DPP - Daily Practice Problems

Name : _____ Date : _____

Start Time : _____ End Time : _____

CHEMISTRY 50

SYLLABUS : Ethers

Max. Marks : 120 **Time : 60 min.**

GENERAL INSTRUCTIONS

- The Daily Practice Problem Sheet contains 30 MCQ's. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.
- You have to evaluate your Response Grids yourself with the help of solution booklet.
- Each correct answer will get you 4 marks and 1 mark shall be deduced for each incorrect answer. No mark will be given/ deducted if no bubble is filled. Keep a timer in front of you and stop immediately at the end of 60 min.
- The sheet follows a particular syllabus. Do not attempt the sheet before you have completed your preparation for that syllabus. Refer syllabus sheet in the starting of the book for the syllabus of all the DPP sheets.
- After completing the sheet check your answers with the solution booklet and complete the Result Grid. Finally spend time to analyse your performance and revise the areas which emerge out as weak in your evaluation.

DIRECTIONS (Q.1-Q.24) : There are 24 multiple choice questions. Each question has 4 choices (a), (b), (c) and (d), out of which ONLY ONE choice is correct.

Q.1 Accroding to Lewis concept of acids and bases, ether is
(a) acidic
(b) basic
(c) neutral
(d) amphoteric

Q.2 Epichlorohydrin is
(a) 3-Chloropropane
(b) 3-Chloropropan-1-ol
(c) 3-Chloro-1, 2-epoxypropane
(d) None of these

Q.3 In Williamson's synthesis, ethoxyethane is prepared by
(a) passing ethanol over heated alumina
(b) sodium ethoxide with ethyl bromide
(c) ethyl alcohol with sulphuric acid
(d) ethyl iodide and dry silver oxide

Q.4 The reagent used for the preparation of higher ether from halogenated ethers is
(a) conc. H_2SO_4 (b) sodium alkoxide
(c) dry silver oxide (d) Grignard reagent

Q.5 The etheral linkage (–C – O– C–) is cleaved by
(a) HBr (b) HNO_3
(c) both (d) none

RESPONSE GRID	1. ⓐⓑⓒⓓ	2. ⓐⓑⓒⓓ	3. ⓐⓑⓒⓓ	4. ⓐⓑⓒⓓ	5. ⓐⓑⓒⓓ

Space for Rough Work

Q.6 Number of metamers represented by molecular formula $C_4H_{10}O$ is

(a) 4 (b) 3

(c) 2 (d) 1

Q.7 Ether which is liquid at room temperature is

(a) $C_2H_5OCH_3$ (b) CH_3OCH_3

(c) $C_2H_5OC_2H_5$ (d) None of these

Q.8 Diethyl ether can be decomposed by heating with which of the following?

(a) HI (b) NaOH

(c) Water (d) $KMnO_4$

Q.9 Dimethyl ether when heated with excess HI gives

(a) CH_3I and CH_3OH

(b) CH_3I and H_2O

(c) $C_2H_6 + CH_3I$ and CH_3OH

(d) CH_3I and HCHO

Q.10 The ether that undergoes electrophilic substitution reactions is

(a) $CH_3OC_2H_5$ (b) $C_6H_5OCH_3$

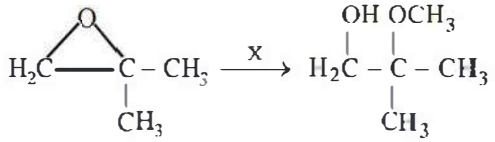
(c) CH_3OCH_3 (d) $C_2H_5OC_2H_5$

Q.11 Acetyl chloride does not react with

(a) diethyl ether (b) aniline

(c) phenol (d) ethanol

Q.12 What is X in the following change ?



