

Alkyl Halides & Aryl Halides

Choose the correct answers :

1. Which will give yellow ppt. with $I_2/NaOH$
 - (a) $CH_3COCH_2CH_3$
 - (b) $CH_3COO-COCH_3$
 - (c) CH_3CONH_2
 - (d) $CH_3CH(OH).CH_2-CH_3$
 - (1) (a) and (d) (2) (a) and (b)
 - (3) (c) and (d) (4) None of these

2. Most reactive halide towards SN_1 reaction is
 - (1) n Butyl chloride
 - (2) Sec. Butyl chloride
 - (3) Tertiary B utyl chloride
 - (4) Allyl chloride

3. The reactivity order of halides for De hydrohalogenation is
 - (1) $RF > RCl > RBr > RI$
 - (2) $RI > RBr > RCl > RF$
 - (3) $RI > RCl > RBr > RF$
 - (4) $RF > RI > RBr > RCl$

4. Chloroform when treated with Nitric acid, gives
 - (1) $CCl_3 \cdot CHO$ (2) CCl_3CHOH
 - (3) $CCl_3 \cdot NO_2$ (4) $CCl_3 \cdot NO_3$

5. $C_2H_5Cl \xrightarrow[(2) \text{ conc. } H_2SO_4 \text{ at } 440K]{(1) \text{ aq. } KOH} |A| \xrightarrow[KMnO_4]{\text{Alkaline}} |B|$
 The product (B) is
 - (1) Ethylene (2) Glycol
 - (3) Glycerol (4) Allyl alcohol

6. Benzene reacts with *n*-Propylchloride in the presence of anhydrous $AlCl_3$ to give
 - (1) *n* Propyl Benzene
 - (2) 2-Propyl chlorobenzene
 - (3) Isopropyl benzene
 - (4) No reaction

7. When acetone reacts with chloroform, the product is
 - (1) Ethylidene dichloride
 - (2) Chloretone
 - (3) Chloral
 - (4) Ethanal

8. Carbon tetrachloride does not have dipole moment because of
 - (1) Its planar structure
 - (2) Its regular tetrahedral structure
 - (3) Similar sizes of carbon and chlorine atoms
 - (4) Similar electron affinities of carbon and chlorine

9. Carbon atom holding halogen in Aryl halide is
 - (1) sp^2 hybridized (2) sp^3
 - (3) sp (4) sp^3d

10. $C_2H_5OH \xrightarrow[c_2]{\text{aqueous}} [A] \xrightarrow{NaOH} [B]$
 $\xrightarrow[\text{Powder}]{\text{Silver}} [C]$
 The product [C] is
 - (1) Formic acid (2) Ethyne
 - (3) Ethanal (4) Formaldehyde

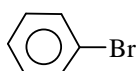
11. Which of the following reactions is most suitable for the preparation of *n*-propylbenzene
 - (1) Friedel-Crafts alkylation
 - (2) Wurtz reaction
 - (3) Wurtz-Fitting reaction
 - (4) Grignard reaction

12. Chloroform on reaction with zinc and HCl forms
 - (1) Formic acid (2) Chloropicrin
 - (3) Methylene chloride (4) Phosgene

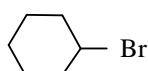
13. The addition of propene with HOCl proceeds via the addition of
 - (1) H^+ in the first step
 - (2) Cl^+ in the first step
 - (3) OH^- in the first step
 - (4) Cl^+ and OH^- in a single step

14. Consider the following haloalkanes :
 - (a) CH_3F (b) CH_3Cl
 - (c) CH_3Br (d) CH_3I
 The correct sequence of increasing order of dipole moments is
 - (1) $a < b < c < d$ (2) $d < c < b < a$
 - (3) $d < c < a < b$ (4) $c < d < a < b$

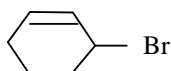
15. Which does not give methyl bromide ?
 (1) $\text{CH}_3\text{OH} + \text{HBr}$ (2) $\text{CH}_3\text{OH} + \text{Br}_2$
 (3) $\text{CH}_3\text{OH} + \text{PBr}_3$ (4) $\text{CH}_3\text{COOAg} + \text{Br}_2$
16. Which of the following haloalkane is hydrolysed by $\text{S}_{\text{N}}1$ mechanism ?
 (1) CH_3Br (2) $\text{CH}_3\text{CH}_2\text{Br}$
 (3) $\text{CH}_3\text{CH}_2\text{CH}_2\text{Br}$ (4) $(\text{CH}_3)_3\text{CBr}$
17. Which of the following haloalkane undergoes nucleophilic substitution reaction by $\text{S}_{\text{N}}2$ mechanism?
 (1) $\text{C}_6\text{H}_5\text{CH}_2\text{Br}$ (2) $(\text{CH}_3)_2\text{CHBr}$
 (3) $(\text{CH}_3)_3\text{CBr}$ (4) CH_3Br
18. The reaction of *t*-butyl chloride and sodium ethoxide gives mainly
 (1) *t*-butyl ethyl ether
 (2) 2,2-dimethylbutane
 (3) 2-methylprop-1-ene
 (4) isopropyl *n*-propyl ether
19. The correct sequence of relative reactivity of the following alkyl halides :
 a. $\text{CH}_3\text{CH}_2\text{Cl}$ b. $(\text{CH}_3)_2\text{CHCl}$
 c. $(\text{CH}_3)_3\text{CCl}$ is
 (1) $a > b > c$ (2) $b > c > a$
 (3) $c > b > a$ (4) $c > a > b$
20. The increasing order of hydrolysis of the following



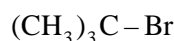
I



II



III



IV

is

- (1) $\text{I} < \text{II} < \text{III} < \text{IV}$ (2) $\text{I} < \text{IV} < \text{II} < \text{III}$
 (3) $\text{IV} < \text{III} < \text{II} < \text{I}$ (4) $\text{I} < \text{II} < \text{IV} < \text{III}$
21. Match list I with list II and select the correct answer using the codes given below the lists

List I (Reactions)

- (a) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{Br} + \text{alc. KOH}$
 (b) $\text{CH}_3\text{CH}_2\text{CH}(\text{Br})\text{CH}_3 + \text{alc. KOH}$
 (c) $(\text{CH}_3)_3\text{CBr} + \text{alc. KOH}$

List II (Products)

- cis*-but-2-ene
 - trans*-but-2-ene
 - but-1-ene
 - 2-methylprop-1-ene
- Codes :** (a) (b) (c)
- (1) 2 1 3
 (2) 3 4 1
 (3) 3 1 4
 (4) 3 2 4
22. 1-chlorobutane is treated with alcoholic KOH, the major product formed is
 (1) but-1-ene (2) but-2-ene
 (3) butan-1-ol (4) butan-2-ol
23. Alkyl halides are most often prepared from alcohols. Match list I and list II and select correct answer using the codes given below the lists.

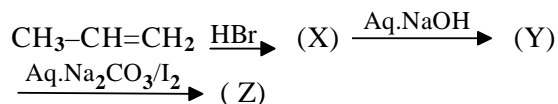
List I (Reactions)

- (a) $\text{CH}_3(\text{CH}_2)_3\text{OH} \xrightarrow[\Delta]{\text{NaBr, H}_2\text{SO}_4}$
 (b) $(\text{CH}_3)_3\text{COH} \xrightarrow[\text{room temp.}]{\text{Conc. HCl}}$
 (c) $\text{CH}_3\text{CH}(\text{OH})(\text{CH}_2)_2\text{CH}_3 \xrightarrow{\text{PBr}_3}$
 (d) $\text{Me}_2\text{CHCH}_2\text{OH} \xrightarrow{\text{SOCl}_2}$

List II (Alkyl halides)

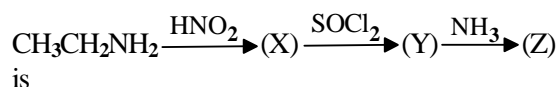
- $\text{CH}_3\text{CHBr}(\text{CH}_2)_2\text{CH}_3$
 - $\text{Me}_2\text{CHCH}_2\text{Cl}$
 - $(\text{CH}_3)_3\text{CCl}$
 - $\text{CH}_3(\text{CH}_2)_3\text{Br}$
- Codes :** (a) (b) (c) (d)
- (1) 4 3 1 2
 (2) 4 3 2 1
 (3) 3 4 1 2
 (4) 3 4 2 1

24. Consider the following sequence of reactions and identify the final product (Z).



- $\text{CH}_3\text{CHICH}_3$
- $\text{CH}_3\text{CH}_2\text{CH}_2\text{I}$
- CHI_3
- CH_3COCH_3

25. The final product (Z) in the following sequence of reactions



- is
- (1) Methanamine
 - (2) Ethanamide
 - (3) Ethanamine
 - (4) Propan-1-amine

26. Consider the following reactions :

- a. $\text{CH}_3\text{CH}_2\text{CH}_2\text{Cl} + \text{I}^- \rightarrow$
- b. $(\text{CH}_3)_3\text{C}-\text{Br} + \text{ethanolic KCN} \rightarrow$
- c. $\text{CH}_3\text{CHBrCH}_3 + \text{aqueous KOH} \rightarrow$
- d. $\text{CH}_3\text{CHBrCH}_3 + \text{alcoholic KOH} \rightarrow$

The most likely products is these reactions would be

- (1)

a. $\text{CH}_3\text{CH}_2\text{CH}_2\text{I}$	b. $(\text{CH}_3)_3\text{C}-\text{CN}$
c. $\text{CH}_3-\underset{\text{OH}}{\text{CH}}-\text{CH}_3$	d. $\text{CH}_3-\underset{\text{OH}}{\text{CH}}-\text{CH}_3$
- (2)

a. $\text{CH}_3\text{CH}_2\text{CH}_2\text{I}$	b. $\text{CH}_2=\overset{\text{CH}_3}{\text{C}}-\text{CH}_3$
c. $\text{CH}_3-\underset{\text{OH}}{\text{CH}}-\text{CH}_3$	d. $\text{CH}_3-\text{CH}=\text{CH}_2$
- (3)

a. $\text{CH}_3-\text{CH}=\text{CH}_2$	b. $(\text{CH}_3)_3\text{C}-\text{CN}$
c. $\text{CH}_3-\underset{\text{OH}}{\text{CH}}-\text{CH}_3$	d. $\text{CH}_3-\text{CH}=\text{CH}_2$
- (4)

a. $\text{CH}_3-\text{CHCH}_2\text{I}$	b. $(\text{CH}_3)_3\text{C}-\text{CN}$
c. $\text{CH}_3-\text{CH}=\text{CH}_2$	d. $\text{CH}_3-\underset{\text{OH}}{\text{CH}}-\text{CH}_3$

27. Which of the following will give a positive carbylamine test ?

- (1) $\text{H}_3\text{C}-\text{NH}_2$
- (2) $\text{H}_3\text{C}-\text{NH}-\text{CH}_3$
- (3) $(\text{CH}_3)_3\text{N}$
- (4) $\text{C}_6\text{H}_5-\text{NH}_2$

28. Which of the following statements is correct?

- (1) Addition of H_2O to isobutylene in presence of H_2SO_4 is an example of electrophilic addition reaction

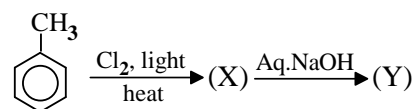
- (2) Addition of H_2O to propyne in presence of dil. $\text{H}_2\text{SO}_4/\text{HgSO}_4$ at 330 K is an example of nucleophilic addition reaction

- (3) Both (1) and (2)
- (4) Both (1) and (2) are wrong

29. Aryl halides are less reactive towards nucleophilic substitution reaction as compared to alkyl halides due to

- (1) The formation of less stable carbonium ion
- (2) Resonance stabilization
- (3) Longer carbon-halogen bond
- (4) sp^2 -hybridized C attached to the H

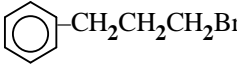
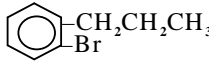
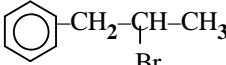
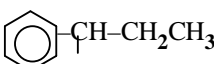
30. In the reaction :



the product (Y) is

- (1) *o*-cresol
- (2) *p*-cresol
- (3) 2,4-dihydroxy toluene
- (4) Benzoic acid

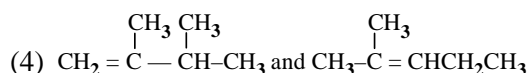
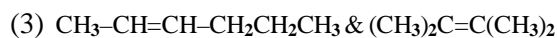
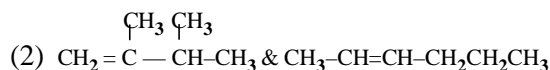
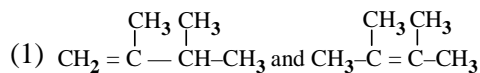
31. Propylbenzene reacts with bromine in presence of light or heat to give

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

32. Which of the following is least reactive towards nucleophilic substitution reaction, when treated with aqueous NaOH ?

