DPP - Daily Practice Problems

Date : | **Start Time :** | **End Time :**

CHEMISTRY CC24

SYLLABUS : Haloalkanes and Haloarenes

Max. Marks : 120 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

INSTRUCTIONS : This 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.

1. In the preparation of chlorobenzene from aniline, the most suitable reagent is
(a) Chlorine in the presence of ultraviolet light
(b) Chlorine in the presence of $AlCl_3$
(c) Nitrous acid followed by heating with Cu_2Cl_2
(d) HCl and Cu_2Cl_2

2. Which reagent cannot be used to prepare an alkyl halide from an alcohol ?
(a) $HCl + ZnCl_2$
(b) NaCl
(c) PCl_5
(d) $SOCl_2$

3. Vapour density of an organic compound is 23. It contains 52.17% of carbon and 13% of hydrogen. The compound gives iodoform test. The compound is :
(a) ethanol
(b) dimethyl ether
(c) acetone
(d) methanol

4. Reaction of *trans* 2-phenyl-1-bromocyclopentane on reaction with alcoholic KOH produces
(a) 1-phenylcyclopentene
(b) 3-phenylcyclopentene
(c) 4-phenylcyclopentene
(d) 2-phenylcyclopentene

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

5. Which of the following is an example of S_N2 reaction?

(a) $CH_3Br + OH^- \longrightarrow CH_3OH + Br^-$

(b) $CH_3-\underset{\underset{Br}{|}}{CH}-CH_3 + OH^- \longrightarrow CH_3-\underset{\underset{OH}{|}}{CH}-CH_3$

(c) $CH_3CH_2OH \xrightarrow{-H_2O} CH_2=CH_2$

(d) $(CH_3)_3C-Br + OH^- \longrightarrow (CH_3)_3COH + Br^-$

6. The reaction of $C_6H_5N_2^+Cl^-$ with CuCl gives

(a) C_6H_5Cl (b) C_6H_6

(c) $C_6H_5-C_6H_5$ (d) $C_6H_4Cl_2$

7. On sulphonation of C_6H_5Cl

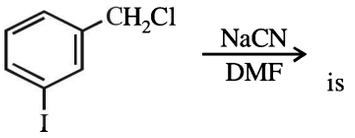
(a) *m*-Chlorobenzenesulphonic acid is formed

(b) Benzenesulphonic acid is formed

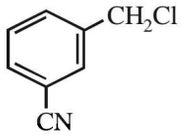
(c) *o*-Chlorobenzenesulphonic acid is formed

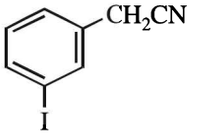
(d) *o*- and *p*-Chlorobenzenesulphonic acid is formed

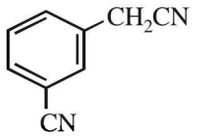
8. The structure of the major product formed in the following reaction

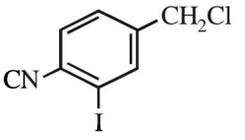


is

(a) 

(b) 

(c) 

(d) 

9. Which of the following will have a mesoisomer also?

(a) 2, 3- Dichloropentane

(b) 2, 3-Dichlorobutane

(c) 2-Chlorobutane

(d) 2-Hydroxypropanoic acid

10. The pesticide DDT slowly changes to

(a) CCl_3-CHO and chlorobenzene

(b) *p, p'*-Dichlorodiphenylethene

(c) *p, p'*-Dichlorodiphenyldichloroethane

(d) *p, p'*-Dichlorodiphenyldichloroethene

11. *o*-Methoxybromobenzene is treated with sodamide and then with ammonia. The product formed is

(a) *o*-Methoxyaniline (b) Aniline

(c) Methoxybenzene (d) *m*-Methoxyaniline

12. The starting substance for the preparation of iodoform is any one of the following, except

(a) $CH_3CH(OH)CH_3$ (b) CH_3CH_2OH

(c) HCH_2OH (d) CH_3COCH_3

13. Which of the following statements is wrong?

(a) Ethyl chloride on reduction with Zn-Cu couple and alcohol gives ethane.

(b) The reaction of methyl magnesium bromide with acetone gives butanol-2.

(c) Alkyl halides follow the following reactivity sequence on reaction with alkenes.