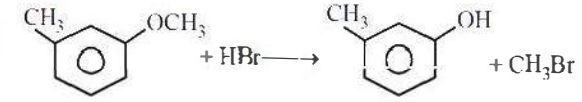
(a) CH_3OH, H_2SO_4

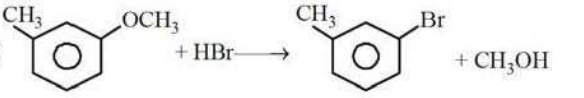
(b) $CH_3OH, CH_3\bar{O}\overset{+}{N}a$

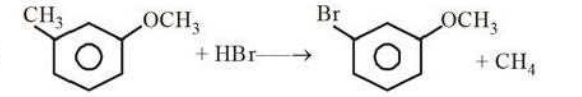
(c) H_2O/H_2SO_4 followed by CH_3OH

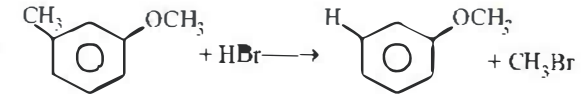
(d) $CH_3MgBr/\ H_3O^+$

Q.13 Which of the following reaction is correctly represented ?

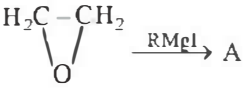
(a) 

(b) 

(c) 

(d) 

Q.14 The product 'A' in the following reaction is



(a) RCHOHR (b) $RCHOH\text{-}CH_3$

(c) $R-CH_2-CH_2-OH$ (d) $\begin{matrix}R\\R\end{matrix}\!>\!CHCH_2OH$

Q.15 Conc. H_2SO_4 heated with excess of C_2H_5OH at 140°C to form

(a) $CH_3CH_2-O-CH_3$

(b) $CH_3CH_2-O-CH_2CH_3$

(c) $CH_3-O-CH_2-CH_2-CH_3$

(d) $CH_2=CH_2$

Q.16 In the following reaction

$$C_2H_5OC_2H_5 + 4[H] \xrightarrow{Red\,P+HI} 2X + H_2O,\ X \text{ is}$$

(a) Ethane (b) Ethylene

(c) Butane (d) Propane

Q.17 Etherates are

(a) Ethers

(b) Solution in ether

(c) Complexes of ethers with Lewis acid

(d) Complexes of ethers with Lewis base

RESPONSE GRID					
	6. ⓐⓑⓒⓓ	**7.** ⓐⓑⓒⓓ	**8.** ⓐⓑⓒⓓ	**9.** ⓐⓑⓒⓓ	**10.** ⓐⓑⓒⓓ
	11. ⓐⓑⓒⓓ	**12.** ⓐⓑⓒⓓ	**13.** ⓐⓑⓒⓓ	**14.** ⓐⓑⓒⓓ	**15.** ⓐⓑⓒⓓ
	16. ⓐⓑⓒⓓ	**17.** ⓐⓑⓒⓓ			

Space for Rough Work

Q.18 An ether is more volatile than an alcohol having the same molecular formula. This is due to
(a) Dipolar character of ethers
(b) Alcohols having resonance structures
(c) Inter-molecular hydrogen bonding in ethers
(d) Inter-molecular hydrogen bonding in alcohols

Q.19 Diethyl ether finds use in medicine as
(a) A pain killer (b) A hypnotic
(c) An antiseptic (d) An anaesthetic

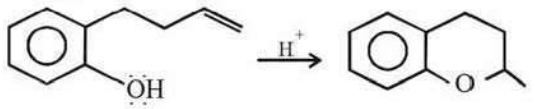
Q.20 The compound formed when ethyl bromide is heated with dry silver oxide is
(a) Dimethyl ether (b) Diethyl ether
(c) Methyl alcohol (d) Ethyl alcohol

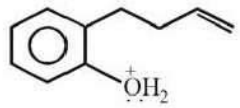
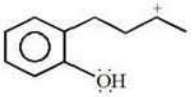
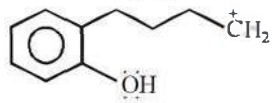
Q.21 Methylphenyl ether can be obtained by reacting
(a) Phenolate ion and methyl iodide
(b) Methoxide ion and bromobenzene
(c) Methanol and phenol
(d) Bromobenzene and methyl bromide

Q.22 When ether is reacted with O_2, it undergoes explosion due to formation of
(a) Peroxide (b) Acid
(c) Ketone (d) TNT

Q.23 Oxiran is
(a) Ethylene oxide (b) Diethyl ether
(c) Ethyl glycolate (d) Glycolic ester

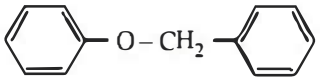
Q.24 Which of the following ion is formed in the following reaction?