- (1) 4-nitrochlorobenzene
- (2) 2,4-dinitrochlorobenzene
- (3) 2,4,6-trinitrochlorobenzene
- (4) 3-nitrochlorobenzene.

33. An alkyl halide of formula $C_6H_{13}Cl$ on treatment with potassium tertiary butoxide gives two isomeric alkenes (C_6H_{12}). Both alkenes on hydrogenation give 2,3-dimethylbutane. Isomeric alkenes are



34. The decreasing order of C-X bond length in Me-X is

- (1) MeI > MeBr > MeCl > MeF
 (2) MeF > MeCl > MeBr > MeI
 (3) MeF > MeCl > MeI > MeBr
 (4) MeI > MeCl > MeF > MeBr.

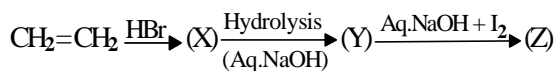
35. Which one of the following has maximum dipole moment ?

- (1) CH_3Cl (2) CH_2Cl_2
 (3) $CHCl_3$ (4) CCl_4 .

36. Friedal-Craft's reaction of bromobenzene with methyl bromide gives

- (1) 2-bromotoluene
 (2) 4-bromotoluene
 (3) 2-and 4-bromotoluenes
 (4) 3-bromotoluene

37. Consider the following sequence of reactions and identify the final product



The compound Z in the reaction is

- (1) CH_3CH_2I (2) CH_3CH_2OH
 (3) CH_3CHO (4) CHI_3

38. When 20% aqueous solution of sodium chloride containing ethyl alcohol is electrolysed, there is formation of

- (1) Ethyl chloride (2) Chloral
 (3) Acetaldehyde (4) Chloroform

39. Which of the following statements is correct ?

- (1) C_2H_5Br reacts with alcoholic KOH to form C_2H_5OH
 (2) C_2H_5Br when treated with metallic sodium gives ethane
 (3) C_2H_5Br when treated with sodium ethoxide forms diethyl ether
 (4) C_2H_5Br with AgCN forms ethyl cyanide

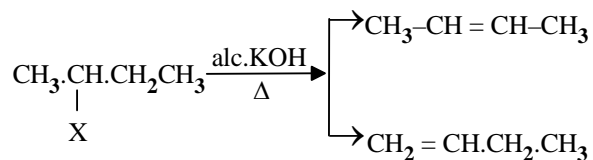
40. Which of the following is hydrolysed most easily?

- (1) C_6H_5Cl
 (2) $(C_6H_5)_2CHCl$
 (3) $C_6H_5CH_2Cl$
 (4) $(C_6H_5)_3CCl$

41. Ethylene dichloride and ethylidene chloride are isomeric compounds. Identify the statement which is not applicable. Both of them

- (1) React with alcoholic potash
 (2) React with aqueous potash and give the same product
 (3) Are dihalides
 (4) Answer Beilstein's test

42. For the reaction

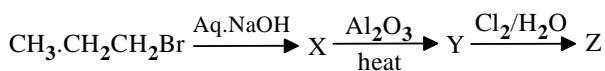


- (1) $CH_3 - CH = CH - CH_3$ predominates
 (2) $CH_2 = CH - CH_2 - CH_3$ predominates
 (3) Both are formed in equal amounts
 (4) The product ratio is dependent on the halogen X

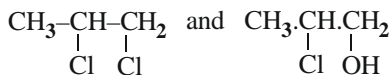
43. Cleavage of an ether with excess of HI gave only one alkyl iodide which contains 74.7% iodine. The hydrolysis of alkyl halides gives 2° alcohol. The ether is

- (1) Diethyl ether
 (2) Di isopropylether
 (3) Di isobutyl ether
 (4) None of these

44. Identify 'Z' in



(1) Mixture of



(2) $\begin{array}{c} \text{CH}_3-\text{CH}-\text{CH}_2 \\ | \quad | \\ \text{OH} \quad \text{Cl} \end{array}$

(3) $\begin{array}{c} \text{CH}_3-\text{CH}-\text{CH}_2 \\ | \quad | \\ \text{Cl} \quad \text{OH} \end{array}$

(4) None of these

45. $\text{CH}_2 = \text{CHCl}$ reacts with HCl to form

(1) $\text{CH}_2\text{Cl}-\text{CH}_2\text{Cl}$ (2) $\text{CH}_3-\text{CHCl}_2$

(3) $\text{CH}_2 = \text{CHCl.HCl}$ (4) None of these

46. Vapour density of an organic compound is 23.0

It contains 52.17% of carbon and 13% of hydrogen. The compound gives iodoform test. The compound is

(1) Ethanol (2) Dimethyl ether

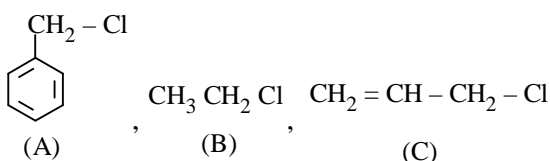
(3) Acetone (4) Methanol

47. Which one of the following compounds forms the most stable hydrate ?

(1) CH_3-CHO (2) $\text{C}_6\text{H}_5-\text{CHO}$

(3) CCl_3-CHO (4) $\text{CH}_3-\text{CO}-\text{CH}_3$

48. The reactivity order of

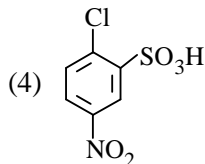
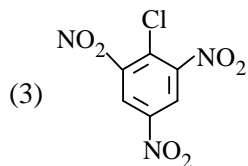
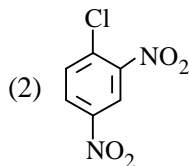
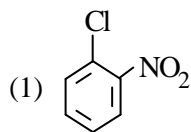


for $\text{S}_\text{N}-1$ mechanism is

(1) $\text{A} > \text{B} > \text{C}$ (2) $\text{C} > \text{A} > \text{B}$

(3) $\text{A} > \text{C} > \text{B}$ (4) $\text{B} > \text{A} > \text{C}$

49. Which of the following will not undergo Ullmann reaction



50. Meso 2, 3-Dibromobutane on dehydro-halogenation gives predominantly

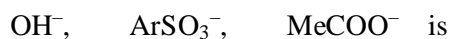
(1) E-2-bromo-2-butene-(cis)

(2) Z-2-bromo butene-(trans)

(3) There is no main product

(4) There is no such dehydro-halogenation possible

51. The correct order of leaving ability of



(A) (B) (C)

(1) $\text{A} < \text{B} < \text{C}$ (2) $\text{A} < \text{C} < \text{B}$

(3) $\text{C} < \text{A} < \text{B}$ (4) $\text{C} < \text{B} < \text{A}$

52. Which of the following can be used to convert ethyl bromide into ethanethiol

(1) Sodium bisulphide

(2) Sodium sulphide

(3) Potassium thiocyanate

(4) Potassium sulphite

53. When 2-bromo butane undergoes elimination reaction with alcoholic potassium hydroxide then the alkene formed in maximum amount is

(1) *cis*-2-butene (2) *trans*-2-butene

(3) *iso*-butene (4) None of these

54. $\text{Cl}-\text{CH}_2-\text{O}-\text{CH}_2\text{CH}_3$ will undergo rapid

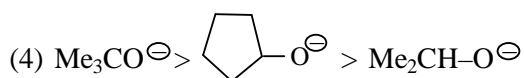
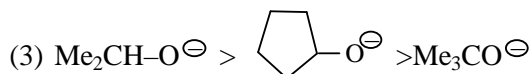
(1) $\text{S}_\text{N}-1$ substitution

(2) $\text{S}_\text{N}-2$ substitution

(3) Both equal reacts ($\text{S}_\text{N}-1$ and $\text{S}_\text{N}-2$)

(4) None of these

55. The correct order of nucleophilicity is



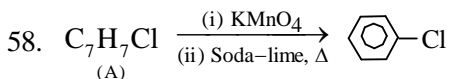
56. The nucleophilicity for $\text{S}_\text{N}-2$ reactions in polar protic solvent is

(1) $\text{I}^- > \text{Br}^- > \text{Cl}^- > \text{F}^-$ (2) $\text{Cl}^- > \text{Br}^- > \text{F}^- > \text{I}^-$

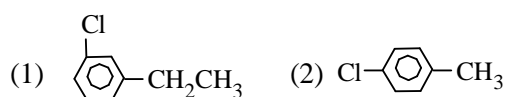
(3) $\text{F}^- > \text{Cl}^- > \text{Br}^- > \text{I}^-$ (4) $\text{Br}^- > \text{Cl}^- > \text{F}^- > \text{I}^-$

57. The reactivity of chlorobenzene can be increased towards Ulman reaction by inserting which of the following

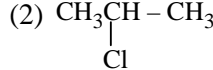
- (1) $-\text{NH}_2$ (2) $-\text{NO}_2$
 (3) OH (4) All of these



In the above reactions, compound (A) is



59. $\text{CH}_3\text{CH}_2\text{CH}_3$ on chlorination in the presence of diffused sunlight gives mainly

- (1) $\text{CH}_3\text{CH}_2\text{CH}_2\text{Cl}$
 (2) 
 (3) Both (1) and (2) in equal proportions
 (4) None of these

60. Consider the following alkyl halides :


1. $(\text{CH}_3)_3\text{CCH}_2\text{Br}$ 2. $\text{ClCH}_2\text{CH}=\text{CH}_2$
 3. $\text{ClCH}_2\text{CH}_2\text{CH}_3$ 4. $\text{BrCH}_2\text{CH}_2\text{CH}_3$

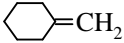
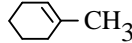
Arrange these alkyl halides in *decreasing order of reactivity* in Williamson's reaction

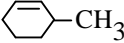
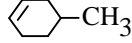
- (1) $2 > 1 > 3 > 4$ (2) $2 > 1 > 4 > 3$
 (3) $1 > 2 > 3 > 4$ (4) $2 > 4 > 3 > 1$

Functional Group-I (Alcohols, Phenols & Ethers)

Choose the correct answers :

-  on dehydration predominantly forms

(1)  (2) 

(3)  (4) 
- A neutral compound gives red colour with ceric ammonium nitrates. This suggests compound is

(1) alcohol
(2) phenol
(3) aldehyde
(4) ketone
- In vector Meyer's test for alcohols the characteristic colour given by 2° alcohol is

(1) Blue (2) Green
(3) Red (4) Purple
- Oxygen when passed through an ethereal solution of C_6H_5MgI followed by acid hydrolysis gives

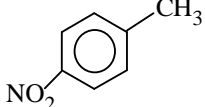
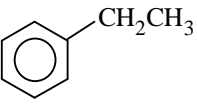
(1) Benzene
(2) Benzoic acid
(3) Phenol
(4) Salicylic acid
- Which of the following does not react with ethers to form coordinate complexes.

