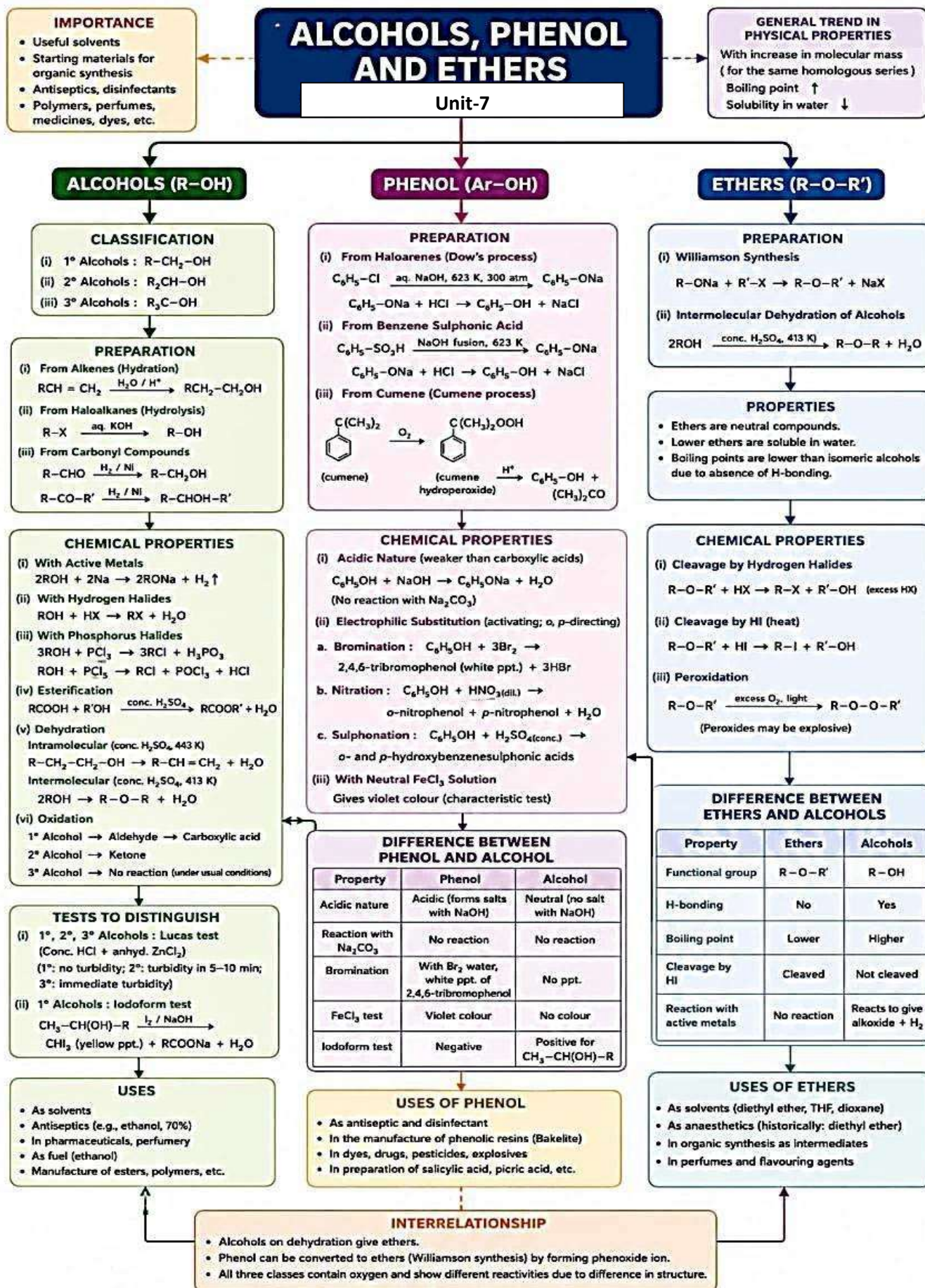




QUESTION BANK
SECTION - A (1 MARK)

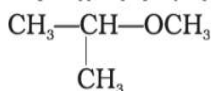
Q1. One mole/L of ethyl acetate on treatment with an excess of LiAlH_4 in dry ether and subsequent acidification produces

- (a) 1M acetic acid + 1M ethyl alcohol (b) 1M ethyl alcohol + 1M methyl alcohol
(c) 2M ethyl alcohol (d) 1M of 2-butanol

Q2. Which of the following reagents can not be used to oxidise primary alcohols to aldehydes ?