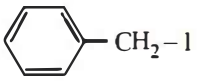
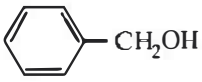
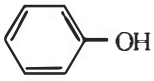
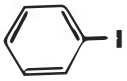


(a) 
(b) 
(c) 
(d) All the three

DIRECTIONS (Q.25-Q.27) : In the following questions, more than one of the answers given are correct. Select the correct answers and mark it according to the following codes:

Codes:
(a) 1, 2 and 3 are correct
(b) 1 and 2 are correct
(c) 2 and 4 are correct
(d) 1 and 3 are correct

Q.25 The ether  when treated with conc. HI produces

(1) 
(2) 
(3) 
(4) 

Q.26 Which one of the following reactions yield an alkyl halide?
(1) Diethyl ether + HI
(2) Diethyl ether and PCl_5
(3) Diethyl ether $\xrightarrow{\text{reduction}} X \xrightarrow{SO_2Cl_2}$
(4) Diethyl ether + Cl_2

Q.27 Which of the following combination can't be used for preparing an ether ?
(1) $C_6H_5OH + (CH_3)_2SO_4$
(2) $C_6H_5Br + CH_3CH_2OH$
(3) $p\text{-}NO_2C_6H_4Br + CH_3CH_2OH$
(4) $C_6H_5OH + (CH_3)_3CBr$

RESPONSE GRID					
	18. ⓐⓑⓒⓓ	19. ⓐⓑⓒⓓ	20. ⓐⓑⓒⓓ	21. ⓐⓑⓒⓓ	22. ⓐⓑⓒⓓ
	23. ⓐⓑⓒⓓ	24. ⓐⓑⓒⓓ	25. ⓐⓑⓒⓓ	26. ⓐⓑⓒⓓ	27. ⓐⓑⓒⓓ

Space for Rough Work

DIRECTIONS (Q.28-Q.30) : Each of these questions contains two statements: Statement-1 (Assertion) and Statement-2 (Reason). Each of these questions has four alternative choices, only one of which is the correct answer. You have to select the correct choice.

(a) Statement-1 is True, Statement-2 is True; Statement-2 is a correct explanation for Statement-1.

(b) Statement-1 is True, Statement-2 is True; Statement-2 is NOT a correct explanation for Statement-1.

(c) Statement -1 is False, Statement-2 is True.

(d) Statement -1 is True, Statement-2 is False.

Q.28 Statement-1 : Etherates are coordination complexes of ethers with Lewis acids.

Statement -2 : Ethers are easily cleaved by mineral acids such as HCl and H_2SO_4 at 373 K.

Q.29 Statement-1 : $(CH_3)_3 - C\bullet Na$ and CH_3CH_2Br react to form $(CH_3)_3C - O - CH_2CH_3$

Statement -2 : Good yields of ethers are obtained when *ter*-alkyl halides are treated with alkoxides.

Q.30 Statement-1 : *ter*-Butyl methyl ether is not prepared by the reaction of *ter*-butyl bromide with sodium methoxide.

Statement -2 : Sodium methoxide is a strong nucleophile.

RESPONSE GRID	28.ⓐⓑⓒⓓ	29.ⓐⓑⓒⓓ	30.ⓐⓑⓒⓓ

DAILY PRACTICE PROBLEM SHEET 50 - CHEMISTRY			
Total Questions	30	Total Marks	120
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	40	Qualifying Score	60
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

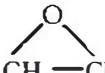
Space for Rough Work

DAILY PRACTICE PROBLEMS

CHEMISTRY SOLUTIONS

50

1. **(b)** Ether is basic because lone pairs of electrons are present on oxygen atom, $R-\ddot{\underset{\cdot\cdot}{O}}-R$.