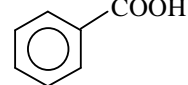
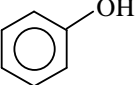
(1) BF_3 (2) $RMgX$
(3) $AlCl_3$ (4) C_2H_5ONa
- Peroxides from old samples of ethers can be removed by treating with aqueous solution of

(1) KI (2) KCNS
(3) $Na_2S_2O_3$ (4) Br_2
- The compound obtained by reaction of ethene with diborane followed by hydrolysis with alkaline H_2O_2 is

(1) Ethanol (2) Propanol
(3) Ethanal (4) Trimethyl bromide
- Carbolic acid is

(1) Phenol (2) Phenyl benzoate
(3) Phenyl acetate (4) Salol
- Which will undergo Friedel Crafts alkylation

(a)  (b) 

(c)  (d) 

(1) (a), (b), (d) (2) (a), (c)
(3) (b), (d) (4) (a), (b)
- Phenol + excess Br_2 water gives white ppt. of

(1) m-promophenol
(2) o and p-bromophenols
(3) 2, 4 dibromophenol
(4) 2, 4, 6-Tribromophenol
- An aromatic ether is not cleaved by HI even at 525 K. The compound is

(1) $C_6H_5OCH_3$
(2) $C_6H_5OC_6H_5$
(3) $C_6H_5OC_3H_7$
(4) THF
- OsO_4 is used for

(1) Hydroxylation of acetylenes
(2) Hydroxylation of olefins to form cis-diol
(3) Hydroxylation of olefine to form trans-diol
(4) Hydroxylation of carbonyl compounds
- Elemental S + $RMgX \longrightarrow X \xrightarrow{H_3O^+} Y$
Y is

(1) Mercaptan (2) Sulphoxides
(3) Thioether (4) Sulphonic acids
- Oxymercuration – demercuration of alkenes gives products corresponding to

(1) Markonikov's rule
(2) Anti markonikov's rule
(3) Saytzeff rule
(4) None of these

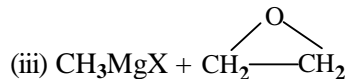
15. Phenyl acetate on heating with 1 mole of anhyd. AlCl_3 gives
- (1) Acetophenone
 - (2) o-hydroxy acetophenone
 - (3) m-hydroxyacetophenone
 - (4) o and p-hydroxy acetophenones

16. Which of the following components shows metamerism
- (1) $\text{CH}_3\text{COC}_2\text{H}_5$
 - (2) $\text{C}_2\text{H}_5\text{SC}_2\text{H}_5$
 - (3) CH_3OCH_3
 - (4) $\text{CH}_3\text{OC}_2\text{H}_5$

17. List I contains the Grignard reagent and carbonyl compounds or ethylene oxide to prepare the alcohols of list II. Match list I & II and select the *correct answer* by using the codes given below the lists.

List I

- (i) $\text{CH}_3\text{CH}_2\text{MgX} + \text{H}_2\text{CO}$
- (ii) $\text{CH}_3\text{CH}_2\text{CH}_2\text{COCH}_3 + \text{CH}_3\text{MgX}$



- (iv) $\text{PhCH}_2\text{CHO} + \text{CH}_3\text{MgX}$

List II

- (a) $(\text{CH}_3)_2\text{C}(\text{OH})\text{CH}_2\text{CH}_2\text{CH}_3$
- (b) $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$
- (c) $\text{CH}_3\text{CH}_2\underset{\text{Ph}}{\text{C}}(\text{CH}_3)\text{OH}$
- (d) $\text{PhCH}_2\text{CH}(\text{OH})\text{CH}_3$

Codes : (1) (2) (3) (4)

- (1) (a) (b) (b) (c)
- (2) (b) (a) (d) (b)
- (3) (b) (a) (b) (c)
- (4) (b) (a) (b) (d)

18. Match List I (Reactants which react with Grignard reagent, $\text{C}_2\text{H}_5\text{MgBr}$) with List II (Products obtained in the reaction) and select the correct answer using the codes given below the lists.

List I

- (1) Ethanol
- (2) Ethylene chlorohydrin
- (3) Acetaldehyde
- (4) Ethylene oxide

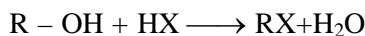
List II

1. Butan-1-ol
2. Butan-2-ol

Codes : (1) (2) (3) (4)

- (1) – 1 2 1
- (2) – 1 2 2
- (3) 1 2 1 –
- (4) 1 2 – 1

19. List the hydrogen halide acids in *decreasing order of reactivity* in the following reaction:



- (1) $\text{HI} > \text{HBr} > \text{HCl} > \text{HF}$
- (2) $\text{HBr} > \text{HI} > \text{HCl} > \text{HF}$
- (3) $\text{HI} > \text{HCl} > \text{HBr} > \text{HF}$
- (4) $\text{HI} > \text{HF} > \text{HBr} > \text{HI}$.

20. List of the class of alcohols in decreasing order of reactivity towards hydrogen halide acids.

- (1) $3^\circ > 1^\circ > 2^\circ > \text{MeOH}$
- (2) $\text{MeOH} > 3^\circ > 2^\circ > 1^\circ$
- (3) $3^\circ > 2^\circ > 1^\circ > \text{MeOH}$
- (4) $2^\circ > 3^\circ > 1^\circ > \text{MeOH}$.

21. Which of the following alcohols cannot be prepared by Grignard reagents and carbonyl compound

- (1) $\text{C}_2\text{H}_5\text{OH}$
- (2) $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$
- (3) $(\text{CH}_3)_2\text{CHOH}$
- (4) CH_3OH

22. Place the following alcohols in decreasing order of rate of dehydration with conc. H_2SO_4 .

1. $\text{CH}_3\text{CH}_2\text{CH}(\text{OH})\text{CH}_2\text{CH}_2\text{CH}_3$
2. $(\text{CH}_3)_2\text{C}(\text{OH})\text{CH}_2\text{CH}_2\text{CH}_3$
3. $(\text{CH}_3)_2\text{C}(\text{OH})\text{CH}(\text{CH}_3)_2$
4. $\text{CH}_3\text{CH}_2\text{CH}(\text{OH})\text{CH}(\text{CH}_3)_2$
5. $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$

- (1) $3 > 2 > 4 > 5 > 1$
- (2) $3 > 2 > 4 > 1 > 5$
- (3) $3 > 2 > 1 > 4 > 5$
- (4) $3 > 2 > 1 > 5 > 4$

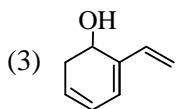
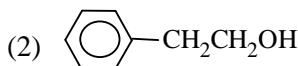
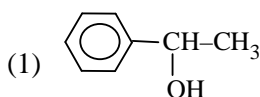
23. Place the following benzyl alcohols in decreasing order of reaction rate with HBr .

- (1) *p*- $\text{CH}_3\text{OC}_6\text{H}_4\text{CH}_2\text{OH}$
- (2) *p*- $\text{ClC}_6\text{H}_4\text{CH}_2\text{OH}$
- (3) $\text{C}_6\text{H}_5\text{CH}_2\text{OH}$
- (4) *p*- $\text{O}_2\text{NC}_6\text{H}_4\text{CH}_2\text{OH}$

- (1) $1 > 2 > 3 > 4$
- (2) $1 > 3 > 2 > 4$
- (3) $1 > 3 > 4 > 2$
- (4) $1 > 4 > 2 > 3$

24. In the reaction,
 $\text{H}_3\text{C}-\text{C} \equiv \text{CH} \longrightarrow \text{H}_3\text{C}-\text{CH}(\text{OH})-\text{CH}_3$,
 the reagent (s) used would include
 (1) 2 mol of H_2/Pt , followed by aqueous NaOH
 (2) 1 mol of H_2/Pt , followed by $\text{H}_2\text{SO}_4/\text{H}_2\text{O}$
 (3) Na in liquid NH_3 , followed by CH_3Cl
 (4) $\text{Hg}^{2+}/\text{H}_2\text{SO}_4$.

25. Compound (X) liberates hydrogen when treated with sodium metal. On oxidation, it gives a compound (Y) with the same number of carbon atoms. Compound (Y) gives orange coloured crystalline 2, 4-dinitrophenyl hydrazone derivative with 2, 4-dinitrophenyl hydrazine hydrochloride. Compound (Y) on treatment with NaOH (aq) and iodine gives compound (Z). Compound (Z) on treatment with dilute acid yields a compound, which is identified as benzoic acid. The structure of compound (X) is



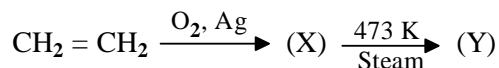
(4) None of these

26. Alcohol (X) $\xrightarrow{\text{aq. NaOH} + \text{I}_2}$ $\text{CHI}_3 + \text{(Y)}$
 $\xrightarrow{\text{H}_3\text{O}^+}$ PhCH_2COOH . The alcohol (X) is
 (1) $\text{CH}_3\underset{\text{Ph}}{\text{CH}}\text{CH}(\text{OH})\text{CH}_3$
 (2) $\text{PhCH}_2\text{CH}(\text{OH})\text{CH}_3$
 (3) $\text{PhCH}(\text{OH})\text{CH}_2\text{CH}_3$
 (4) $\text{PhCH}(\text{CH}_3)\text{OH}$

27. An industrial method of preparation of methanol is
 (1) Catalytic reduction of carbon monoxide in presence of $\text{ZnO}-\text{Cr}_2\text{O}_3$
 (2) By reacting methane with steam at 900°C with a nickel catalyst.
 (3) By reducing formaldehyde with lithium aluminium hydride
 (4) By reacting formaldehyde with aqueous sodium hydroxide solution.

28. The Compound which reacts fastest with Lucas reagent at room temperature is
 (1) Butan-1-ol
 (2) Butan-2-ol
 (3) 2-methylpropan-1-ol
 (4) 2-methylpropan-2-ol

29. Identify the final product.



- (1) Ethanol (2) Ethanal
 (3) Epoxyethane (4) Ethylene glycol.

30. Glycerol on heating with KHSO_4 gives

- (1) Acetone (2) Acrolein
 (3) Glyceraldehyde (4) Propanol.

