 Calculate the elevation in boiling point of urea solution which is prepared by dissolving 1.20×10^{-2}kg of urea in 170 cm^3 of water. [K_b(water)=0.5 kg mol^{-1}, density of water $= 1g\ cm^{-3}$and molar mass of urea=60 g mol^{-1}]

Q.25 Explain Grignard's reagent with example and state Saytzeff's rule.

Q.26 Classify the following into monosaccharides, oligosaccharids and polysaccharides

(i) Starch (ii) Sucrose (iii) Lactose (iv) Raffinose

Write the monomers used in preparing Buna-S-polymer.

OR

Q.26 Give name of polymer which is prepared by using lactic acid and glycollic acid. Explain the structure of cellulose.

Section-D (15 marks)

Q.27 Define the term colligative property.

State second law of thermodynamics in term of entropy and under what condition $\Delta H = \Delta U$?

Write the systematic names of –

(i) $[PtBr_2(NH_3)_4]Br_2$ (ii) $[CoH_2O(NH_3)_5]I_3$

OR

Q.27 State van't Hoff-Avogadro's law

Define entropy and give balanced chemical equation that has ΔH^0 value equal to $\Delta_t H^0$ *for* $KClO_3$.

Explain linkage isomerism with an example.

Q.28 What are trans-uranic elements?

Name the method used for the vapour-phase refining of impure titanium.

Write the notes on: (i) Pyrophosphoric acid (ii) Polymetaphosphoric acid

OR

Q.28 What is lanthanoid contraction?

Which form of the iron is the purest form of commercial iron?

What is the action of conc. H_2SO_4 *on* –

(i) Zinc (ii) Carbon (iii) Oxalic acid

Q.29 Give IUPAC name of (i) Diisopropylamine (ii) Di-tert-butylamine.

Formulate a cell for $Sn^{2+}_{(aq)} + 2AgCl_{(s)} \rightarrow Sn^{4+}_{(aq)} + 2Ag_{(s)} + 2Cl^-_{(aq)}$

Calculate the rate constant of a first order reaction $x \rightarrow y$, where 50% of the sample decomposes in half an hour.

OR

Q.29 Write the structure of

(i) 5-Bromo-2-ethylaniline (ii) 4-Chloro-N-ethyl-3-nitroaniline

Write Nernst equation for reaction $Al^{3+}_{(aq)} + 3e^- \rightarrow Al_{(s)}$

What is the activation energy for a reaction whose rate constant doubles when temperature changes from 30^0C *to* 40^0C?