INTERNATIONAL INDIAN SCHOOL DAMMAM

FIRST TERMINAL EXAMINATION 2017-2018

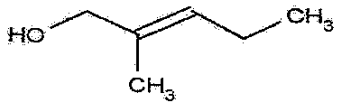
GRADE : XII **CHEMISTRY**

TIME : 3 HOURS **SET – A** **MAX MARKS: 70**

General Instructions:

1. All questions are compulsory
2. Question numbers 1 to 5 are very short answer type carrying 1 mark each.
3. Question numbers 6 to 10 are short answer type carrying 2 marks each.
4. Question numbers 11 to 22 are short answer type carrying 3 marks each.
5. Question 23 is a value based question, carrying 4 marks.
6. Question numbers 24 to 26 are long answer questions, carrying 5 marks each.
7. Calculators are not permitted. Use log tables if necessary.

1. Write IUPAC name for the following compound. 1



2. What is the basicity of H_3PO_3 and why ? 1

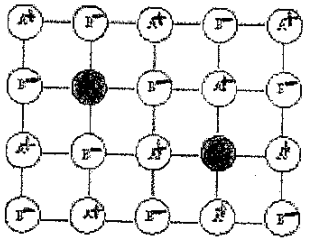
3. Define cryoscopic constant. 1

4. A solid is made of two elements P and Q . Atoms Q are in ccp arrangement while atoms P occupy all the tetrahedral voids. What is the formula of the compound ? 1

5. a) Which one of the following pair undergoes faster S_N1 reaction and why ? 1

   1-Bromo-2-methylbutane or 2-bromo-2-methylbutane

6. Examine the given portion of a defective crystal and answer the following questions. 2



i) What are these types of defects called ?

ii) How is the density of a crystal affected by these defects ?

iii) Name an ionic compound which show this type of defect in the crystalline state.

OR

a) Why is glass considered as a super cooled liquid ?

b) What are ferromagnetic substance ?

7. Describe the principle involved in each of the following process of metallurgy. 2

i) Froth floatation

ii) Zone refining

8. How the following conversions can be carried out? 2

i) Chloroethane to propanoic acid

ii) Isopropyl benzene to phenol

9. In an electrochemical cell , which is in the standard state , the half cell reduction potentials are : 2

$E^0_{(Pb^{2+}/Pb)} = -0.13V$ $E^0_{(Ag^+/Ag)} = +0.80V$

i) Write cell reaction for the cell .

ii) Write cell representation for the cell.

iii) Calculate emf of the cell.

10. A primary alkyl chloride (A) , on reaction with magnesium in dry ether followed by treatment with ethanol gave 2- methyl butane. Identify A and the write the reactions involved. 2

11. a)Arrange the following in the order of the property mentioned. 3

i) PH_3 , NH_3 , SbH_3 , AsH_3 (Increasing basic strength)

ii)F_2 , Cl_2 , Br_2 , I_2 (Increasing bond dissociation enthalpy)

b) Write the conditions to maximise the yield of NH_3 by Haber process.

12. a) Define azeotropes . What type of azeotrope is formed by positive deviation from Raoult's law ? Give an example. 3

b) The mole fraction of water in a sulphuric acid solution is 0.85. Calcutate the molality of the solution.

13. a) Complete the following equations. 3

i) $CH_3\text{-}CH_2\text{-}CH_2\text{-}OH \xrightarrow{PBr_3} A \xrightarrow{alc.KOH} B$

ii) $C_6H_5NH_2 \xrightarrow[HCl]{NaNO_2} C \xrightarrow{KI} D$

iii) $C_6H_5CH_3 \xrightarrow[uv]{Cl_2} E \xrightarrow[ii)\ H^+ / H_2O]{i)\ KCN} F$

14. Describe the role of the following . 3

i) Cryolite in the metallurgy of aluminium.

ii) Iodine in the refining of titanium.

iii) Silica in the extraction of Cu.

15. Write Nernst equation and calculate emf of the following cell at 298 K. 3

Cu (s) | Cu^{2+} (0.130M) || Ag^+ (1 x 10^{-4} M) |Ag (s).

Given: E^0 (Cu^{2+} /Cu) = 0.34V E^0 (Ag^+/Ag) = 0.80V

16. a) State Henry's law for the solubility of a gas in a liquid. 3

b) At the same temperature , H_2 is more soluble in water than He .Which of them will have higher value of K_H and why ?

c) Equimolar solutions of sodium chloride and glucose are not isotonic. Why ?