31. Glycerol on Oxidation by periodic acid (HIO_4) gives

- (1) 3 mol of HCOOH
 (2) 3 mole of HCHO
 (3) 2 mol of HCOOH and 1 mole of HCHO
 (4) 1 mol of HCOOH and 2 mol of HCHO

32. Pick out the correct statements.

- (a) The C–O bond in phenol is shorter than in alcohol
 (b) The dipole moments of phenol (1.7D) and methanol (1.6D) are in the same directions
 (c) The dipole moment of p-nitrophenol is greater than that of phenol or nitrobenzene
 (d) o-nitrophenol and o-hydroxybenzaldehyde have lower solubility as compared with their m and p-isomers.

- (1) (a), (b) and (d) (2) (a) and (b)
 (3) (a), (c) and (d) (4) (a), (b) and (d)

33. p-nitrophenol has higher boiling point than o-nitrophenol because

- (1) o-nitrophenol shows intramolecular H-bonding; whereas p-nitrophenol involves intermolecular H-bonding
 (2) o-nitrophenol shows intermolecular H-bonding; whereas p-nitrophenol involves intramolecular H-bonding
 (3) Both involve intramolecular H-bonding, but p-nitrophenol forms stronger H-bonds.
 (4) Both involve intermolecular H-bonding but p-nitrophenol forms stronger H-bond.

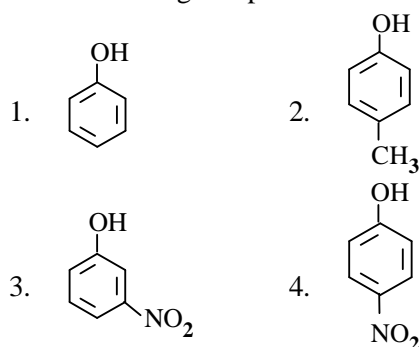
34. Consider the following compounds :
1. Phenol
 2. *o*-nitrophenol
 3. *m*-nitrophenol
 4. *p*-nitrophenol
- Place these compounds in the decreasing order of acidity.

- (1) $2 > 3 > 1 > 4$ (2) $2 > 3 > 4 > 1$
 (3) $2 > 4 > 3 > 1$ (4) $4 > 2 > 3 > 1$

35. Consider the following compounds :
1. Phenol
 2. *o*-cresol
 3. *m*-cresol
 4. *p*-cresol
- Arrange these compounds in the decreasing order of acidity.

- (1) $3 > 1 > 4 > 2$ (2) $2 > 3 > 1 = 4$
 (3) $1 > 3 > 4 > 2$ (4) $2 = 4 > 1 > 3$

36. In the following compounds :



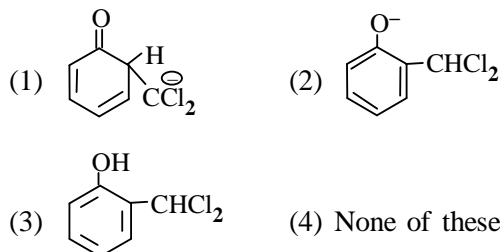
the order of acidity is

- (1) $3 > 4 > 1 > 2$ (2) $1 > 4 > 3 > 2$
 (3) $2 > 1 > 3 > 4$ (4) $4 > 3 > 1 > 2$

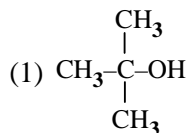
37. An organic compound (X), C_7H_8O , is insoluble in $NaHCO_3$. On treatment with bromine-water, (X) rapidly forms compound of molecular formula, $C_7H_5OBr_3$. The compound (X) is
- (1) *o*-cresol
 - (2) *p*-cresol
 - (3) *m*-cresol
 - (4) None of these

38. The decreasing order of basicity of alcohols is
- (1) $3^\circ < 2^\circ < 1^\circ$
 - (2) $3^\circ < 1^\circ < 2^\circ$
 - (3) $2^\circ < 3^\circ < 1^\circ$
 - (4) $1^\circ < 2^\circ < 3^\circ$

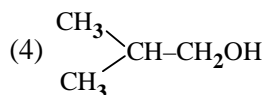
39. When phenol is treated with $CHCl_3$ and $NaOH$, followed by acidification, salicylaldehyde is obtained. Which of the following species are involved in the above mentioned reaction as intermediate ?



40. Which one of the following alcohols react most readily with conc. HCl ?



- (2) $CH_3-CHOH-CH_2-CH_3$
 (3) $CH_3-CH_2-CH_2-CH_2OH$

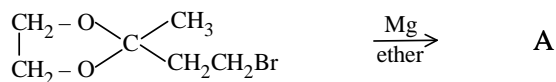


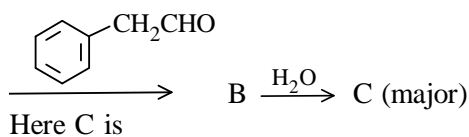
41. A organic compound, C_3H_6O , does not give a precipitate with 2,4-dinitrophenylhydrazine reagent and does not react with metallic sodium. It could be

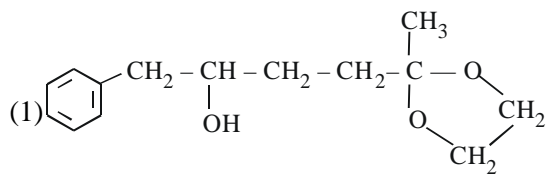
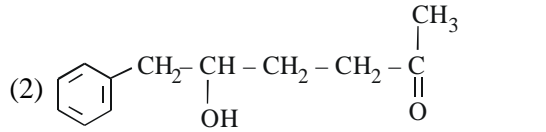
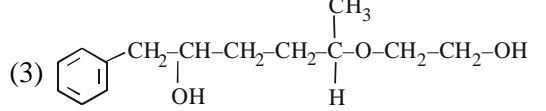
- (1) CH_3-CH_2-CHO
- (2) $CH_3-CO-CH_3$
- (3) $CH_2 = CH-CH_2OH$
- (4) $CH_2 = CH-O-CH_3$

42. $CH_3CH_2CH_2-OH + (C_2H_5)_3O^+ BF_4^- \longrightarrow$ products

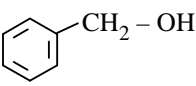
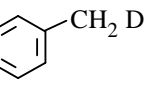
- (1) $HBF_4 + (C_2H_5O)_3O^+ CH_3CH_2CH_3$
- (2) $BF_3 + CH_3CH_2CH_2F + (C_2H_5)_3O^+ HF^-$
- (3) $CH_3CH_2CH_2OC_2H_5 + HBF_4 + C_2H_5OC_2H_5$
- (4) None of these

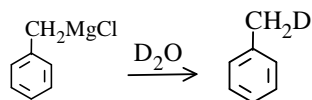
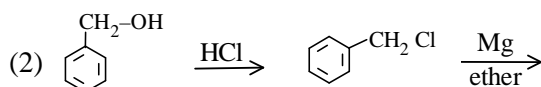
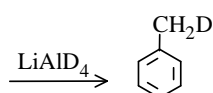
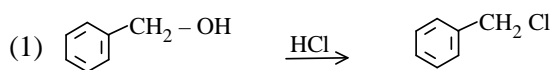
43. 



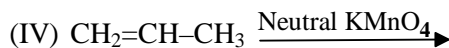
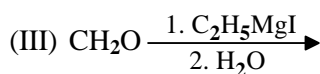
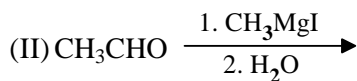
- (1) 
- (2) 
- (3) 
- (4) None of these

44. Enzymes used to convert starch to ethanol are
- (1) Invertase, zymase, emulsin
 - (2) Maltase, zymase, emulsin
 - (3) Diastase, maltase, zymase
 - (4) Invertase, diastase, zymase

45.  can be converted to  by which of the following sequence



- (3) Both of these
(4) None of these
46. Which one of following is *more reactive* than the rest towards a mixture of anhyd. ZnCl_2 and conc. HCl ?
- (1) Butan-1-ol
 - (2) Butan-2-ol
 - (3) 2-methylpropan-2-ol
 - (4) Methanol
47. An alcohol $\text{C}_5\text{H}_{11}\text{OH}$ on dehydration gives an alkene, which on oxidation yields a mixture of a ketone and an acid. The alcohol is
- (1) $\text{CH}_3-\underset{\text{OH}}{\text{CH}}-\text{CH}_2-\text{CH}_2-\text{CH}_3$
 - (2) $\text{CH}_3-\underset{\text{CH}_3}{\text{CH}}-\underset{\text{OH}}{\text{CH}}-\text{CH}_3$
 - (3) $\text{CH}_3\text{CH}_2\text{CH}(\text{OH})\text{CH}_2\text{CH}_3$
 - (4) $(\text{CH}_3)_3\text{CCH}_2\text{OH}$.
48. Which one/ones of the following reactions will yield 2-propanol ?



- (1) I and II (2) II and III
(3) III and I (4) II and IV.
49. A Compound with molecular formula $\text{C}_4\text{H}_{10}\text{O}_3$ is converted by the action of acetyl chloride to a compound of molecular mass 190. The original compound ($\text{C}_4\text{H}_{10}\text{O}_3$) has
- (1) One OH group
 - (2) Two OH groups
 - (3) Three OH groups
 - (4) Four OH groups.
50. Ethylene glycol, when heated with anhydrous ZnCl_2 , forms
- (1) Vinyl alcohol
 - (2) Ethyl alcohol
 - (3) Acetaldehyde
 - (4) Acetic acid
51. Ethanol and methanol are miscible in water because of
- (1) their acidic characters
 - (2) Vander Waals forces of attraction
 - (3) dipole-dipole interactions
 - (4) intermolecular H-bonding
52. An unknown compound dissolves in sulphuric acid, but does not decolourise bromine-water and does not react with sodium. Which of the following classes of molecules would behave in this manner ?
- (1) Alkene
 - (2) Alcohol
 - (3) Ether
 - (4) Phenol.
53. Match list I and list II and select the correct answer by using the codes given below the lists.

List I

- (a) Absolute alcohol
 (b) Denatured alcohol
 (c) 80 proof alcoholic liquor
 (d) Rubbing alcohol

Codes :	(a)	(b)	(c)	(d)
(1)	1	3	2	4
(2)	3	1	4	2
(3)	3	1	2	4
(4)	1	3	4	2

54. Under different conditions, nitration of phenol yields

1. o-nitrophenol 2. p-nitrophenol
 3. 2,4,6-trinitrophenol

The correct sequence of decreasing order of acidic nature of these phenols is

- (1) 1,2,3 (2) 3,1,2
 (3) 2,3,1 (4) 3,2,1

55. The three products obtained in the reaction between glycerol and excess hydriodic acid would be in the order

- (1) Propene, allyl iodide and isopropyl iodide
 (2) Allyl iodide, propene and isopropyl iodide
 (3) Allyl iodide, isopropyl iodide and propene
 (4) Isopropyl iodide, allyl iodide and propene.

