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SET NO. 2



INDIAN SCHOOL MUSCAT FIRST TERM EXAMINATION CHEMISTRY

CLASS: XII
13.05.2018

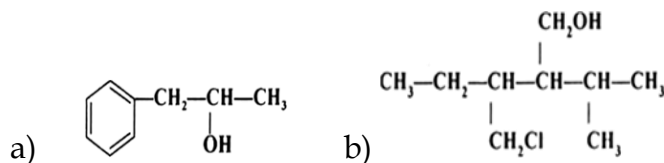
Sub. Code: 042

Time Allotted: 3 Hrs
Max. Marks:70

General Instructions:

- All questions are compulsory.
- Marks for each question are indicated against it.
- Question numbers 1 to 5 are very short answer questions and carry 1 mark each.
- Question numbers 6 to 12 are short answer questions and carry 2 marks each.
- Question numbers 13 to 24 are also short answer questions and carry 3 marks each.
- Question numbers 25 to 27 are long answer questions and carry 5 marks each.
- Use log tables if necessary, use of calculators is not allowed.

- 1 Which will undergo S_N2 faster and why? $CH_3CH_2CH_2I$ or $CH_3CH_2CH_2Cl$ 1
- 2 Nitrogen doesn't form pentahalides. Why? 1
- 3 Draw the structure of 1-Ethoxy-2,2-dimethylcyclohexane. 1
- 4 Name the alkyl halide and sodium alkoxide used to synthesize tert-butyl ethyl ether. 1
- 5 What is the covalency of nitrogen in N_2O_5 ? 1
- 6 Write the IUPAC names of the following compounds 2



- 7 Explain the terms 2
 - a) Racemic mixture
 - b) Stereocenter
- 8 Draw the structures of the following 2
 - a) $H_4P_2O_7$
 - b) $(HPO_3)_3$
- 9 Name the reagent(s) used in the following conversions 2
 - a) Bromopropane to nitropropane
 - b) Chlorobenzene to diphenyl
- 10 Explain how you will distinguish between primary, secondary and tertiary alcohols. 2

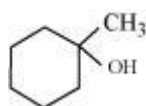
- 11 What happens when 2
- Orthophosphorus acid is heated
 - Barium azide undergoes thermal decomposition
- OR**
- Mention the conditions to maximize the yield of ammonia in Haber's process
- 12 Write the equations involved in the following 2
- Reimer-Tiemann reaction
 - Williamson's synthesis
- 13 Account for the following 3
- Alkyl halides, though polar, are immiscible with water
 - C-Cl bond length in chlorobenzene is shorter than in chloromethane
 - Chloroform is stored in closed dark colored bottles
- 14 Complete the following equations 3
- $\text{AgNO}_3 + \text{H}_3\text{PO}_2 + \text{H}_2\text{O} \rightarrow$
 - $\text{Zn} + \text{HNO}_3 (\text{conc}) \rightarrow$
 - $\text{CuSO}_4 + \text{PH}_3 \rightarrow$
- 15 Explain Ostwald's process of manufacture of nitric acid. 3
- 16 Predict the major product in the following reactions 3
- $\text{C}_2\text{H}_5\text{Cl} + \text{AgCN} \rightarrow$
 - $(\text{CH}_3)_3\text{CBr} + \text{alc.KOH} \rightarrow$
 - $\text{CH}_3\text{CH}_2\text{Br} + \text{NaI} \rightarrow$
- 17 Write the mechanism of dehydration of ethanol at 443K. 3
- 18 i) How are the following prepared in the lab? 3
- N_2
 - PH_3
- ii) White phosphorus is more reactive than red phosphorus. Why?
- 19 Identify the reagent that will carry out the following conversions- 3
- $\text{CH}_3\text{CH}=\text{CHCH}_2\text{CH}_2\text{OH} \rightarrow \text{CH}_3\text{CH}=\text{CHCH}_2\text{CHO}$
 - $\text{CH}_3\text{COCH}_2\text{CH}_3 \rightarrow \text{CH}_3\text{CH}(\text{OH})\text{CH}_2\text{CH}_3$
 - $\text{C}_6\text{H}_5\text{OH} \rightarrow \text{C}_6\text{H}_6$
- 20 i) Give a chemical test to distinguish between chlorobenzene and benzyl chloride. 3
- ii) Compound A with molecular formula $\text{C}_6\text{H}_7\text{N}$ reacts with nitrous acid at $0-5^\circ\text{C}$ to form a salt B which on treatment with KI gave iodobenzene. B on treatment with warm water

formed a compound C which on treatment with acidified sodium dichromate gave an oxidized product D. Identify the compounds A, B, C and D.

- 21 i) State the products in the following reactions 3
- a) Nitration of anisole
- b) Anisole is heated with HI
- ii) Write the structure of the alcohol formed when propanone reacts with methyl magnesium bromide followed by hydrolysis.

OR

- i) How will you convert propanol to
- a) propanoic acid
- b) propene
- ii) How will you synthesize the following alcohol from a suitable alkene.



- 22 i) Arrange in the increasing order of boiling points, giving reason: 3
Chloropentane, 1-Chloro -2,2-dimethylpropane, 1-chloro-2-methylbutane
- ii) Draw the structures of the possible enantiomers of 3-methylpent-1-ene.
- 23 Explain with equations 3
- a) Hydroboration reaction
- b) Acetylation of salicylic acid
- c) Friedel crafts acylation of anisole
- 24 a) Among isomeric dihalobenzenes, which has higher melting point and why? 3
- b) Although chlorine is an electron withdrawing group, yet why is it ortho para directing in electrophilic substitution reaction?
- c) Why haloarenes are less reactive than haloalkanes towards nucleophilic substitution reaction?
- 25 Account for the following 5
- a) NO₂ dimerises
- b) Bi(V) is strong oxidizing agent
- c) N shows weak tendency to catenate
- i) Draw the structures of N₂O₄, H₃PO₄

OR

A translucent white waxy solid [A] on heating in an inert atmosphere is converted to its allotropic form [B]. Allotrope [A] on reaction with dry chlorine forms a compound C which when comes in contact with moisture undergoes hydrolysis to form compound D and fumes of HCl gas. Identify A, B, C and D and write the chemical equations involved for the conversion of A to C and C to D. Also draw the structure of C.

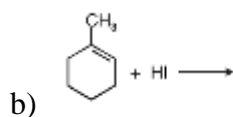
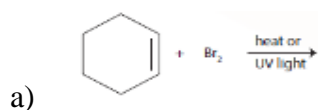
- 26 i) How are the following converted to phenol? 5
 a) Benzene b) cumene
 ii) Phenol on treatment with concentrated nitric acid. Give the structure and IUPAC name of the product formed.
 iii) Give a chemical test to distinguish between cyclohexanol and phenol.

OR

- i) Write equation involved in Kolbe's reaction.
 ii) Draw the structure of 2,5-dimethylphenol
 iii) Give reason
 a) The boiling points of ethers are lower than isomeric alcohols
 b) Ortho-nitrophenol is more acidic than ortho-methoxy phenol
 iv) Convert benzyl chloride to benzyl alcohol.
- 27 i. Among isomeric alkanes of molecular formula C_5H_{12} . Identify the one that on photochemical chlorination yields a single monochloride. 5
 ii. Illustrate Wurtz-Fittig reaction.
 iii. Explain SN_1 mechanism with an example.

OR

- i) Effect the following conversions
 a) Benzene to 4-bromonitrobenzene
 b) Chloroethane to butane
 c) Ethanol to Fluoroethane
 ii) Complete the following reactions:



End of the Question Paper