$R-I > R-Br > R-Cl > R-I$

(d) $C_2H_4Cl_2$ may exist in two isomeric forms

14. An organic compound A (C_4H_9Cl) on reaction with Na/diethyl ether gives a hydrocarbon which on monochlorination gives only one chloro derivative, then A is

(a) tert-butyl chloride (b) sec-butyl chloride

(c) isobutyl chloride (d) n-butyl chloride

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

15. If chloroform is left open in air in the presence of sunlight, it gives
(a) carbon tetrachloride (b) carbonyl chloride
(c) mustard gas (d) lewisite

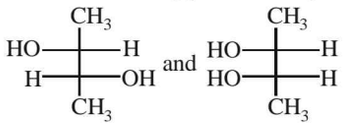
16. The reaction of toluene with Cl_2 in presence of $FeCl_3$ gives 'X' and reaction in presence of light gives 'Y'. Thus, 'X' and 'Y' are :
(a) X = Benzal chloride, Y = *o* – Chlorotoluene
(b) X = *m* – Chlorotoluene, Y = *p* –Chlorotoluene
(c) X = o –and *p* – Chlorotoluene,
Y = Trichloromethylbenzene
(d) X = Benzyl chloride, Y = *m* – Chlorotoluene

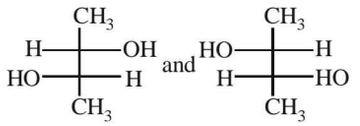
17. $CH_3Br + Nu^- \longrightarrow CH_3 - Nu + Br^-$ The decreasing order of the rate of the above reaction with nucleophiles (Nu^-) A to D is
[Nu^- = (A) PhO^-, (B) AcO^-, (C) HO^-, (D) CH_3O^-]
(a) A > B > C > D (b) B > D > C > A
(c) D > C > A > B (d) D > C > B > A

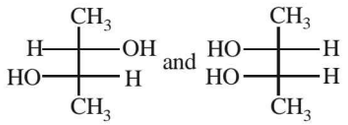
18. The Wurtz-Fittig reaction involves condensation of :
(a) two molecules of aryl halides
(b) one molecule of each of aryl-halide and alkyl-halide.
(c) one molecule of each of aryl-halide and phenol.
(d) two molecules of aralkyl-halides.

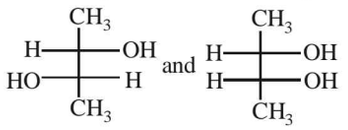
19. The major organic compound formed by the reaction of 1, 1, 1-trichloroethane with silver powder is:
(a) Acetylene (b) Ethene
(c) 2 - Butyne (d) 2 - Butene

20. Which of the following pairs of compounds are enantiomers?

(a) 

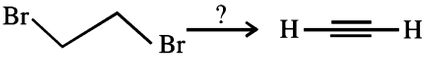
(b) 

(c) 

(d) 

21. Iodoform can be prepared from all except :
(a) Ethyl methyl ketone
(b) Isopropyl alcohol
(c) 3-Methyl 2-butanone
(d) Isobutyl alcohol

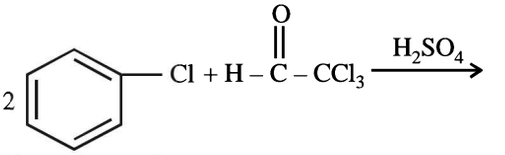
22. The reagent(s) for the following conversion,



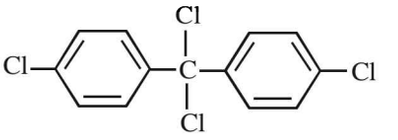
is/are
(a) alcoholic KOH
(b) alcoholic KOH followed by $NaNH_2$
(c) aqueous KOH followed by $NaNH_2$
(d) Zn/CH_3OH

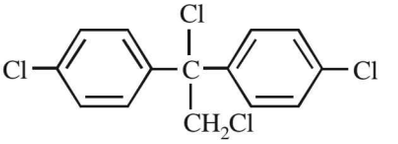
23. In a nucleophilic substitution reaction:
$R - Br + Cl^- \xrightarrow{DMF} R - Cl + Br^-$,
which one of the following undergoes complete inversion of configuration?
(a) $C_6H_5CHC_6H_5Br$ (b) $C_6H_5CH_2Br$
(c) $C_6H_5CHCH_3Br$ (d) $C_6H_5CCH_3C_6H_5Br$

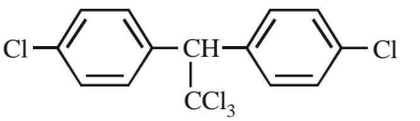
24. Chlorobenzne reacts with trichloro acetaldehyde in the presence of H_2SO_4.