- (a) CrO_3 in anhydrous medium (b) KMnO_4 in acidic medium
(c) Pyridiniumchlorochromate (d) Heat in the presence of Cu at 573 K

Q3. IUPAC name of the following compound



- (a) 1-methoxy-1-methylethane (b) 2-methoxypropane
(c) 2-methoxy-2-methylethane (d) isopropylmethylethe

Q4. Which of the following is the proper method to prepare n-hexane from n-propyl alcohol ?



- (a) (X) $\rightarrow$ HBr, (Y) $\rightarrow$ HCN (b) (X) $\rightarrow$ HBr, (Y) $\rightarrow$ Na, ether
(c) (X) + Br_2 , (Y) $\rightarrow$ CH_3CN (d) (X) $\rightarrow$ Br_2 , (Y) $\rightarrow$ KMnO_4

Q5. 1-Propanol and 2-propanol can be best distinguished by

- (a) Oxidation with KMnO_4 followed by reaction with Fehling solution?
(b) Oxidation with acidic dichromate followed by reaction with Fehling solution.
(c) Oxidation by heating with copper followed by reaction with Fehling solution.
(d) Oxidation with cone. H_2SO_4 followed by reaction with Fehling solution.

Q6. Denatured alcohol (ethanol) is prepared by addition with-

- (a) Methanol, CuSO_4 and Pyridine (b) Ethers, CuSO_4 and Pyridine
(c) Acetone, CuSO_4 and Pyridine (d) Benzene and Pyridine

Q7. Which alcohol known as 'wood spirit', was produced by destructive distillation of wood.

- (a) Ethanol (b) Propanol (c) Methanol (d) iso Propyl Alcohols

Q8. Arrange the following compounds in increasing order of boiling point. Propan-1-ol, butan-1-ol, butan-2-ol, pentan-1-ol

- (a) Propan-1-ol, butan-2-ol, butan-1-ol, pentan-1-ol
(b) Propan-1-ol, butan-1-ol, butan-2-ol, pentan-1-ol
(c) Pentan-1-ol, butan-2-ol, butan-1-ol, propan-1-ol
(d) Pentan-1-ol, butan-1-ol, butan-2-ol, propan-1-ol

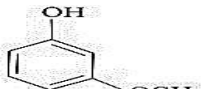
Q9. Mark the correct order of decreasing acid strength of the following compounds.



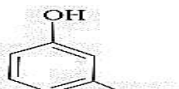
(a)



(b)



(c)



(d)



(e)

- (a) $e > d > b > a > c$ (b) $b > d > a > c > e$
(c) $d > e > c > b > a$ (d) $e > d > c > b > a$

Q10. Tert-butyl methyl ether on heating with 1mol HI gives.

- (a) $\text{CH}_3\text{I} + (\text{CH}_3)_3\text{COH}$ (b) $\text{CH}_3\text{OH} + (\text{CH}_3)_3\text{I}$ (c) $\text{CH}_3\text{I} + (\text{CH}_3)_3\text{OH}$ (d) None of these

In these questions (Q11-Q15), a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.

(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.

(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.

(c) Assertion is correct statement but reason is wrong statement.

(d) Assertion is wrong statement but reason is correct statement.

Q11. Assertion : Among n-butane, ethoxyethane, 1-propanol and 2-propanol, the increasing order of boiling points is, 1-butanol < 1-propanol < ethoxyethane < n-butane.

Reason: Boiling point increases with increase in molecular mass.

Q12. Assertion : Williamson's synthesis method cannot be used for preparing diphenyl ether.

Reason : Aryl halides do not undergo nucleophilic substitution easily.

Q13. Assertion: Bromination of phenol does not require the presence of Lewis acid.

Reason: -OH group attached to benzene ring has highly activating effect

Q.14. Assertion (A); The boiling point of ethanol is higher than that of dimethyl ether.

