



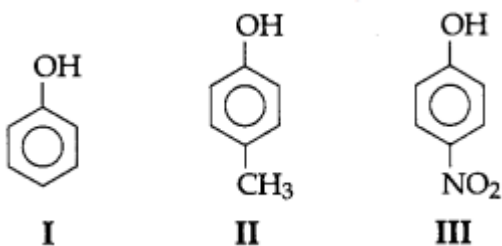
## INDIAN SCHOOL AL WADI AL KABIR

<b>Class: XII</b>	<b>Department: SCIENCE 2020 -21</b> <b>SUBJECT : CHEMISTRY</b>	<b>Date of submission:</b> <b>15.11.2020</b>
<b>Worksheet No: 11</b> <b>WITH</b> <b>ANSWERS</b>	<b>Chapter:</b> <b>ALCOHOLS, PHENOLS AND ETHERS</b>	<b>Note:</b> <b>A4 FILE FORMAT</b>
<b>NAME OF THE STUDENT</b>	<b>CLASS &amp; SEC:</b>	<b>ROLL NO.</b>

### MULTIPLE CHOICE QUESTIONS (1M)

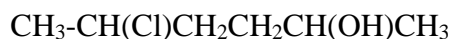
- How many alcohols with the molecular formula  $C_4H_{10}O$  are chiral?
  - 1
  - 2
  - 3
  - 4
- Phenol can be distinguished from ethanol by the reactions with
  - $Br_2$  water
  - Na
  - Neutral  $FeCl_3$
  - Nitration
  - i
  - i and ii
  - i and iii
  - iv

- The correct order of acidic strength is



- $I > II > III$
  - $III > I > II$
  - $II > III > I$
  - $I > III > II$
- Which of the following alcohol is least soluble in water?
    - n-Butyl alcohol
    - iso-Butyl alcohol
    - t-Butyl alcohol
    - sec-Butyl alcohol

5. Give the IUPAC name of the following.

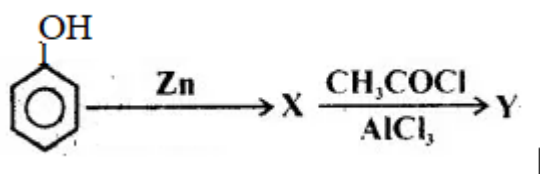


- 2-Chloro-5-hydroxyhexane
- 2-Hydroxy-5-chlorohexane
- 2-Chlorohexan-5-ol
- 5-Chlorohexan-2-ol

6. Which of the following reagents cannot be used to oxidise primary alcohols to aldehydes?

- $\text{CrO}_3$  in anhydrous medium
- $\text{KMnO}_4$  in acidic medium
- Pyridinium chlorochromate
- Heat in the presence of Cu at 573 K

7. Identify the final product of the reaction sequence.



- Benzophenone
- Acetophenone
- Diphenyl
- Methyl salicylate

8. Propanone on reaction with alkyl magnesium bromide followed by hydrolysis will produce

- primary alcohol
- secondary alcohol
- tertiary alcohol
- carboxylic acid

9. Assertion: Like bromination of benzene, bromination of phenol is also carried out in the presence of Lewis acid.

Reason: Lewis acid polarises the bromine molecule.

- Assertion and reason both are correct and reason is correct explanation of assertion.
- Assertion and reason both are wrong statements.
- Assertion is correct statement but reason is wrong statement.
- Assertion is wrong statement but reason is correct statement.

10. Assertion: Bond angle in ethers is slightly less than the tetrahedral angle.

Reason: There is a repulsion between the two bulky ( $\text{—R}$ ) groups.

- Assertion and reason both are correct and reason is correct explanation of assertion.
- Assertion and reason both are wrong statements.
- Assertion is correct statement but reason is wrong statement.
- Assertion is wrong statement but reason is correct statement.

SHORT ANSWER TYPE (2 M)

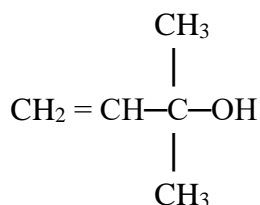
11. Write the chemical equations for the following reactions.