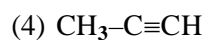
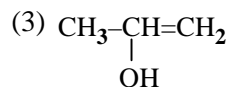
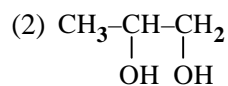
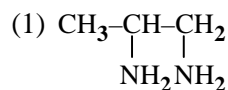
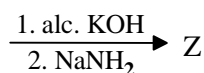
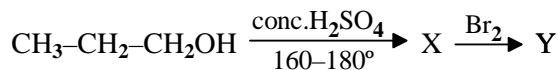
56. $Z \xrightarrow{\text{PCl}_5} X \xrightarrow{\text{alc. KOH}} Y \xrightarrow[2. \text{H}_2\text{O; boil}]{1. \text{conc. H}_2\text{SO}_4} Z$ is

- (1) $\text{CH}_3\text{-CH}_2\text{-CH}_2\text{-OH}$
 (2) $\text{CH}_3\text{-CH-CH}_3$
 |
 OH
 (3) $(\text{CH}_3\text{-CH}_2)_3\text{C-OH}$
 (4) $\text{CH}_3\text{-CH=CH}_2$

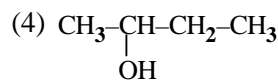
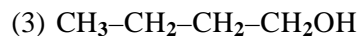
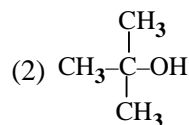
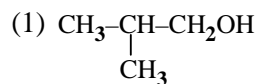
List II

1. Alcohol made undrinkable by the addition of toxic materials or poisons
 2. Alcoholic liquor containing 40% ethanol by volume
 3. Anhydrous alcohol liquor
 4. Isopropyl alcohol

57. Identify Z in the following series :



58. The compound which gives the most stable carbonium ion on dehydration is

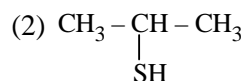
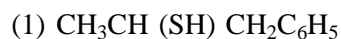


59. Which one of the following is not the characteristic of the alcohols ?

- (1) Their boiling points rise fairly with a rise in molecular weight
 (2) Lower members have a burning taste and the higher odourless and tasteless
 (3) These are lighter than water
 (4) Lower members are insoluble in polar solvents but goes on increasing with the molecular weight



Here B is



- (3) Both of these
 (4) None of these

61. The reactivity for alcohols with acids for formation of esters is
 (1) $1^\circ > 2^\circ > 3^\circ$ (2) $2^\circ > 3^\circ > 1^\circ$
 (3) $3^\circ > 2^\circ > 1^\circ$ (4) None of these
62. The most toxic of all alcohols is
 (1) C_6H_5OH (2) C_2H_5OH
 (3) C_3H_7OH (4) CH_3OH
63. When but-3-en-2-ol reacts with aq. HBr then
 (1) 3-bromo-1-butene only is formed
 (2) 1-bromo-2-butene only is formed
 (3) Both (1) and (2) are formed
 (4) 4-bromo-1-butene is formed
64. $CH_2 = CH - CH_2 - OH$ can be oxidised to acryl aldehyde using
 (1) alk. $KMnO_4$ (2) Acid $K_2Cr_2O_7$
 (3) MnO_2 (4) None of these
65.
$$\begin{array}{c} CH_2 - OH \\ | \\ CH_2 - OH \end{array} \xrightarrow{HIO_4} \text{ Gives}$$

 (1) 2 moles of $HCOOH$
 (2) 2 moles of $HCHO$
 (3) 1 mole of $HCOOH$
 (4) None of these

Assertion-Reason Type Questions (AIIMS)

Each of the questions given below consists of two statements, an assertion (A) and reason (R). Select the number corresponding to the appropriate alternative as follows

- (1) If both A and R are true and R is the correct explanation of A, then mark 1
(2) If both A and R are true but R is not the correct explanation of A, then mark 2
(3) If A is true but R is false, then mark 3
(4) If both A and R are false, then mark 4
- A. Alkyl halides are not soluble in water.
R. Although polar in nature, yet alkyl halides are not able to form H-bonds with water molecules.
 - A. Chloral is not alkyl halide.
R. Chloral molecule contains two OH groups linked to same C atom.
 - A. The reaction of vinyl chloride and hydroiodic acid produces 1-chloro-1-iodoethane.
R. HI adds on vinyl chloride against Markownikoff's rule.
 - A. Chloroform is generally stored in brown bottles which are filled to brim.
R. Chloroform reacts with glass in the presence of sunlight.
 - A. Chlorobenzene is easily hydrolysed as compared to chloroethane.
R. Carbon chlorine bond in Chlorobenzene is relatively shorter than that in Chloroethane.
 - A. Carbon tetrachloride is used as fire extinguisher.
R. Carbon tetrachloride is a non polar substance.
 - A. A yellow precipitate is formed when ethanol is refluxed with I₂ and sodium carbonate.
R. Ethanol reacts with sodium carbonate to form yellow coloured ethyl carbonate.
 - A. Tertiary haloalkanes are more reactive than 1° alkyl halides towards elimination.
R. Positive Inductive effect of alkyl groups weakens carbon halogen bond in 3° Halides.
 - A. In comparison to ethyl chloride, it is difficult to carry out nucleophilic substitution on vinyl chloride.
R. Vinyl group is electron donating group.
 - A. Last traces of moisture in EtOH can be removed by putting sodium wires in it.
R. Sodium reacts with water to produce H₂ gas.
 - A. Ethers are more soluble in water than corresponding alcohols.
R. Ethers cannot act as acids.
 - A. Triester of glycerol and palmitic acid on boiling with aqueous NaOH gives a solid cake having soapy touch.
R. Free glycerol is liberated during the reaction which is a greasy solid.
 - A. Both symmetrical as well as unsymmetrical ethers can be prepared by Williamson's synthesis.
R. Williamson's synthesis is an example of nucleophilic substitution reaction.
 - A. Etherates are the coordination complexes of ethers and Lewis acids.
R. Ethers are easily cleaved by treatment with mineral acids like HCl, H₂SO₄ at 373 K.
 - A. Alcohols on dehydration can produce ether as well as alkene under different conditions.
R. Dehydration of alcohols proceeds through the formation of carbocation.
 - A. Both ethyl acetoacetate and acetylacetone exhibit keto-enol tautomerism but the amount of enolic form is much higher in acetylacetone than in acetoacetic ester.
R. Keto group is a much better electron-withdrawing group than an ester group.
 - A. Free radical chlorination of n-butane gives 72% 2-chlorobutane and 28% 1-chlorobutane though it has six primary and four secondary hydrogens.

- R.** A secondary hydrogen is abstracted more easily than the primary hydrogen.
18. **A.** *tert*-Butyl chloride on treatment with sodium metal in dry ether gives 2, 2, 3, 3-tetramethyl butane.
R. *tert*-Alkyl halides readily undergo Wurtz reaction.
19. **A.** Benzyl chloride is more reactive than *p*-chlorotoluene towards aqueous NaOH.
R. The C—Cl bond in benzyl chloride is more polar than C—Cl bond in *p*-chlorotoluene.
20. **A.** Nucleophilic substitution reaction on an optically active alkyl halide gives a mixture of enantiomers.
R. The reaction occurs by S_N¹ mechanism.
21. **A.** Benzyl bromide when kept in acidified water produces benzyl alcohol.
R. The reaction follows S_N² mechanism.
22. **A.** Ethyl bromide reacts with alcoholic silver cyanide solution to give ethyl carbylamine as the major product alongwith a small amount of ethyl cyanide.
R. CN⁻ is an ambident nucleophile.
23. **A.** $\text{CH}_3 - \text{CH} = \text{CH}_2 \xrightarrow{\text{Cl}_2, 773\text{K}}$
 $\text{ClCH}_2 - \text{CH} = \text{CH}_2 + \text{HCl}$
R. At high temperature Cl₂ dissociates into chlorine atoms which bring about the allylic substitution.
24. **A.** CH₃CH₂OCH₂Cl reacts faster when treated with water than CH₃CH₂OCH₂CH₂Cl.
R. Carbonium ion formed by the ionization of CH₃CH₂OCH₂Cl is stabilized by resonance.
25. **A.** Tertiary haloalkanes are more reactive than primary haloalkanes towards elimination reactions.
R. The +I-effect of the alkyl groups weakens the C—X bond.

Answers of Assignment

Alkyl Halides & Aryl Halides

1. (1,3)	2. (3)	3. (2)	4. (3)	5. (2)
6. (3)	7. (2)	8. (2)	9. (1)	10. (2)
11. (3)	12. (3)	13. (2)	14. (3)	15. (2)
16. (4)	17. (4)	18. (3)	19. (3)	20. (4)
21. (4)	22. (1)	23. (1)	24. (3)	25. (3)
26. (2)	27. (1)	28. (3)	29. (2)	30. (4)
31. (4)	32. (4)	33. (1)	34. (1)	35. (1)
36. (3)	37. (4)	38. (4)	39. (3)	40. (4)
41. (2)	42. (1)	43. (2)	44. (2)	45. (2)
46. (1)	47. (3)	48. (3)	49. (1)	50. (1)
51. (2)	52. (1)	53. (2)	54. (1)	55. (2)
56. (1)	57. (2)	58. (2,3)	59. (2)	60. (4)

Functional Group-I (Alcohols, Phenols & Ethers)

1. (2)	2. (1)	3. (1)	4. (3)	5. (4)
6. (1)	7. (1)	8. (1)	9. (3)	10. (4)
11. (2)	12. (2)	13. (1)	14. (1)	15. (4)
16. (2)	17. (4)	18. (1)	19. (1)	20. (3)
21. (4)	22. (2)	23. (2)	24. (2)	25. (2)
26. (2)	27. (1)	28. (4)	29. (4)	30. (2)
31. (4)	32. (3)	33. (1)	34. (4)	35. (3)
36. (4)	37. (3)	38. (1)	39. (1)	40. (1)
41. (4)	42. (3)	43. (2)	44. (3)	45. (3)
46. (3)	47. (2)	48. (1)	49. (2)	50. (3)
51. (4)	52. (3)	53. (3)	54. (4)	55. (2)
56. (2)	57. (4)	58. (2)	59. (4)	60. (2)
61. (1)	62. (4)	63. (3)	64. (3)	65. (2)

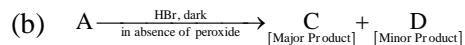
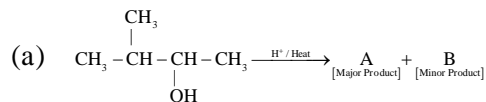
Assertion & Reason Type Questions (AIIMS)

1. (1)	2. (2)	3. (1)	4. (3)	5. (4)
6. (2)	7. (3)	8. (1)	9. (3)	10. (4)
11. (4)	12. (3)	13. (2)	14. (2)	15. (2)
16. (1)	17. (1)	18. (4)	19. (1)	20. (1)
21. (3)	22. (1)	23. (1)	24. (1)	25. (1)

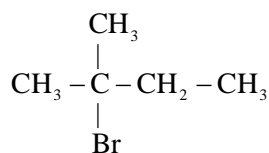
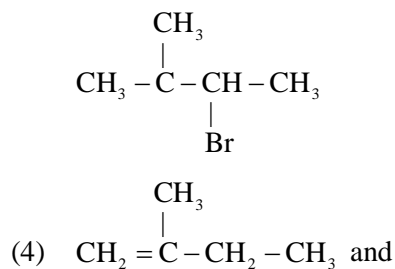
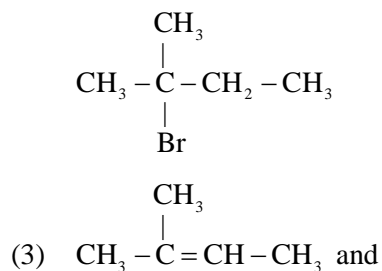
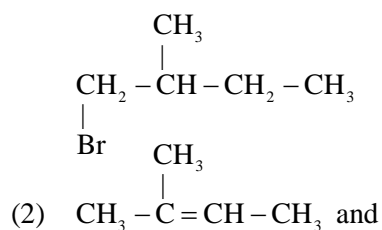
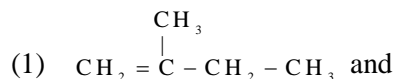
Questions from Competitive Examinations