Reason (R): Ethanol molecules are associated through hydrogen bonding whereas in dimethyl ether, it is not possible.

Q15. Assertion: Phenol is more reactive than benzene towards electrophilic substitution reaction.

Reason: In the case of phenol, the intermediate carbocation is more resonance stabilized.

Answer key-

Question no.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Answer	(c)	(b)	(b)	(b)	(c)	(a)	(c)	(a)	(b)	(b)	(d)	(a)	(a)	(a)	(a)

VERY SHORT ANSWER TYPE QUESTIONS (2 MARKS)

Q1. Arrange each set of compounds in the decreasing order of property indicated

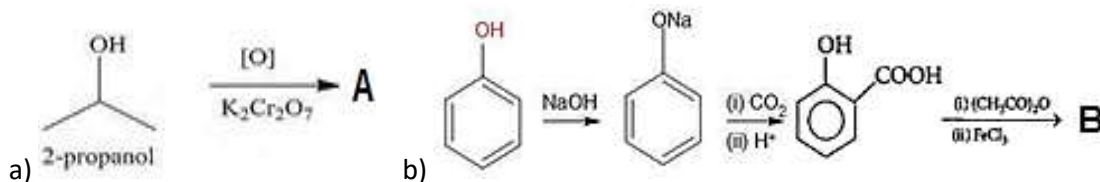
a) Ethanol, isopropanol, tertiary butyl alcohol (reactivity towards Lucas reagent)

Hint- reactivity order -Tertiary > secondary > primary

b) Propan-1-ol, 2,4,6-trinitrophenol, 3-nitrophenol, 3,5-dinitrophenol, phenol, 4-Methyl phenol (acidic strength)

Hint-electron releasing and electron withdrawing groups.

Q2 Give the structures and IUPAC names of the products expected from the following reaction



Hint-a) oxidation reaction b) formation of Aspirin .

Q3 a) In the process of wine making, ripened grapes are crushed so that sugar and enzyme should come in contact with each other and fermentation should start. What will happen if anaerobic conditions are not maintained during this process?

Hint -oxidation of alcohol.

b) 2,4,6-trinitrophenol gives sodium bicarbonate test. why?

Hint-presence of three nitro group showing electron withdrawing effect.

Q4 Give one chemical test each to distinguish between the following pairs of compounds:

(i) Phenol and Benzoic acid (ii) Methanol and ethanol.

i) Neutral FeCl_3 Test –Phenol produces violet colour with neutral FeCl_3 only but not Benzoic acid

ii) Iodoform Test-Ethanol Produces yellow colour with Iodine and KOH but not Methanol.

Q5 Alcohol reacts with sodium metal whereas ether do not.

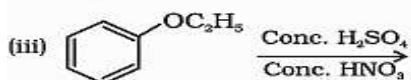
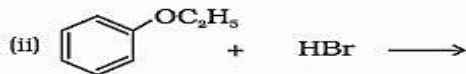
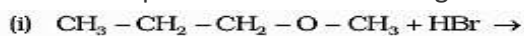
Hint-presence of active hydrogen.

b) Write the equations involved in the following reaction- Reimer - Tiemann reaction.

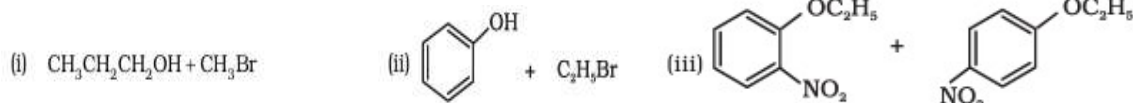
Hint-refer chemical reactions of phenol (name reaction)

SHORT ANSWER TYPE QUESTIONS (3 MARKS)

Q1- Predict the products of the following reactions:



Hint- Products are-;



Q2. Account for the following: -

(a) PCl_5 reacts with ethanol to form chloroethane. However, with phenol, it does not give chlorobenzene but gives triphenyl phosphate. Explain.

Hint- $\text{S}_{\text{N}}2$ mechanism and, partial double bond character of the O-H bond.

(b) While separating a mixture of ortho and paranitrophenols by steam distillation, name the isomer which will be steam volatile. Give reason.