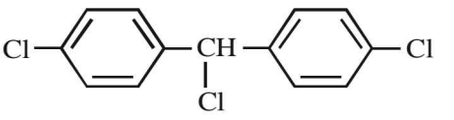


The major product formed is:

(a) 

(b) 

(c) 

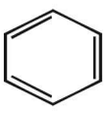
(d) 

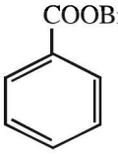
RESPONSE GRID					
	15. ⓐⓑⓒⓓ	**16.** ⓐⓑⓒⓓ	**17.** ⓐⓑⓒⓓ	**18.** ⓐⓑⓒⓓ	**19.** ⓐⓑⓒⓓ
	20. ⓐⓑⓒⓓ	**21.** ⓐⓑⓒⓓ	**22.** ⓐⓑⓒⓓ	**23.** ⓐⓑⓒⓓ	**24.** ⓐⓑⓒⓓ

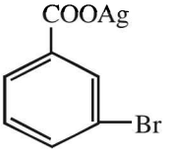
25. Benzene reacts with n-propyl chloride in the presence of anhydrous $AlCl_3$ to give
(a) 3 – Propyl – 1 – chlorobenzene
(b) n-Propylbenzene
(c) No reaction
(d) Isopropylbenzene

26. Replacement of Cl of chlorobenzene to give phenol requires drastic conditions but chlorine of 2, 4-dinitrochlorobenzene is readily replaced. This is because
(a) NO_2 makes the ring electron rich at *ortho* and *para* positions
(b) NO_2 withdraws e^- from *meta*-position
(c) NO_2 donates e^- at *m*-position
(d) NO_2 withdraws e^- from *ortho/para*-positions

27. Silver benzoate reacts with bromine to form

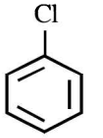
(a) 

(b) 

(c) 

(d) C_6H_5Br

28. What is the product of the following reaction ?



$\xrightarrow[(CH_3)_2NH]{(CH_3)_2NLi}$?

(a) N, N-dimethyl aniline
(b) phenyl lithium (C_6H_5Li)
(c) para chloro-N, N-dimethyl aniline
(d) meta chloro-N, N-dimethyl aniline

29. The major product formed when 1, 1, 1-trichloropropane is treated with aqueous potassium hydroxide is:
(a) Propyne (b) 1-Propanol
(c) 2-Propanol (d) Propionic acid

30. Consider the reactions :

(i) $(CH_3)_2CH - CH_2Br \xrightarrow{C_2H_5OH} (CH_3)_2CH - CH_2OC_2H_5 + HBr$

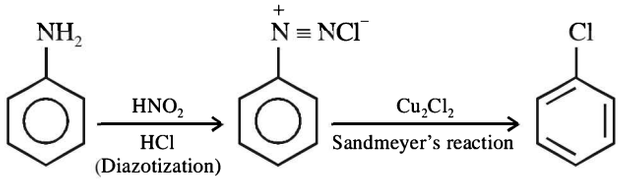
(ii) $(CH_3)_2CH - CH_2Br \xrightarrow{C_2H_5O^-} (CH_3)_2CH - CH_2OC_2H_5 + Br^-$

The mechanisms of reactions (i) and (ii) are respectively :
(a) S_N1 and S_N2 (b) S_N1 and S_N1
(c) S_N2 and S_N2 (d) S_N2 and S_N1

RESPONSE GRID	25. ⓐⓑⓒⓓ 26. ⓐⓑⓒⓓ 27. ⓐⓑⓒⓓ 28. ⓐⓑⓒⓓ 29. ⓐⓑⓒⓓ 30. ⓐⓑⓒⓓ

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 24 - CHEMISTRY			
Total Questions	30	Total Marks	120
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	37	Qualifying Score	54
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

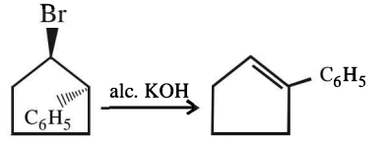
1. **(c)**



2. **(b)**

3. **(a)**

4. **(a)** The reaction is dehydrohalogenation



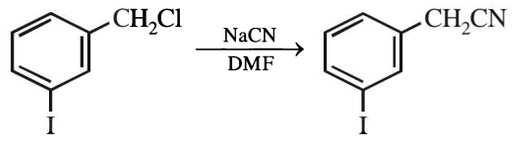
1-phenyl cyclopentene

5. **(a)** Only 1° alkyl halides (i.e. CH_3Br) undergo S_N2 reaction.

