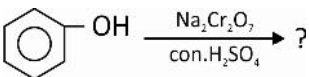
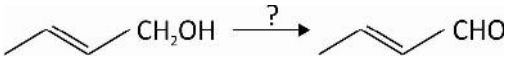
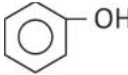
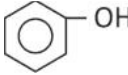
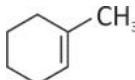
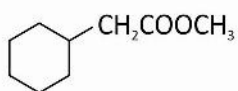
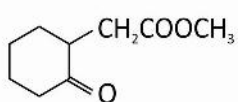


UNIT-11: ALCOHOLS, PHENOLS AND ETHERS

One mark questions:	
1. Write the IUPAC name of $\begin{array}{c} \text{CH}_3 - \text{CH} - \text{CH} - \text{CH}_3 \\ \quad \\ \text{OH} \quad \text{OH} \end{array}$	K
2. Write the structure of 2, 3 - diethyl phenol.	K
3. Which of the following is allyl alcohol? $\text{CH}_2 = \text{CH} - \text{CH}_2 - \text{CH}_2\text{OH}$, $\text{CH}_2 = \text{CH} - \text{OH}$, $\text{HO} - \text{CH}_2 - \text{CH} = \text{CH}_2$.	U
4. C-O-H bond angle in alcohols is less than $109^\circ 28'$. Give reason.	U
5. Identify 'X': $\text{CH}_3\text{COOH} \xrightarrow[2) \text{H}_2\text{O}]{1) \text{LiAlH}_4} \text{X}$	U
6. Write equation for the conversion of ethanal into propan-2-ol using a Grignard reagent.	K
7. Ethanol and methoxymethane have same molar mass. But ethanol has higher B.P than methoxymethane. Give reason.	U
8. Give a reaction to show the acidic nature of alcohols.	K
9. Arrange the following in the increasing order of acid strength: $\text{CH}_3\text{CH}_2\text{OH}$, $\text{CH}_3\text{CH}(\text{OH})\text{CH}_3$, $(\text{CH}_3)_3\text{C}-\text{OH}$.	U
10. What type of alcohols do not give turbidity at room temperature when treated with Lucas reagent?	K
11. Dehydration of 2° or 3° alcohols fails to give ethers. Why?	U
12. Name a metal which is used as catalyst for dehydrogenation of alcohols.	K
13. Write the IUPAC name of the organic product obtained if t-butyl alcohol is heated with copper at 573 K.	U
14. Mention the reagent used to prepare benzene from phenol.	K
15. Which alcohol is known as 'wood spirit'?	K
16. What is denaturation of alcohol?	K
17. Consumption which alcohol causes blindness?	K
18. Name the alcohol obtained by destructive distillation of wood.	K
19. Name the enzyme involved in the following reaction: $\text{C}_6\text{H}_{12}\text{O}_6 \longrightarrow 2\text{C}_2\text{H}_5\text{OH} + 2\text{CO}_2$.	K
20. Name the product obtained in the following reaction: 	K
21. Write the general equation for Williamson synthesis.	K