CBSE – PMT

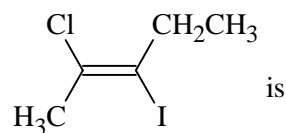
1. In the following reactions,



the major products (A) and (C) are respectively :

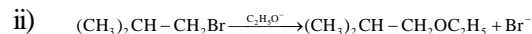
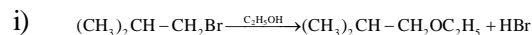


2. The IUPAC name of the following compound



- (1) cis-2-chloro-3-iodo-2-pentene
- (2) trans-2-chloro-3-iodo-2-pentene
- (3) cis-3-iodo-4-chloro-3-pentene
- (4) trans-3-iodo-4-chloro-3-pentene

3. Consider the reactions:



The mechanisms of reactions (i) and (ii) are respectively:

- (1) $\text{S}_{\text{N}}1$ and $\text{S}_{\text{N}}1$
- (2) $\text{S}_{\text{N}}1$ and $\text{S}_{\text{N}}2$
- (3) $\text{S}_{\text{N}}1$ and $\text{S}_{\text{N}}1$
- (4) $\text{S}_{\text{N}}2$ and $\text{S}_{\text{N}}2$

4. Which one is most reactive towards $\text{S}_{\text{N}}1$ reaction?

- (1) $\text{C}_6\text{H}_5\text{CH}_2\text{Br}$
- (2) $\text{C}_6\text{H}_5\text{CH}(\text{C}_6\text{H}_5)\text{Br}$
- (3) $\text{C}_6\text{H}_5\text{CH}(\text{CH}_3)\text{Br}$
- (4) $\text{C}_6\text{H}_5\text{C}(\text{CH}_3)(\text{C}_6\text{H}_5)\text{Br}$

5. Among the following four compounds

-]
- (a) phenol
 - (b) methyl phenol
 - (c) metanitrophenol
 - (d) paranitrophenol

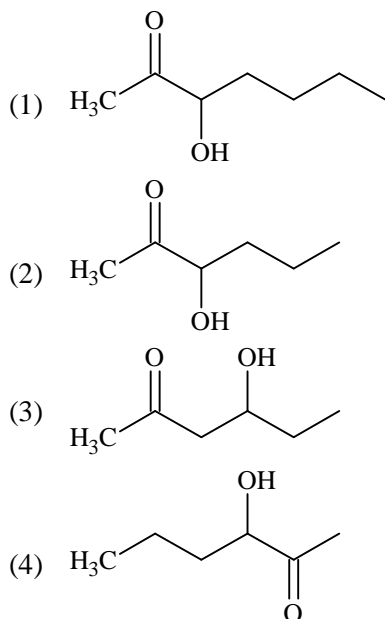
the acidity order is:

- (1) $d > c > a > b$
- (2) $c > d > a > b$
- (3) $a > d > c > b$
- (4) $b > a > c > d$

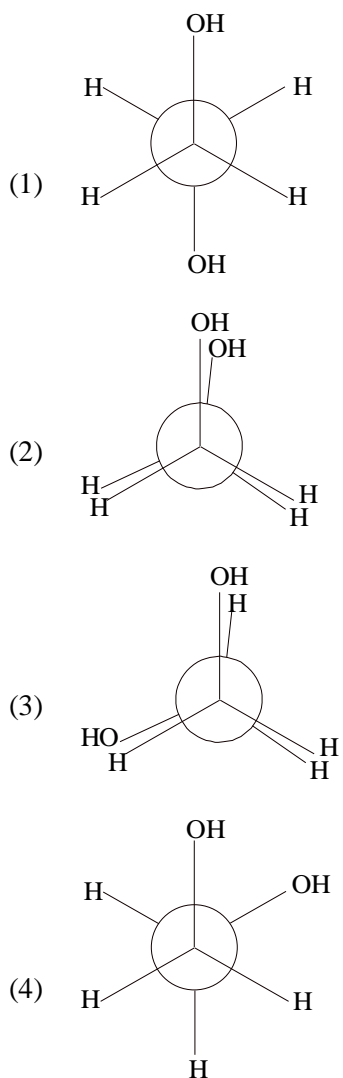
6. When glycerol is treated with excess of HI, it produces:

- (1) 2-iodopropane
- (2) allyl iodide
- (3) propene
- (4) glycerol triiodide

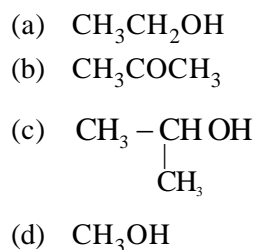
7. Which one of the following compounds will be most readily dehydrated?



8. Which of the following conformers for ethylene glycol is most stable? [CBSE 2010 Mains]



9. Following compounds are given:

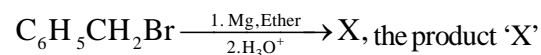


Which of the above compound(s), on being warmed with iodine solution and NaOH, will give iodoform?

Options

- (1) (a), (c) and (d) (2) only (b)
 (3) (a), (b) and (c) (4) (a) and (b)

10. In the following reaction



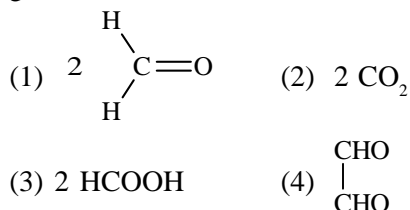
is [CBSE 2010 Mains]

- (1) $\text{C}_6\text{H}_5\text{CH}_2\text{OCH}_2\text{C}_6\text{H}_5$
 (2) $\text{C}_6\text{H}_5\text{CH}_2\text{OH}$
 (3) $\text{C}_6\text{H}_5\text{CH}_3$
 (4) $\text{C}_6\text{H}_5\text{CH}_2\text{CH}_2\text{C}_6\text{H}_5$

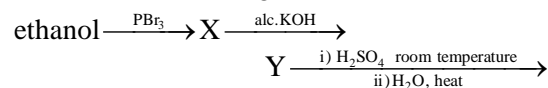
11. What is the dominant intermolecular force or bond that must be overcome in converting liquid CH_3OH to a gas?

- (1) London dispersion force
 (2) Hydrogen bonding
 (3) Dipole-dipole interaction
 (4) Covalent bonds

12. $\text{H}_2\text{COH}.\text{CH}_2\text{OH}$ on heating with periodic acid gives:



13. Consider the following reaction,



the product Z is:

- (1) $\text{CH}_3\text{CH}_2\text{OH}$
 (2) $\text{CH}_2 = \text{CH}_2$
 (3) $\text{CH}_3\text{CH}_2 - \text{O} - \text{CH}_2 - \text{CH}_3$
 (4) $\text{CH}_3 - \text{CH}_2 - \text{O} - \text{SO}_3\text{H}$

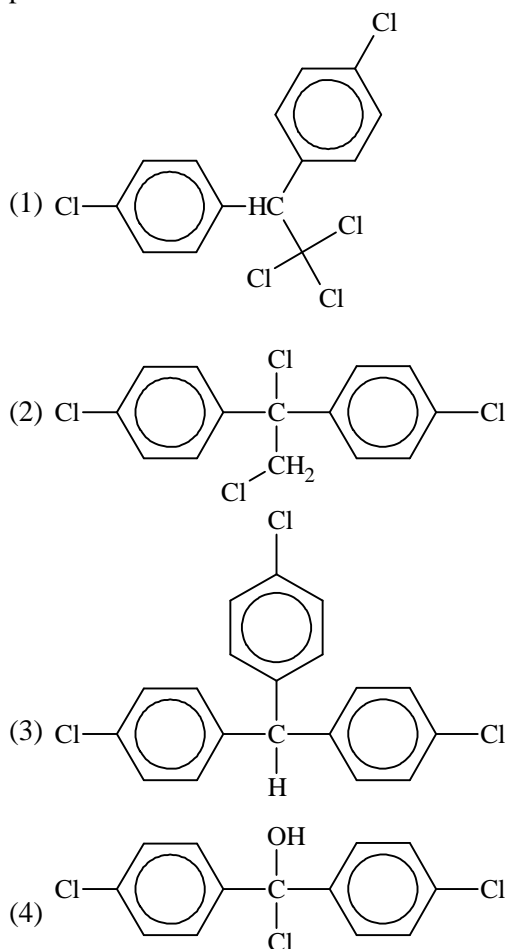
14. Benzene reacts with CH_3Cl in the presence of anhydrous AlCl_3 to form:

- (1) Xylene (2) Toluene
(3) Chlorobenzene (4) Benzylchloride

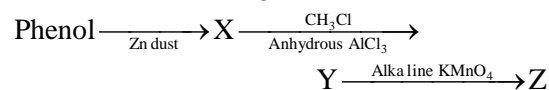
15. Which of the following reactions is an example of nucleophilic substitution reaction?

- (1) $\text{RX} + \text{Mg} \longrightarrow \text{RMgX}$
(2) $\text{RX} + \text{KOH} \longrightarrow \text{ROH} + \text{KX}$
(3) $2\text{RX} + 2\text{Na} \longrightarrow \text{R-R} + 2\text{NaX}$
(4) $\text{RX} + \text{H}_2 \longrightarrow \text{RH} + \text{HX}$

16. Trichloroacetaldehyde, CCl_3CHO reacts with chlorobenzene in presence of sulphuric acid and produces:



17. Consider the following reaction:



the product Z is:

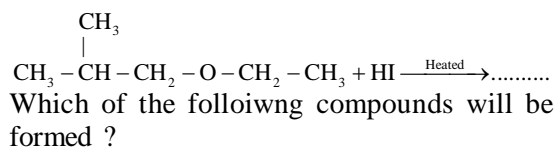
- (1) Benzene (2) Toluene
(3) Benzaldehyde (4) Benzoic acid

18. In a $\text{S}_{\text{N}}2$ substitution reaction of the type $\text{R-Br} + \text{Cl}^- \xrightarrow{\text{DMF}} \text{R-Cl} + \text{Br}^-$, which one of the following has the highest relative rate?

- (1) $\text{CH}_3 - \text{CH}_2 - \text{CH}_2\text{Br}$
(2) $\text{CH}_3 - \underset{\text{CH}_3}{\text{CH}} - \text{CH}_2\text{Br}$

- (3) $\text{CH}_3 - \underset{\text{CH}_3}{\overset{\text{CH}_3}{\text{C}}} - \text{CH}_2\text{Br}$
(4) $\text{CH}_3\text{CH}_2\text{Br}$

19. In the reaction



- (1) $\text{CH}_3 - \underset{\text{CH}_3}{\text{CH}} - \text{CH}_3 + \text{CH}_3\text{CH}_2\text{OH}$

- (2) $\text{CH}_3 - \underset{\text{CH}_3}{\text{CH}} - \text{CH}_2\text{OH} + \text{CH}_3\text{CH}_3$

- (3) $\text{CH}_3 - \underset{\text{CH}_3}{\overset{\text{CH}_3}{\text{CH}}} - \text{CH}_2\text{OH} + \text{CH}_3 - \text{CH}_2 - \text{I}$

- (4) $\text{CH}_3 - \underset{\text{CH}_3}{\text{CH}} - \text{CH}_2 - \text{I} + \text{CH}_3\text{CH}_2\text{OH}$

20. Ethylene oxide when treated with Grignard reagent yields

- (1) cyclopropyl alcohol (2) primary alcohol
(3) secondary alcohol (4) tertiary alcohol

21. The general molecular formula, which represents the homologous series of alkanols is

- (1) $\text{C}_n\text{H}_{2n+1}\text{O}$ (2) $\text{C}_n\text{H}_{2n+2}\text{O}$
(3) $\text{C}_n\text{H}_{2n}\text{O}_2$ (4) $\text{C}_n\text{H}_{2n}\text{O}$

22. The major organic product in the reaction, $\text{CH}_3 - \text{O} - \text{CH}(\text{CH}_3)_2 + \text{HI} \longrightarrow \text{Product}$ is

- (1) $\text{CH}_3\text{OC}(\text{CH}_3)_2$
I

- (2) $\text{CH}_3\text{I} + (\text{CH}_3)_2\text{CHOH}$
(3) $\text{CH}_3\text{OH} + (\text{CH}_3)_2\text{CHI}$
(4) $\text{ICH}_2\text{OCH}(\text{CH}_3)_2$

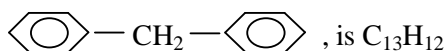
23. Which of the following undergoes nucleophilic substitution exclusively by S_N1 mechanism?