6. **(a)**

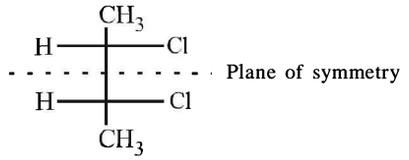
7. **(d)** –Cl is *o, p*–directing.

8. **(b)**



Nuclear substitution will not take place.

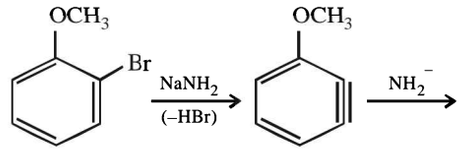
9. **(b)** The compound has two similar assymmetric C-atoms. It has plane of symmetry and exist in meso form.



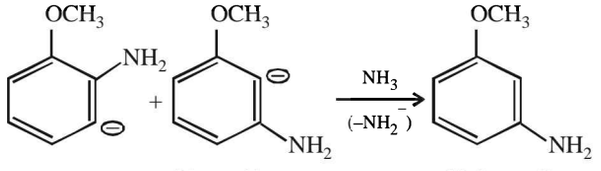
Meso - 2, 3 dichlorobutane

10. **(d)**

11. **(d)**



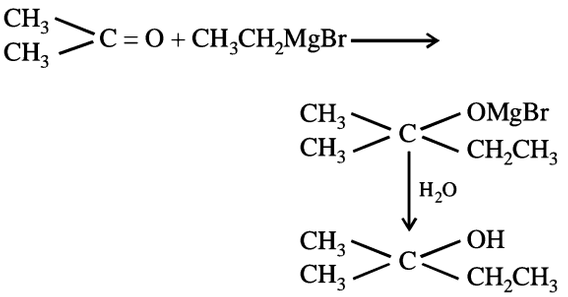
Benzyne intermediate



More stable *m*-Methoxyaniline

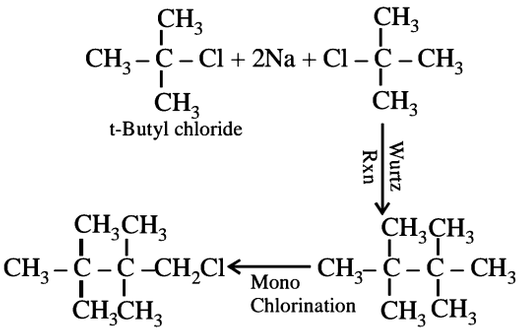
12. **(c)** CH_3OH does not undergo iodoform reaction, all others do so.

13. **(b)**



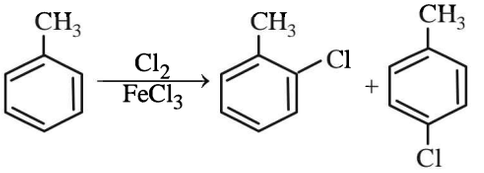
2- methyl butan-2ol
(3° alcohol)

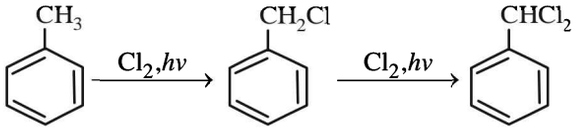
14. **(a)**

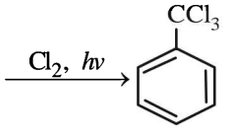


15. **(b)**

16. **(c)**







17. **(c)** The acid character follows the order :
$CH_3COOH > C_6H_5OH > H_2O > CH_3OH$
The basic character will follow the order
$CH_3COO^- < C_6H_5O^- < O^-H < CH_3O^-$
The stronger the acid, the weaker the conjugate base formed.

