MAR THOMA RESIDENTIAL SCHOOL TIRUVALLA
ANNUAL EXAMINATION FEBRUARY- 2018-19
CHEMISTRY [PAPER – 1]

CLASS: XI **[MAXIMUM MARKS: 70]**
TIME: 3 Hr

[Candidates are allowed additional 15 minutes for only reading the paper. They must not start writing during this time]

ALL QUESTIONS ARE COMPULSORY

QUESTION 1 is of 20 marks all of which are compulsory

QUESTION numbers from 2 to 8 is of two marks each.

QUESTION numbers from 9 to 15 is of three marks each.

QUESTION numbers from 16 to 18 is of five marks each.

All working including rough work should be done on the same sheet as and adjacent to the rest of the answer. The intended marks for questions are given in brackets [ ]. Balanced equation must be given wherever possible and diagrams where they are helpful. When solving numerical problems all essential working must be shown. For solving numericals the followting data can be used

1 Faraday = 96500 coulombs , h = 6.626 x 10^{-34} Kgm^2s^{-1},

R=8.314J/K/mol, 0.0821Latm/K/mol , 0.083Lbar/K/mol, 1.987 cal/K/mol

avogadros number= 6.022 x 10^{22}

PART -1

QUESTION – 1

(a) **Fill in the blanks:** [4]

(i) ---------- is a reagent used for dehydrohalogenation while ---------- Is a reagent used for decarboxylation.

(ii) A ring system exhibit aromatic character when it contains ---------- Pi electrons and it is known as ---------- rule.

(iii) The hybridization and shape of ammonia is ---------- and ----------

(iv) P_x , P_Y , P_Z are called ---------- orbitals as they have same ----------

(b) **Choose the correct answer:** [4]

(i) Melting point is highest for
(a) B (b) Al (c) Ga (d) In

(ii) The rate of S_N1 reaction is more in
(a) $(CH_3)_2 - CHBr$ (b) $CH_3 - CH_2 - Br$ (c) CH_3Br (d) $(CH_3)_3 - C - Br$

(iii) The electrons occupying the same orbital are distinguished by
(a) Azimuthal quantum number (b) spin quantum number
(c) Principal quantum number (d) Magnetic quantum number

(iv) Which of the following represents the most electropositive elemer
(a) [He] $2S^1$ (b) [He] $2S^2$ (c) [Xe] $6S^1$ (d) [Xe] $6S^2$

(c) **Match the following:** [4]

(i) Nucleophile	Visible region
(ii) Balmer series	Boron tri fluoride
iii) Electrophile	Infrared region
iv) Brackett series	Ethanol

(d) **Answer the following:**

(i) Explain:

(a) CCl_4doesnot undergo hydrolysis whereas $SiCl_4$ does so

(b) Lithium shows anomalous behaviour

(ii) (a) Why is lactic acid an optically active compound

(b) Draw the geometrical isomer for C_4H_8

(iii) State Heisenbergsuncertainity principle. Give its mathematical Expression

(iv) (a) Define normality

(b) How many grams of sodium chloride are required to prep 250 ml of 0.50 M NaCl solution [Na = 23, Cl= 35.5]

PART – 11

Question-2

omplete and balance the following equation:

(i) $H_2O_2 + PbS \rightarrow$

(ii) $H_2O_2 + Cl_2 \rightarrow$

QUESTION – 3

(a) State two uses of silicones

(b) What happens when silver nitrate solution is added to hypo solution? Write the equations

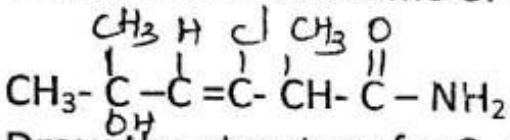
[OR]

(a) $Ba(OH)_2$ is more basic than $Be(OH)_2$ Why?

(b) State two uses of soda ash

QUESTION – 4

(a) Write the IUPAC name of the following:



(b) Draw the structure for 2-amino -3,4 –dimethyl hept-5 –yn-1-oic acid

QUESTION – 5

The density of a gas is 3.80 g/ L at STP. Calculate its density at 27^0C and 700 mm of Hg

QUESTION – 6

Calculate the enthalpy of reaction when ammonia is oxidized

$4NH_{3(g)} + 5\,O_{2(g)} \rightarrow 6H_2O_{(g)} + 4\,NO_{(g)}$

The enthalpy of formation of ammonia , water and NO are – 46.2 KJ/mo

– 241.8 KJ/mol , + 90.4 KJ/mol

QUESTION -7

(a) Why is ammonia a base although it does not contain OH^- ion

(b) What do you mean by buffer solution

QUESTION – 8

Calculate the solubility of nickel hydroxide [$Ni(OH)_2$] in pure water and 0.10 M NaOH solution if K_{SP} of $Ni(OH)_2$ is 2×10^{-15}

[OR]

Two electrolytic cells containing silver nitrate solution and copper sulphate solution are connected in series. A steady current of 2.5 ampere was passed through them until 1.078 g of silver were deposited. How long did the current flow? What weight of copper was deposited at the same time?