- a. Friedel Crafts acetylation of anisole                      b. Kolbe's reaction

12. Distinguish between

- a. Ethanol and phenol                                      b. Propan-2-ol and 2-Methylpropan-2-ol

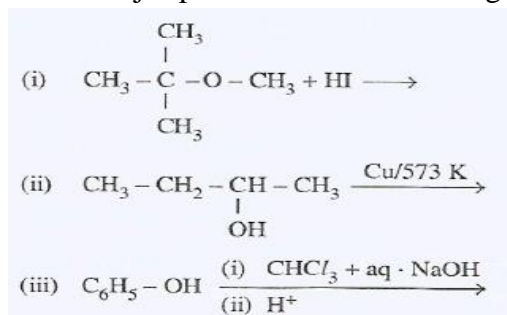
13. a. Write the IUPAC name of the following compound.



- b. Write the structure of the molecule of a compound whose IUPAC name is 1-Phenylpropan-2-ol.

SHORT ANSWER TYPE (3 M)

14. Write the major products in the following reactions.



15. How would you obtain the following?

- a. Benzoquinone from phenol  
b. 2-Methylpropan-2-ol from Methylmagnesium bromide  
c. Propan-2-ol from propene

16. a. o and p nitrophenols are more acidic than phenols. Give reason.

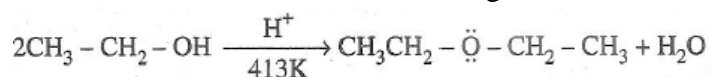
- b. o-Nitrophenol is steam volatile than p nitrophenol.  
c. t-Butyl chloride on heating with sodium methoxide gives 2-Methylpropene instead of t-Butylmethyl ether.

17. Name the reagents used in the following reactions:

- a. Oxidation of a primary alcohol to carboxylic acid.  
b. Oxidation of a primary alcohol to aldehyde.  
c. Bromination of phenol to 2,4,6-tribromophenol.  
d. Benzyl alcohol to benzoic acid.  
e. Dehydration of propan-2-ol to propene.  
f. Butan-2-one to butan-2-ol.

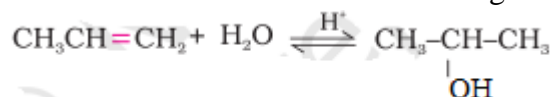
LONG ANSWER TYPE (5M)

18. a. Write the mechanism for the following reaction.



- b. What happens when benzene diazonium chloride is heated with water?  
 c. Out of benzene and phenol, which one is more easily nitrated and why?

19. a. Write the mechanism for the following reaction.

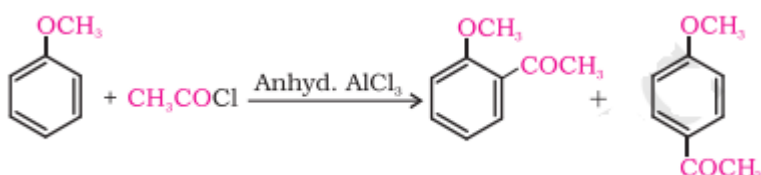


- b. Write the preparation of Aspirin from phenol.  
 c. Lewis acid is not required in bromination of phenol. Why?

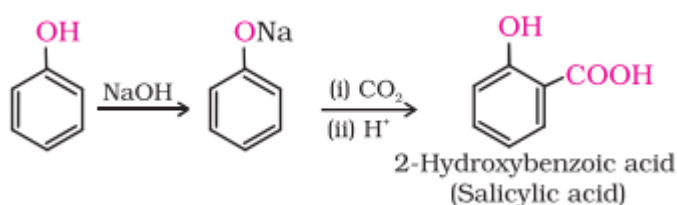
**ANSWER KEY**

Hints

1. a
2. c
3. b
4. a
5. d
6. b
7. b
8. c
9. d
10. d
11. a.



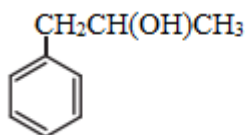
b.



- 12.
- a. Phenol forms violet colouration with neutral  $\text{FeCl}_3$
  - b. 2-Methylpropan-2-ol forms turbidity immediately with  $\text{Con HCl}$  and  $\text{anh ZnCl}_2$

13. a. 2-Methylbut-3-en-2-ol

b.



14. i.  $(\text{CH}_3)_3\text{C-I} + \text{CH}_3\text{OH}$

ii.  $\text{CH}_3\text{CH}_2\text{COCH}_3$

iii. Salicylaldehyde

15.

a. Oxidation with  $\text{Na}_2\text{Cr}_2\text{O}_7 + \text{H}_2\text{SO}_4$  (write reactions)

b. Reaction of 2-methylpropan-2-ol with  $\text{CH}_3\text{COCH}_3$

c. Acid hydration

16. a.  $\text{NO}_2$  group is electron withdrawing group. The phenoxide ion formed is stabilized through resonance.