- (1) Ethyl chloride (2) Isopropyl chloride
 (3) Benzyl chloride (4) Chlorobenzene

24. Which one of the following compounds is most acidic?

- (4) CH_3CH_2Cl

29. The molecular formula of diphenyl methane,



How many structural isomers are possible when one of the hydrogens is replaced by a chlorine atom ?

- (1) 7 (2) 6
 (3) 4 (4) 8

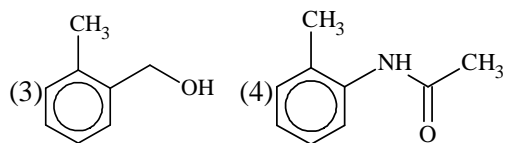
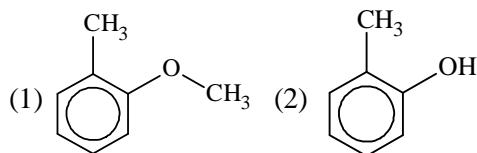
30. The reaction of toluene with Cl_2 in presence of $FeCl_3$ gives 'X' and reaction in presence of light gives 'Y'. Thus 'X' and 'Y' are

- (1) X = Benzyl chloride, Y = m-chlorotoluene
 (2) X = Benzal chloride, Y = o-chlorotoluene
 (3) X = m-chlorotoluene, Y = p-chlorotoluene
 (4) X = o- and p-chlorotoluene, Y = Trichloromethyl benzene

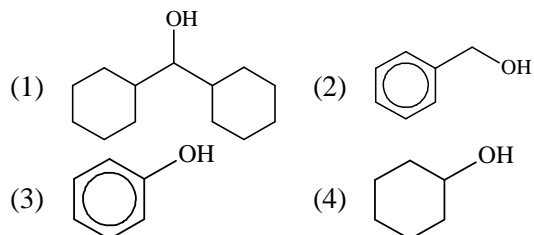
31. Which one is most reactive towards S_N1 reaction?

- (1) $C_6H_5CH_2Br$
 (2) $C_6H_5CH(C_6H_5)Br$
 (3) $C_6H_5CH(CH_3)Br$
 (4) $C_6H_5C(CH_3)(C_6H_5)Br$

32. Which one is most reactive towards electrophilic reagent?



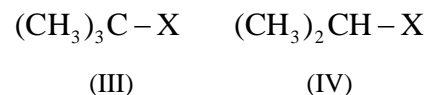
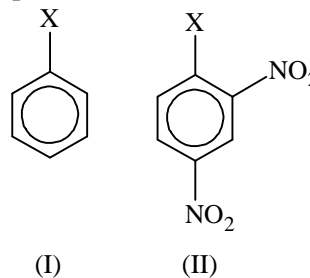
33. Which one of the following compounds has the most acidic nature?



34. Given are cyclohexanol (I), acetic acid (II), 2, 4, 6-trinitrophenol (III) and phenol (IV). In these the order of decreasing acidic character will be:

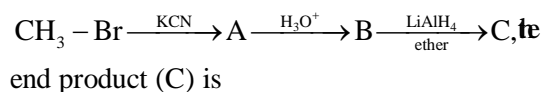
- (1) III > IV > II > I
 (2) III > II > IV > I
 (3) II > III > I > IV
 (4) II > III > IV > I

35. The correct order of increasing reactivity of C-X bond towards nucleophile in the following compounds is:



- (1) III < II < I < IV
 (2) I < II < IV < III
 (3) II < III < I < IV
 (4) IV < III < I < II

36. In the following sequence of reactions



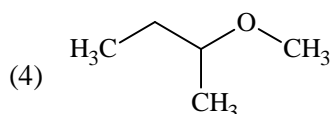
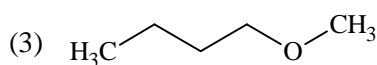
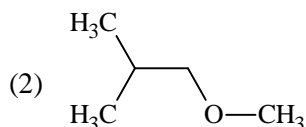
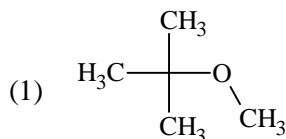
- (1) Ethyl alcohol (2) Acetone
 (3) Methane (4) Acetaldehyde

37. Which of the following compounds can be used as antifreeze in automobile radiators?

- (1) Ethyl alcohol
 (2) Methyl alcohol
 (3) Glycol
 (4) Nitrophenol

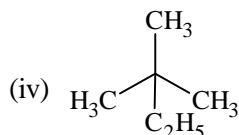
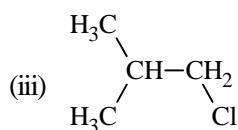
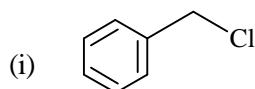
NEET

1. Among the following ethers, which one will produce methyl alcohol on treatment with hot concentrated HI?



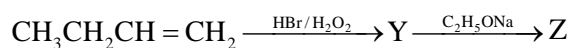
NEET

1. Which of the following compounds will undergo racemisation when solution of KOH hydrolysis?

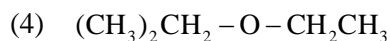
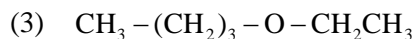


- (1) (iii) and (iv) (2) (i) and (iv)
 (3) (i) and (iii) (4) (ii) and (iv)

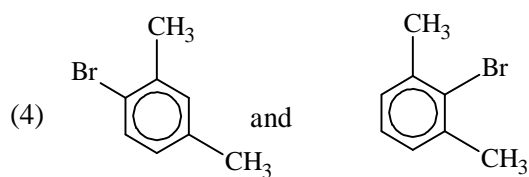
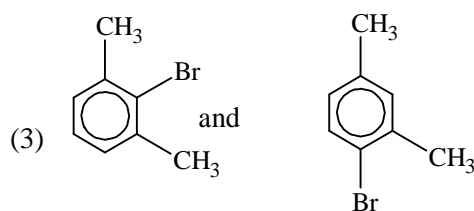
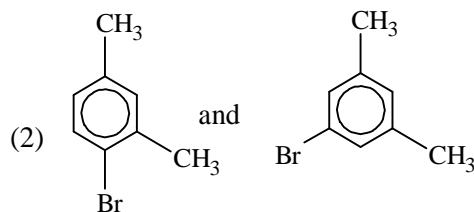
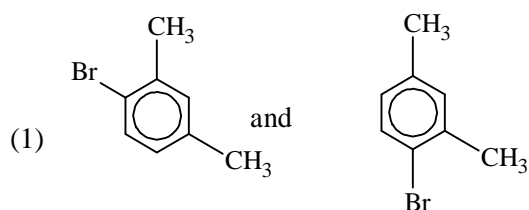
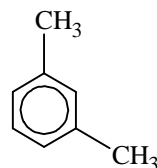
2. Identify Z in the sequence of reactions:



- (1) $\text{CH}_3(\text{CH}_2)_4-\text{O}-\text{CH}_3$
 (2) $\text{CH}_3\text{CH}_2-\text{CH}(\text{CH}_3)-\text{O}-\text{CH}_2\text{CH}_3$



3. What products are formed when the following compound is treated with Br_2 in the presence of FeBr_3 ?

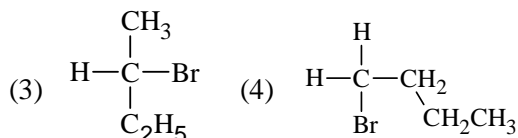
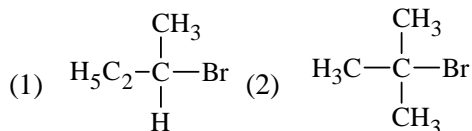


4. Among the following sets of reactants which one produces anisole?

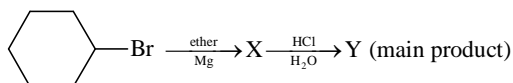
- (1) $\text{C}_6\text{H}_5\text{OH}$; neutral FeCl_3
 (2) $\text{C}_6\text{H}_5-\text{CH}_3$; CH_3COCl ; AlCl_3
 (3) CH_3CHO ; RMgX
 (4) $\text{C}_6\text{H}_5\text{OH}$; NaOH ; CH_3I

DPMT

1. Which will undergo fastest S_N2 substitution reaction when treated with NaOH?



2. Given reaction

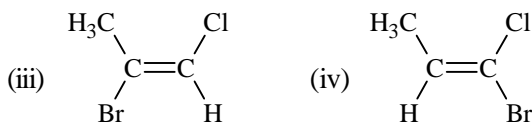
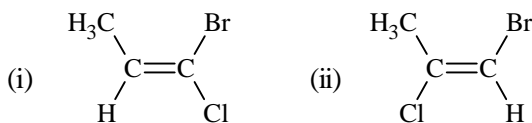


'Y' in the reaction is

- (1) Hexane
 (2) Cyclohexane
 (3) Cyclohexylcyclohexane
 (4) Cyclohexylether
3. The correct decreasing order of dipole moment in CH_3Cl , CH_3Br and CH_3F is:
- (1) $\text{CH}_3\text{F} > \text{CH}_3\text{Cl} > \text{CH}_3\text{Br}$
 (2) $\text{CH}_3\text{F} > \text{CH}_3\text{Br} > \text{CH}_3\text{Cl}$
 (3) $\text{CH}_3\text{Cl} > \text{CH}_3\text{F} > \text{CH}_3\text{Br}$
 (4) $\text{CH}_3\text{Cl} > \text{CH}_3\text{Br} > \text{CH}_3\text{F}$
4. The order of rate of hydrolysis of alkyl halides 1° , 2° , 3° and CH_3X by the S_N2 pathway is

- (1) $1^\circ > 2^\circ > 3^\circ > \text{CH}_3\text{X}$
 (2) $\text{CH}_3\text{X} > 3^\circ > 2^\circ > 1^\circ$
 (3) $\text{CH}_3\text{X} > 1^\circ > 2^\circ > 3^\circ$
 (4) $3^\circ > 2^\circ > 1^\circ > \text{CH}_3\text{X}$

5. Which of the following is a pair of geometric isomers?



- (1) (i) and (ii) (2) (i) and (iii)

- (3) (i) and (iv) (4) (ii) and (iii)

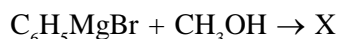
6. How many chiral stereoisomers can be drawn for 2-bromo-3-chlorobutane?