22. What is P in the following reaction? $\text{C}_6\text{H}_5\text{--O--R} + \text{P} \xrightarrow{\Delta} \text{C}_6\text{H}_5\text{OH} + \text{R--X}$.	K
Two mark questions:	
1. O–H bond length in phenol is slightly less than the same in methanol. Give two reasons.	U
2. Give an example for the preparation of 3° alcohol from a Grignard reagent.	A
3. Write the equation for the preparation of phenol from cumene.	K
4. Complete the following equations:	
a) $\text{HCHO} + \text{R-MgX} \xrightarrow{\text{ether}} \text{_____} \xrightarrow{\text{H}_2\text{O}} \text{_____}$	
b)  $\xrightarrow{\text{oleum}} \text{_____} \xrightarrow[2) \text{H}^+]{1) \text{NaOH}} \text{_____}$	U
5. Write the structures of P and Q	A
$\begin{array}{c} \text{CH}_3\text{CH}-\text{CH}_3 \\ \\ \text{OH} \end{array} \xrightarrow[\Delta]{85\% \text{H}_3\text{PO}_4} \text{P} \xrightarrow[2) \text{H}_2\text{O}_2 / \text{OH}]{1) \text{BH}_3} \text{Q}$	
6. How is aniline converted into phenol? Write the equation.	K
7. Write the equations for the conversion of chlorobenzene to phenol.	K
8. How does b.p of alcohols change	
a) With increase in number of carbon atoms	
b) With increase in branching	U
9. i) Propanol has a higher boiling point than butane even though they have nearly the same molar mass. Give reason.	
ii) o-nitrophenol is steam volatile but not p-nitrophenol	U
10. a) Alkoxide ion is stronger base than hydroxide ion, why?	
b) Phenoxide ion is more stable than alkoxide ion. Give reason.	U
11. Arrange 3°, 2°, 1° alcohols in	
a) decreasing order of acid strength	
b) relative order of ease of dehydration	U
12. Explain Kolbe's reaction.	K
13. Write the structure of the final product and name the reaction:	
 $\xrightarrow[\Delta]{\text{CHCl}_3 + \text{NaOH}} \text{X} \xrightarrow{\text{H}^+} \text{Y}$	U
14. What is the effect of EWG on acid strength of phenol?	U
15. Give reasons: Phenol is a stronger acid than an alcohol.	U
16. Cresols are less acidic than phenol. Why?	U
17. i) What is the composition of Lucas reagent?	
ii) What happens if a 3° alcohol is treated with Lucas reagent?	K

18. Name a reagent for the following conversion. KMnO_4 cannot be used for this, explain	
	U
19. How is aspirin prepared from salicylic acid?	K
20. What is the role of pyridine in the following reaction? Identify the product obtained.	
$\text{ArOH} + \text{CH}_3\text{COCl} \xrightarrow{\text{pyridine}} \text{_____} + \text{HCl}$	K
21. Give reasons for the following:	
i) Fermentation of glucose takes place under anaerobic conditions.	
ii) Electrophilic substitution of phenol and anisole takes place at ortho and para positions.	U
22. Give the structures of the major products in the following:	
a) $\text{CH}_3\text{-CH=CH}_2 + \text{H}_2\text{O} \xrightarrow{\text{H}^+}$	
b)  + $\text{Br}_2 \xrightarrow{\text{CS}_2}$	K
23. Bring out the following conversions:	
a) phenol into sodium phenoxide	K
b) anisole into 4-methoxy acetophenone	
24. Draw the structure of the product in the following reactions.	
a) Phenol treated with bromine water	K
b) 2-propanol treated with PCC or CrO_3 in anhydrous medium	
25. How will you convert phenol into picric acid?	K
26. Identify the major product in	
i.  $\xrightarrow{\text{dil. HNO}_3}$	K
ii. $\text{CH}_3\text{CH}_2\text{OH} \xrightarrow[413\text{K}]{\text{conc. H}_2\text{SO}_4}$	
27. How is methanol manufactured commercially?	K
28. Write the equations along with enzymes involved in the manufacture of ethanol from molasses.	K
29. Explain Williamson synthesis with an example.	K
30. How is anisole prepared by Williamson synthesis?	K
31. Write the IUPAC names of the products in	
a) $\text{CH}_3\text{-I} + \text{NaOC}_2\text{H}_5 \longrightarrow$	
b) $\text{CH}_3\text{CH}_2\text{OH} + \text{CH}_3\text{COOH} \xrightarrow{\text{conc. H}_2\text{SO}_4}$	K
32. Complete the equation :	