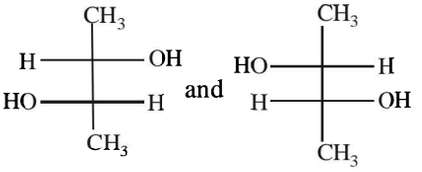
18. **(b)** Reaction between alkyl halide, aryl halide and sodium in presence of ether is known as Wurtz fitting reaction

$$C_6H_5Cl + 2Na + ClCH_3 \longrightarrow \underset{\text{Toluene}}{C_6H_5CH_3} + 2NaCl$$

19. **(c)** $$2Cl-\underset{\underset{Cl}{|}}{\overset{\overset{Cl}{|}}{C}}-CH_3 + 6Ag \longrightarrow \underset{\text{2–butyne}}{CH_3C \equiv CCH_3} + 6AgCl$$

1, 1, 1-trichloroethane

20. **(b)** Compound which are mirror image of each other and are non superimposable are termed as enantiomers.



These are enantiomers

21. **(d)** Iodoform test is given by methyl ketones, acetaldehyde and methyl secondary alcohols.

$$CH_3-\underset{\underset{CH_3}{|}}{CH}-CH_2-OH$$

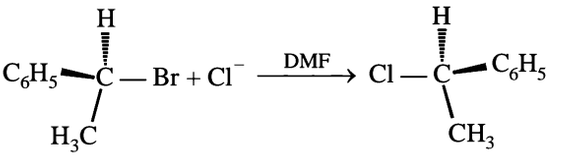
Isobutyl alcohol is a primary alcohol hence does'nt give positive iodoform test.

22. **(b)** $$BrCH_2-CH_2Br \xrightarrow[-HBr]{\text{Alc. KOH}} CH_2=CHBr$$

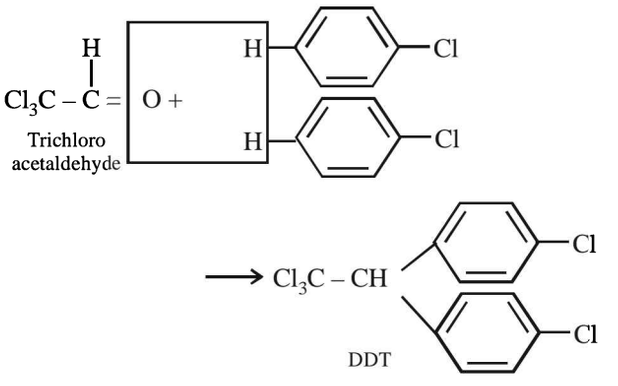
$$\xrightarrow[-HBr]{NaNH_2} CH \equiv CH$$

Elimination of HBr from $CH_2 = CHBr$ requires a stronger base because here, Br acquires partial double bond character due to resonance.

23. **(c)** $C_6H_5CHCH_3Br$ being an optically active secondary alkyl bromide undergoes S_N2 nucleophilic substitution reaction. Hence it undergoes complete inversion of configuration.



24. **(c)** Chloral on reaction with chlorobenzene in the presence of a catalytic amount of sulphuric acid forms DDT (dichlorodiphenyl Trichloro ethane).

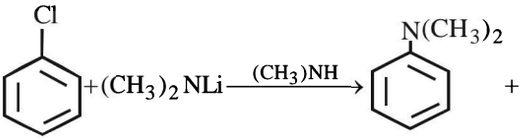


25. **(d)** $$C_6H_6 + CH_3CH_2CH_2Cl \xrightarrow[AlCl_3]{\text{Anhyd.}} \underset{\text{Isopropyl benzene}}{C_6H_5-\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{CH}}-CH_3}$$

26. **(d)** $-NO_2$ group withdraws electrons from *o*- and *p*-positions and hence activates the –Cl present on that position towards nucleophilic substitution.

27. **(d)** $$C_6H_5COOAg + Br_2 \xrightarrow{\text{Hunsdiecker reaction}}$$

$$C_6H_5Br + CO_2 + AgBr$$

28. **(a)** 

29. **(d)** $$Cl_3C-CH_2CH_3 + KOH \xrightarrow{\text{heat}}$$

$$(OH)_3C-CH_2CH_3 + 3KCl$$

$$\downarrow$$

$$CH_3CH_2\overset{\overset{O}{||}}{C}-OH$$

30. **(a)** A strong nucleophile favours the S_N2 reaction and a weak nucleophile favours the S_N1 reaction.
First reaction is S_N1 reaction because C_2H_5OH is used as solvent which is a weak nucleophile.
Second reaction is S_N2 reaction because $C_2H_5O^-$ is strong nucleophile.