Hint- inter and Intra molecular hydrogen bonding

(c) Why in the Reimer-Tiemann reaction the major product is ortho-substituted?

Hint- intermolecular hydrogen bonding

Q3 A compound A ($\text{C}_4\text{H}_{10}\text{O}$) is optically active, on mild oxidation it gives compound B but on vigorous oxidation it gives compound C. The compound 'C' along with 'D' are also formed from 'B' by reacting with iodine in the presence of alkali. Deduce the structures of 'A', 'B', 'C' and 'D'.

Hint-A-alcohol, B-ketone, C-carboxylic acid, D-refer iodoform reaction.

Q4 [X] and [Y] are functional isomers of each other with molecular formula $\text{C}_3\text{H}_8\text{O}$.

(i) Draw the isomers.

(ii) Which compound will have a lower boiling point and why?

Hint- i) alcohol and ether. ii) hydrogen bonding

Q5 a) Show how the following alcohols are prepared by reaction with a suitable Grignard reagent on methanal.

i) 2-methylpropan-1-ol ii) $\text{CH}_3\text{CH}_2\text{OH}$.

Hint-method of preparation of alcohol using Grignard reagent.

b) You are given a benzene, conc. H_2SO_4 and NaOH . Write the equations for the preparation of phenol using these reagents

Hint-preparation of phenol.

CASE STUDY BASED QUESTIONS (4 MARKS)

Read the passage carefully and answer the questions.

Q1. Dehydration of alcohols can lead to the formation of either alkenes or ethers. This dehydration can be carried out either with protonic acids such as cone. H_2SO_4 , H_3PO_4 or catalysts such as anhydrous ZnCl_2 or Al_2O_3 . When primary alcohols are heated with cone. H_2SO_4 at 433-443 K, they undergo intramolecular dehydration to form alkenes. Secondary and tertiary alcohols undergo dehydration under milder conditions. The ease of dehydration of alcohols follows the order: $3^\circ > 2^\circ > 1^\circ$. The dehydration of alcohols always

occurs in accordance with the Saytzeffs rule. Primary alcohols when heated with protic acid at 413 K, gives dialkyl ether.

i) The dehydration of alcohol belongs to which category of reactions?

(a) Substitution reaction (b) Elimination reaction (c) Addition reaction (d) Both (a) and (b)

Ans – (b) Elimination reaction

ii) Why is tertiary alcohol dehydration the easiest way to dehydrate?

Hint – tertiary carbocations are more stable

iii) During the dehydration of alcohols to alkenes by heating with concentrated H_2SO_4 , the initiation step is:

(a) Formation of carbocation (b) Protonation of alcohol

(c) Formation of carbanion (d) Elimination of water.

Ans- (b) Protonation of alcohol

iv) Why do more substituted alkenes are more stable? (*Hint- Refer Saytzeffs rule.*)

SECTION –E (5 MARKS)

Q1 Give reasons for the following: -

(a) The usual halogenation of benzene takes place in the presence of a Lewis acid, but In case of phenol, the reaction takes place even in the absence of Lewis acid.

Hint- activating effect of - OH group.

(b) Pure phenol is a colorless solid but why it is converted into pink after some time?

Hint-oxidation of phenol.

(c) why does ethers possess a dipole moment even if the alkyl radicals in the molecules are identical

Hint -bond polarity and bond angle in ethers .

(d) boiling point of glycol is higher than the alcohol of same molecular mass

Hint- hydrogen bonding

(e) The K_a for p- nitro hydroxybenzene is 6.9×10^{-8} whereas o-nitro hydroxybenzene is 6.0×10^{-8}

Hint-hydrogen bonding between the -OH group and the nitro group.

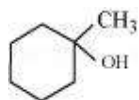
Q2 How would you obtain

i) (a) phenol from benzene (b) acetophenone from phenol (c) ethane-1,2-diol from Ethanol

Hint -a) preparation of phenol; b) Friedel-Crafts acylation reaction.; c) dehydration reaction followed by addition of Baeyer's reagent

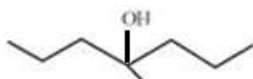
ii) **Show how would you synthesize the following alcohols from appropriate alkenes?**

a)



Hint-

b)



acid catalyzed hydration of appropriate alkene