$\text{CH}_3-\underset{\text{CH}_3}{\text{CH}}-\text{O}-\text{CH}_3 \xrightarrow[\text{heat}]{\text{excess HX}} \text{A} + \text{B} + \text{H}_2\text{O}$	A
What is the order of reactivity of HBr, HI and HCl in this reaction?	
33. Complete the following equation. Mention whether the reaction is S_N1 or S_N2. $\text{CH}_3-\underset{\text{CH}_3}{\overset{\text{CH}_3}{\text{C}}}-\text{O}-\text{CH}_3 \xrightarrow{\text{conc. HI}}$	A
34. Write structures of the products formed in the given reactions. a)  $\xrightarrow{\text{H}_2\text{O}/\text{H}^+}$ b) $\text{CH}_3-\underset{\text{CH}_3}{\text{CH}}-\text{O}-\text{CH}_3 \xrightarrow{\text{HBr}}$	A
35. Which of the following is better method for the preparation of t-butyl ethyl ether? Give reason. $\text{C}_2\text{H}_5\text{ONa} + \text{CH}_3-\underset{\text{CH}_3}{\overset{\text{CH}_3}{\text{C}}}-\text{Cl} \quad \text{OR} \quad \text{C}_2\text{H}_5\text{Cl} + \text{CH}_3-\underset{\text{CH}_3}{\overset{\text{CH}_3}{\text{C}}}-\text{ONa}$	A K
36. How does anisole react with a mixture of conc. HNO₃ and conc. H₂SO₄?	
37. Write equations for a) Friedel-Craft's methylation of anisole. b) Bromination of anisole in acetic acid medium	K
Three mark questions:	
1. Give the mechanism for acid catalysed dehydration of ethanol to ethene.	K
2. Write equations for the mechanism of acid dehydration of ethanol to diethyl ether.	K
3. Write the structures of A, B and C a)  $\xrightarrow{\text{H}_2/\text{Pd}} \text{A} + \text{B}$ b)  $\xrightarrow{\text{NaBH}_4} \text{C}$ Hint: A, B are primary alcohols and C is secondary alcohol.	A
4. $\text{CH}_3\text{CH}=\text{CH}_2 \xrightarrow{\text{BH}_3} \text{P} \xrightarrow{\text{H}_2\text{O}_2/\text{OH}^-} \text{Q}$. Identify P and Q. Is the final product obtained as per Markownikov's rule or opposite to it?	A
5. $\text{CH}_3-\text{O}-\text{CH}_2\text{CH}_3 \xrightarrow{\text{H}^+} ? \xrightarrow{\text{I}^-} [\text{Intermediate}] \longrightarrow \text{final products}$	

Write the structures of protonated product, intermediate and its final products.	U										
Five mark questions:											
1. Write the structures of any two alcohol and three ethers with the formula $C_4H_{10}O$.	U										
2. a) Give the structures of X, Y, Z and write the IUPAC name of Z. $\begin{array}{c} \text{CH}_3\text{CH}-\text{CH}_3 \\ \\ \text{OH} \end{array} \xrightarrow{\text{CrO}_3} \text{X} \xrightarrow{\text{C}_2\text{H}_5\text{MgBr / ether}} \text{Y} \xrightarrow{\text{H}_2\text{O}} \text{Z}$											
b) Name the alcohol that is used as solvent in varnishes.	A										
3. a) Identify A, B, C. Write the IUPAC name of C. $\text{CH}_3\text{OH} \xrightarrow[\Delta]{\text{Cu}} \text{A} \xrightarrow{\text{CyclohexylMgBr}} \text{B} \xrightarrow{\text{H}_2\text{O}} \text{C}$											
b) Carboxylic acid is usually called _____	A										
4. a) Identify the missing compounds, P, Q, R, S: $\text{CH}_3\text{CH}_2\text{OH} \xrightarrow{\text{PCC}} \text{P} \xrightarrow{\text{HCN}} \text{Q} \xrightarrow{\text{H}_2\text{O}/\text{H}^+} \text{R} \xrightarrow{\text{LiAlH}_4} \text{S}$											
b) What is the IUPAC name of $\text{CH}_3\text{--O--CH}_2\text{--CH}_2\text{--OCH}_3$?	A										
5. Write all the possible structures which are aromatic compounds with the formula C_7H_8O .	A										
6. a) Match the following acids with their pK_a values:											
<table border="1"> <thead> <tr> <th>A</th><th>B</th></tr> </thead> <tbody> <tr> <td>a) p-cresol</td><td>i) 15.9</td></tr> <tr> <td>b) phenol</td><td>ii) 10.2</td></tr> <tr> <td>c) p-nitrophenol</td><td>iii) 9.98</td></tr> <tr> <td>d) ethanol</td><td>iv) 7.1</td></tr> </tbody> </table>	A	B	a) p-cresol	i) 15.9	b) phenol	ii) 10.2	c) p-nitrophenol	iii) 9.98	d) ethanol	iv) 7.1	
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d) ethanol	iv) 7.1										
(Hint: Greater the pK_a value, weaker is the acid)											
b) Arrange the following in the increasing order of bond angle around oxygen atom. $\text{CH}_3\text{--O--CH}_3, \text{C}_6\text{H}_5\text{--O--H}, \text{CH}_3\text{--O--H}$											
	U										