[At weight of copper=63.5, silver =107.8]

QUESTION - 9

(a) State Lechatliers principle

(b) What is ΔH for the following reaction at 300 K if $\Delta E = -885389 J/mol$

$$CH_{4(g)} + 2\,O_{2(g)} \rightarrow CO_{2(g)} + 2H_2O_{(l)}$$

QUESTION -10

(a) Using the concept of oxidation number identify the substance undergoing oxidation and reduction

$$Cr_2O_3 + 2Al \rightarrow 2Cr + Al_2O_3$$

(b) Balance the following redox reaction in acidic medium

$$Sn + NO_3^- \rightarrow SnO + NO$$

QUESTION -11

Write the balanced equation for the following:

(a) Phenol to nitrobenzene

(b) Ethyl chloride to butane

(c) Ethyne to ethanal

QUESTION – 12

(a) Draw the resonating structures of benzoic acid and explain its directi influence and rate of second substitution

(b) What happens when $MgCl_2 \cdot 6H_2O$ is heated . Write the equation

QUESTION – 13

Write the type of attacking reagent and type of reaction for the following:

(a) Chlorination of benzene to give chlorobenzene
(b) Bromine in CCl_4 added to ethene
(c) HBr reacted with propene in presence of peroxide

[OR]

(a) Write the principle involved in estimation of sulphur by carius method
(b) In carius determination 0.64 g of an organic substance gave 0.764 g of barium sulphate. Calculate the percentage of sulphur in the given compound.[At wt of S= 32 ,Ba = 137 ,O =16]

QUESTION – 14

(a) What do you mean by covalent radius?
(b) Write the electronic configuration of Zn^{2+} [atomic number of zinc= 30]
(c) Why is the ionization energy of nitrogen greater than [illegible] oxygen

[OR]

Explain why

(a) Water has a higher boiling point than hydrogen sulphide
(b) $PbCl_2$ is more common than $PbCl_4$[at no : of lead= 82]
(c) Aluminium chloride shows covalent character when compared to sodium chloride

QUESTION – 15

(a) Write the molecular orbital configuration of Nitrogen molecule
Calculate the bond order and predict its magnetic behaviour
(b) What is the criteria for spontaneity in terms of free energy change
(c) Draw the lewis structure of nitric acid

ESTION – 16

(a) State the third law of thermodynamics
(b) Calculate the degree of ionization and pH of 0.05 M ammonia solution. If K_b of ammonia is 1.77×10^{-5} State the law behind this.
(c) What do you mean by salt hydrolysis?

QUESTION – 17

(a) Give reasons for the following:
- (i) TlCl is more stable than $TlCl_3$ [2]
- (ii) CO_2 exist as gas while SiO_2 exists as solid

(b) Write balanced chemical equation
- (i) Preparation of silicon carbide from silica [3]
- (ii) Reaction of water with calcium phosphide
- (iii) Iodine reacted with sodium thiosulphate

[OR]

(a) What is an alum? Write its uses [1]

(b) What are the types of hard water? How is the hardness of water removed? [2]

(c) Write two uses of zeolite? [1]

(d) Calculate the strength in gm/L of 20 volume of hydrogen peroxide solution [1]

QUESTION 18

(a) Write the balanced equation and name the reaction [3]
- (i) Benzene treated with ethyl chloride in presence of anhydrous $AlCl_3$
- (ii) Sodium benzoate heated with soda lime

(b) Write the two differences between S_N1 and S_N2 mechanism? [1]

(c) Draw the metamers of $C_4H_{10}O$ [1]

[OR]

(a) Find A and B [2]
- (i) $C_6H_5OH \xrightarrow[\Delta]{Zn} A \xrightarrow[\Delta]{Conc\ H_2SO_4} B$
- (ii) $CH_2=CH_2 \xrightarrow[CCl_4]{Br_2} A \xrightarrow{alc\ KOH} B$

(b) Give a chemical test to distinguish between 1-pentyne and 2-pentyne [1]

(c) Why is it necessary to fuse the compound with sodium in the detection of Nitrogen ,Sulphur or Halogens by Laisaignes test [1]

(d) Reductive ozonolysis of an alkene X gave a mixture of propan-2-one and propanal .What is the structural formulae of the alkene X. [1]

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