2. **(c)**  $\overset{1}{CH_2}-\overset{2}{CH}\overset{3}{CH_2}Cl$ (3-chloro-1,2-epoxypropane)

3. **(b)** Williamson's synthesis –

$CH_3-CH_2-ONa + Br-CH_2-CH_3 \rightarrow$

$CH_3-CH_2-O-CH_2-CH_3$

4. **(d)** $CH_3OCH_3 \xrightarrow{Cl_2/hv} CH_3OCH_2Cl$

Methoxymethane (lower ether) — α-Chloro methyl ether

$\xrightarrow[-MgBr(Cl)]{CH_3MgBr} CH_3OCH_2CH_3$

Methoxyethane (Higher ether)

5. **(a)** Cleavage of ethers by acid is a nucleophilic substitution reaction which is possible only in case of HI and HBr, but not in HNO_3 and H_2SO_4. The reason being the fact that I^- and Br^- are less sterically hindered in attacking the substrate in comparison to NO_3^- and SO_4^{2-} .

6. **(b)** $CH_3CH_2OCH_2CH_3$(I), $CH_3OCH_2CH_2CH_3$(II) and $CH_3OCH(CH_3)_2$(III).

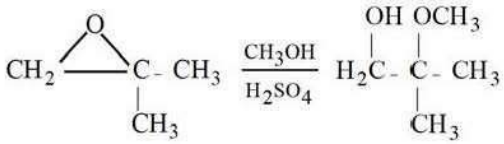
7. **(c)** CH_3OCH_3 and $C_2H_5OCH_3$ are gases, while $C_2H_5OC_2H_5$ (b.p. 308K) is a low boiling liquid

8. **(a)** $C_2H_5OC_2H_5 + HI \rightarrow C_2H_5OH + C_2H_5I$

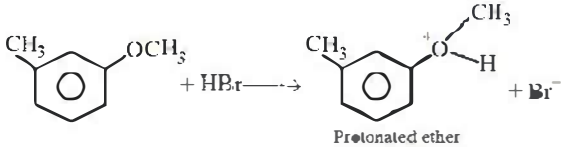
9. **(b)** $CH_3-O-CH_3 + 2HI \rightarrow 2CH_3I + H_2O$

10. **(b)** Only alkyl aryl ethers e.g., $C_6H_5OCH_3$ can undergo electrophilic substitution reactions.

11. **(a)** $CH_3COCl + C_2H_5-O-C_2H_5 \rightarrow$ No reaction

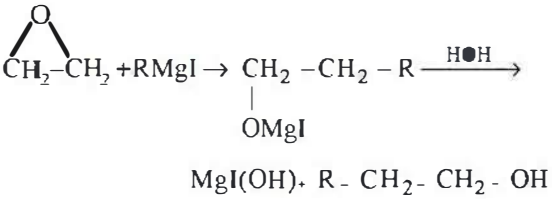
12. **(a)** 

13. **(a)** The ether molecule gets protonated by the hydrogen of the acid to form protonated ether or oxonium salt.



Protonated ether

The protonated ether undergoes nucleophilic attack by bromide ion Br^- and forms *m*-cresol and methyl bromide.

14. **(c)** 

$MgI(OH) + R-CH_2-CH_2-OH$

15. **(b)** $CH_3CH_2-OH + HO-CH_2-CH_3 \xrightarrow[140°C]{Conc.H_2SO_4}$

$CH_3CH_2-O-CH_2-CH_3 + H_2O$

16. **(a)** $C_2H_5OC_2H_5 + 4[H] \xrightarrow[\text{(Cleavage of ethers)}]{Red\,P/HI} 2C_2H_5I$

$\xrightarrow[\text{(Reduction)}]{Red\,P/HI} \underset{\text{Ethane}}{2C_2H_6} + H_2O$

17. **(c)** $R-O-R \xrightarrow{BF_3} \underset{\text{Etherate}}{\overset{R}{\overset{R}{}}\!\!>\!\ddot{O}:\rightarrow BF_3}$

18. **(d)** Due to intermolecular hydrogen bonding in alcohols, boiling point of an alcohol is much higher than that of the corresponding ether.