- (1) 2 (2) 3
 (3) 4 (4) 5

7. When acetyl chloride reacts with sodium propionate, the product formed is

- (1) acetic anhydride
 (2) acetic propionic anhydride
 (3) n-propyl acetate
 (4) pent-2, 4-dione

8. In the reaction below, X is



- (1) C_6H_6 (2) $\text{C}_6\text{H}_5\text{OH}$
 (3) $\text{C}_6\text{H}_5\text{OCH}_3$ (4) CH_3COOH

9. Which of the following reactions involves carbon-carbon bond formation?

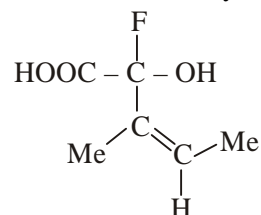
- (1) Reimer-Tiemann reaction
 (2) Hydroboration oxidation
 (3) Cannizzaro reaction
 (4) Reaction of primary alcohols with PCC

10. In the reaction below, X is]



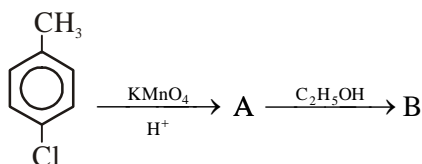
- (1) 2-methylpentane
 (2) 2-methyl pent-2-ene
 (3) 2-methyl but-2-ene
 (4) neopentane

11. The configuration of the chiral centre and the geometry of the double bond in the following molecule can be described by



- (1) R and E (2) S and E

- (3) R and Z (4) S and Z
12. Chlorobenzene is?..... reactive than benzene towards electrophilic substitution and directs the incoming electrophile to the?.....position.
- (1) more, ortho/para (2) less, ortho/para
(3) more, meta (4) less, meta
13. Identify B in the following reaction

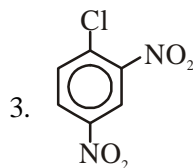
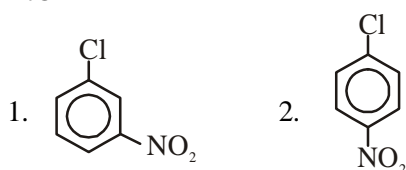


- (1)
- (2)
- (3)
- (4) none of these

14. Number of isomers for molecular formula $C_6H_5Cl_3$ will be
- (1) 3 (2) 2
(3) 1 (4) 5

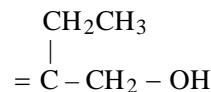
15. IUPAC name of $C=C-C-C-C-C$ is
- $\begin{array}{ccccccc} & & & \text{Me} & & & \\ & & & | & & & \\ & & & \text{C} & - & \text{C} & - & \text{C} & - & \text{C} \\ & & & | & & | & & & & \\ & & & \text{eth} & & \text{OH} & & & & \end{array}$

- (1) 3-ethyl-4-methylhex-5-en-2-ol
(2) 3-ethyl-4-methylhex-1-en-2-ol
(3) 4-ethyl-3-methylhex-2-ol-5-en
(4) 4-ethyl-3-methylhex-5-en-2-ol
16. Reactivity order of following towards NaOEt, EtOH



- (1) $3 > 2 > 1$ (2) $2 > 1 > 3$
(3) $1 > 2 > 3$ (4) $3 > 1 > 2$
17. Phosgene is a poisonous gas obtained in chloroform bottles substance used to make it non-poisonous is
- (1) Formic Acid (2) Ethanol
(3) Dichloro Methane (4) CH_3COOH
18. $C_6H_9Br \xrightarrow[(CH_3)_3COH]{(CH_3)_3CO^-K^+} X$
 $\xrightarrow{CH_2=CHCOCH_3} B$ conversion of X to B is
- (1) Claisen reaction
(2) Perkin reaction
(3) Diels-Alder reaction
(4) Mannich reaction

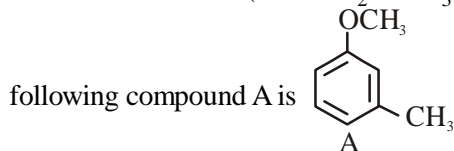
19. IUPAC name of $Cl - CH_2 - HC$

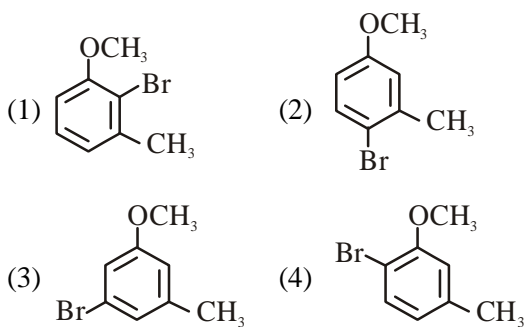


- (1) 1-chloro 2-ethyl-4-hydroxy but-2-ene
(2) 4-hydroxy-1-chloro 2-ethyl but-2-ene
(3) 4-chloro 2-ethyl but-2-en-1-ol
(4) 2-ethyl. 4-chloro but-2-en-1-ol
20. Order of boiling point]
- (1) $HF > HI > HBr > HCl$
(2) $HF > HBr > HI > HCl$
(3) $HCl > HBr > HI > HF$
(4) $HCl > HI > HBr > HF$

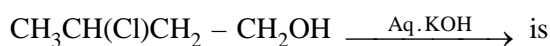
AIIMS

1. Isopropylbenzene on air oxidation in the presence of dilute acid gives
- (1) C_6H_5COOH (2) $C_6H_5COCH_3$
(3) C_6H_5CHO (4) C_6H_5OH
2. The major product obtained on the monobromination (with $Br_2/FeBr_3$) of the





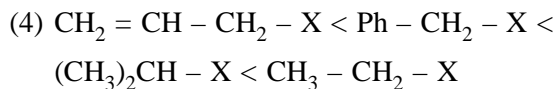
3. The major product formed in the following reaction



- (1) $\text{CH}_3\text{CH} = \text{CH} - \text{CH}_2\text{OH}$
- (2) $\text{CH}_2 = \text{CH} - \text{CH}_2 - \text{CH}_2\text{OH}$
- (3)
$$\begin{array}{c} \text{CH}_3 - \text{CH} - \text{CH}_2 \\ | \quad | \\ \text{O} - \text{CH}_2 \end{array}$$
- (4)
$$\begin{array}{c} \text{CH}_3 - \text{CH} - \text{CH}_2 - \text{CH}_2\text{OH} \\ | \\ \text{OH} \end{array}$$
4. Which of the following compounds has the highest boiling point?
- (1) $\text{CH}_3\text{CH}_2\text{CH}_2\text{Cl}$
- (2) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{Cl}$
- (3) $\text{CH}_3\text{CH}(\text{CH}_3)\text{CH}_2\text{Cl}$
- (4) $(\text{CH}_3)_3\text{CCl}$
5. The correct increasing order of the reactivity of halides for $\text{S}_{\text{N}}1$ reaction is

[AIIMS 2006]

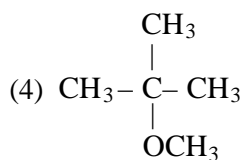
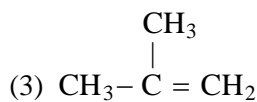
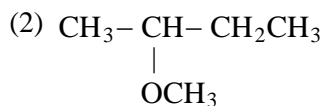
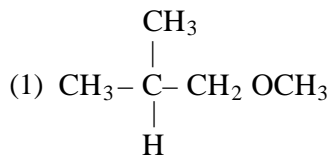
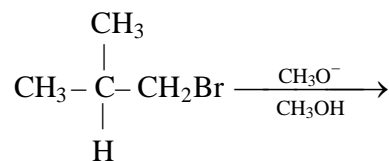
- (1) $\text{CH}_3 - \text{CH}_2 - \text{X} < (\text{CH}_3)_2\text{CH} - \text{X} < \text{CH}_2 = \text{CH} - \text{CH}_2 - \text{X} < \text{PhCH}_2 - \text{X}$
- (2) $(\text{CH}_3)_2\text{CH} - \text{X} < \text{CH}_3 - \text{CH}_2 - \text{X} < \text{CH}_2 = \text{CH} - \text{CH}_2\text{X} < \text{PhCH}_2 - \text{X}$
- (3) $\text{PhCH}_2 - \text{X} < (\text{CH}_3)_2\text{CH} - \text{X} < \text{CH}_3 - \text{CH}_2 - \text{X} < \text{CH}_2 = \text{CH} - \text{CH}_2 - \text{X}$



6. 3-Phenylpropene on reaction with HBr gives (as a major product):

- (1) $\text{C}_6\text{H}_5\text{CH}_2\text{CH}(\text{Br})\text{CH}_3$
- (2) $\text{C}_6\text{H}_5\text{CH}(\text{Br})\text{CH}_2\text{CH}_3$
- (3) $\text{C}_6\text{H}_5\text{CH}_2\text{CH}_2\text{CH}_2\text{Br}$
- (4) $\text{C}_6\text{H}_5\text{CH}(\text{Br})\text{CH} = \text{CH}_2$

7. The major product formed in the following reaction



8. The major product obtained on treatment of $\text{CH}_3\text{CH}_2\text{CH}(\text{F})\text{CH}_3$ with $\text{CH}_3\text{O}^-/\text{CH}_3\text{OH}$ is

- (1) $\text{CH}_3\text{CH}_2\text{CH}(\text{OCH}_3)\text{CH}_3$
- (2) $\text{CH}_3\text{CH} = \text{CHCH}_3$
- (3) $\text{CH}_3\text{CH}_2\text{CH} = \text{CH}_2$
- (4) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OCH}_3$

9. Among the following most stable compound is

- (1) *cis*-1, 2-cyclohexanediol

- (2) *trans*-1, 2-cyclohexanediol
- (3) *cis*- 1, 3-cyclohexenediol
- (4) *trans*-1, 2-cyclohexanediol

ANSWERS :
QUESTIONS FROM COMPETITIVE EXAMS

CBSE

- | | | | | |
|---------|---------|---------|---------|---------|
| 1. (2) | 2. (2) | 3. (4) | 4. (4) | 5. (1) |
| 6. (1) | 7. (3) | 8. (4) | 9. (3) | 10. (3) |
| 11. (2) | 12. (1) | 13. (1) | 14. (2) | 15. (2) |
| 16. (1) | 17. (4) | 18. (4) | 19. (3) | 20. (2) |
| 21. (2) | 22. (2) | 23. (3) | 24. (1) | 25. (1) |
| 26. (2) | 27. (1) | 28. (3) | 29. (3) | 30. (4) |
| 31. (4) | 32. (2) | 33. (3) | 34. (2) | 35. (2) |
| 36. (1) | 37. (3) | | | |

NEET

1. (1)

NEET

- | | | | |
|--------|--------|--------|--------|
| 1. (3) | 2. (3) | 3. (1) | 4. (4) |
|--------|--------|--------|--------|

DPMT

- | | | | | |
|---------|---------|---------|---------|---------|
| 1. (4) | 2. (2) | 3. (3) | 4. (3) | 5. (3) |
| 6. (3) | 7. (2) | 8. (1) | 9. (1) | 10. (3) |
| 11. (3) | 12. (2) | 13. (3) | 14. (1) | 15. (4) |
| 16. (1) | 17. (2) | 18. (3) | 19. (3) | 20. (1) |

AIIMS

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|--------|--------|--------|--------|--------|
| 1. (4) | 2. (2) | 3. (4) | 4. (2) | 5. (1) |
| 6. (2) | 7. (3) | 8. (3) | 9. (1) | |