17. Give reasons for the following observations. 3

i) NH_3 gas adsorbs more readily than N_2 gas on the surface of charcoal.

ii) Physisorption is multimolecular while chemisorption is unimolecular.

iii) Sky appears blue in colour.

OR

Define the following terms.

i) Zeta potential

ii) Multimolecular colloid

iii) Selectivity of a catalyst

18. a) Account for the following. 3

i) ZnO is white but it turns yellow on heating.

ii) Conductivity of silicon increases on dopping it with phosphorus.

b) Analysis shows that iron oxide has the empirical formula $Fe_{0.93}O_{1.00}$. What percentage of iron is present in the form of Fe(III) ions ?

19. a) Write mechanism for the preparation of propan -2-ol from propene. 3

b) Describe Kolbe's reaction with equation.

20. Account for the following. 3

i) Solid phosphorous pentachloride behaves as an ionic compound.

ii) Sulphur has great tendency for catenation than oxygen.

iii) Fluorine is a stronger oxidising agent than chlorine.

21. Silver metal with face centred cubic unit cell. If the radius of silver atom is 144 pm, calculate density of silver metal. Atomic mass of silver 108 u. 3

22. Give reasons for the following 3

i) C-Cl bond length in chlorobenzene is shorter than C-Cl bond length in CH_3Cl.

ii) S_N1 reactions are accompanied by racemization in optically active alky halides .

iii) Vinyl chloride is hydrolysed very slowly than ethyl chloride.

23. Wasim went to purchase bricks to build his house from a brick manufacturing unit. He was shocked after seeing a lot of smoke , dust and other gases coming out of the chimney. He observed that these products were leading to pollution in nearby areas too. He decided to do something about it. 4

a) What type of colloidal system is smoke ?

b) How does smoke differ from fog ?

c) What are the values displayed by Wasim?

d) As a chemist , which process you suggest the manufacturing unit owner to manage smoke and gases ?

24. a) Draw the structures of the following . 5

i) $H_4P_2O_7$ ii) XeF_4

b) Write balanced chemical equations for the following.

i) White phosphorus is reacted with NaOH solution in an inert atmosphere of CO_2 .

ii) Chlorine is reacted with dry slaked lime.

iii) Sulphur dioxide gas is passed through an aqueous solution of a Fe(III) salt.

OR

An orange solid A on heating gives a colourless gas B which is a constituent of air. The gas B in dry conditions is passed over heated Ca to give a solid C . The solid C

further reacts with water to produce gas D which forms a deep blue coloured compound E on reaction with copper sulphate solution. Identify A , B , C , D , E and give the sequence of reactions involved.

25. a) Write chemical equations for the following. 5

i) Ethoxy benzene with HI.

ii) Phenol with conc.HNO_3.

iii) Oxidation of propan-1-ol with PCC.

b) Which is a stronger acid – phenol or ethanol ? Explain.

c) Give a chemical test to distinguish between butan -2-ol and 2 methyl propan-2-ol.

OR

a) Give reasons for the following.

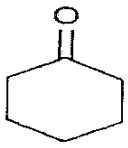
i) Preparation of ethers by acid hydration of 2^0 or 3^0 alcohols is not a suitable method.

ii) 2 nitrophenol is steam volatile but 4 nitrophenol is not.

b) Give structures and IUPAC names of the products for the following reactions.

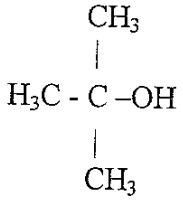
i) $CH_3\text{-}CH_2\text{-}CH(C_2H_5)\text{-}CH{=}CH_2 \xrightarrow[H_2O_2\ /OH^-]{B_2H_6} ?$

ii)



$\xrightarrow[H_3O^+]{C_2H_5MgBr} ?$

iii)



$\xrightarrow[573K]{Cu} ?$

26. a) Non-ideal solutions exhibit deviations from Raoult's law. What are these deviations and why are they caused ? Explain with one example for each type. 5

b) 0.6mL of acetic acid (CH_3COOH) having density 1.06g mL^{-1} is dissolved in litre of water. The depression of freezing point observed for this strength of acid was 0.0205^0C. Calculate Van't Hoff factor and dissociation constant of the acid.

OR

a) Define the term osmotic pressure. What are the advantages of using osmotic pressure as compared to other colligative properties for the determination of molar masses of solutes in solutions ?

b) An aqueous solution freezes at 272.2K while pure water freezes at 273K. Determine

i) Boiling point of the solution.

ii) Lowering in vapour pressure at 298K.

(Given $K_f = 1.86$ Kkg/mol , $K_b = 0.512$Kkg/mol and vapour pressure of water at 298K is 23.756mmof Hg)