Draw resonance structures

b. o-Nitrophenol – intramolecular H bonding

p nitrophenol – Intermolecular H bonding- Explanation

c. Sodium methoxide is a strong base and hence dehydrohalogenation will take place.

17. a. Acidified  $\text{KMnO}_4$

b.  $\text{CrO}_3$

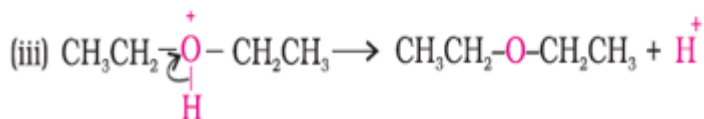
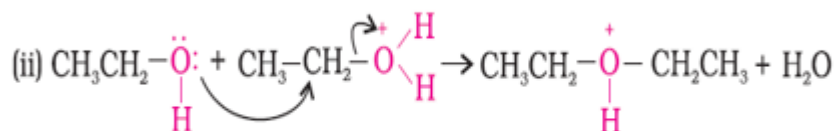
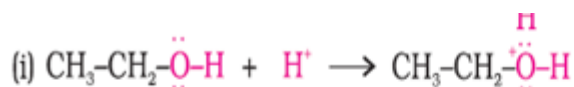
c.  $\text{Br}_2$  water

d. Acidified  $\text{KMnO}_4$

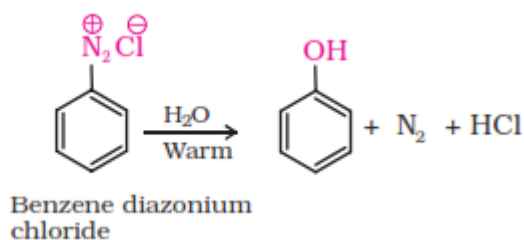
e. 85%  $\text{H}_3\text{PO}_4$  and 440K

f.  $\text{NaBH}_4$

18. a.



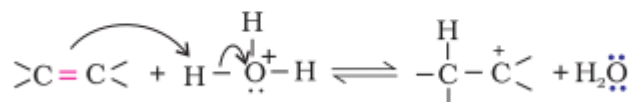
b.



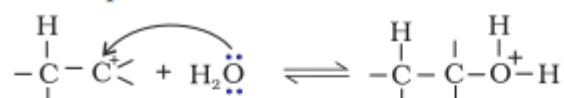
c. Phenol will be easily nitrated since the  $\text{—OH}$  group attached to the benzene ring activates it towards electrophilic substitution. Also, it directs the incoming group to *ortho* and *para* positions in the ring as these positions become electron rich due to the resonance effect caused by  $\text{—OH}$  group.

19. a. (Substitute the alkene accordingly to make it propene)

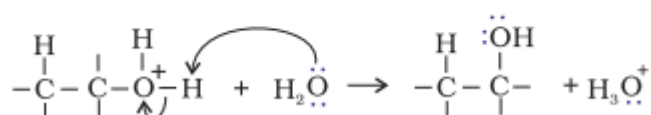
Step 1: Protonation of alkene to form carbocation by electrophilic attack of  $\text{H}_3\text{O}^+$ .



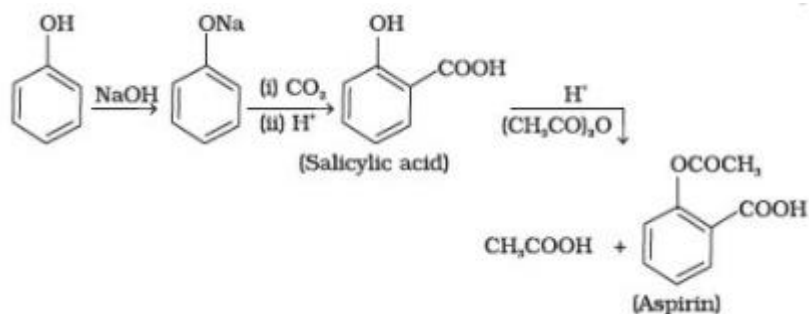
Step 2: Nucleophilic attack of water on carbocation.



Step 3: Deprotonation to form an alcohol.



b.



c. The usual halogenations of benzene takes place in the in presence of a Lewis acid, such as  $\text{FeBr}_3$ , which polarises the halogen molecule. In case of phenol, the polarisation of bromine molecule takes place even in the absence of Lewis acid. It is due to the highly activating effect of  $-\text{OH}$  group attached to the benzene ring.

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