19. **(d)** An anaesthetic

20. **(b)** $2C_2H_5Br + \underset{Dry}{Ag_2O} \rightarrow C_2H_5-O-C_2H_5 + 2AgBr$

If we take moist Ag_2O then alcohol is formed

$Ag_2O + H_2O \rightarrow 2AgOH$

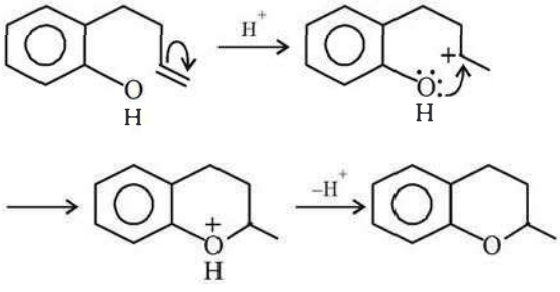
$C_2H_5Br + AgOH \rightarrow C_2H_5OH + AgBr$

21. **(a)** $C_6H_5O^- + CH_3I \rightarrow C_6H_5-O-CH_3 + I^-$

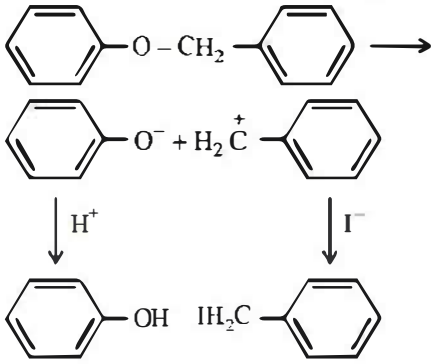
22. **(a)** $CH_3CH_2-O-C_2H_5 + O_2 \xrightarrow[25°C]{h\nu}$

$CH_3-\underset{\underset{OOH}{|}}{CH}-O-C_2H_5$

23. **(a)** Oxiran is ethylene oxide, 

24. **(b)** 

25. **(d)** Intermediate in above reaction is benzyl carbocation, which acquires stability through resonance and then $I^{\ominus}$ attacks on carbocation through S_N1 mechanism.



26. **(a)** $C_2H_5O-C_2H_5 \xrightarrow{Cl_2}$

Dark → $CH_3-CH(Cl)-O-CH(Cl)-CH_3$ (α-α′- dichlorodiethyl ether)

Light → $CCl_3-CCl_2-O-CCl_2-CCl_3$ (Perchlorodiethyl ether)

Thus (1), (2) and (3) are correct choices.

27. **(c)** The combination C_6H_5Br + CH_3CH_2OH has non-reactive C_6H_5Br, while in the combination C_6H_5OH+ Me_3CBr, Me_3CBr being *tert*-halide will undergo elimination reaction rather substitution. Hence, only combinations (1) and (3) can be used for preparing ether.

$C_6H_5OH + (CH_3)_2SO_4 \xrightarrow{S_N} C_6H_5OCH_3$;

$p\text{-}NO_2C_6H_4Br + CH_3CH_2OH \xrightarrow{ArS_N}$

$p\text{-}NO_2C_6H_4OCH_2CH_3$

28. **(d)** Ethers being Lewis bases form etherates with Lewis acids. Ethers are not easily cleaved by H_2SO_4.

29. **(d)** $(CH_3)_3CONa$ and CH_3CH_2Br react to form $(CH_3)_3C-O-CH_2CH_3$. Good yields of ether are obtained when primary alkyl halides are treated with alkoxides derived from any alcohol, 1°, 2° or 3°.

30. **(b)**