

Alcohols, Phenols and Ethers

1. The major product obtained on interaction of phenol with sodium hydroxide and carbon dioxide is:

[AIEEE-2009]

- (1) Salicylaldehyde (2) Salicylic acid
(3) Phthalic acid (4) Benzoic acid

2. From amongst the following alcohols the one that would react fastest with conc. HCl and anhydrous ZnCl_2 , is

[AIEEE-2010]

- (1) 1-Butanol (2) 2-Butanol
(3) 2-Methylpropan-2-ol (4) 2-Methylpropanol

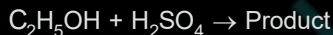
3. The correct order of acid strength of the following compounds is

[AIEEE-2011]

- A. Phenol
B. p-Cresol
C. m-Nitrophenol
D. p-Nitrophenol

- (1) $A > B > D > C$ (2) $C > B > A > D$
(3) $D > C > A > B$ (4) $B > D > A > C$

4. Consider the following reaction

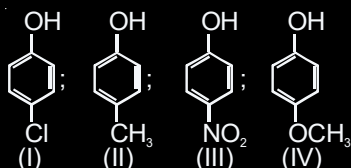


Among the following, which one cannot be formed as a product under any conditions? [AIEEE-2011]

- (1) Diethyl ether
(2) Ethyl-hydrogen sulphate
(3) Ethylene
(4) Acetylene

5. Arrange the following compounds in order of decreasing acidity

[JEE (Main)-2013]



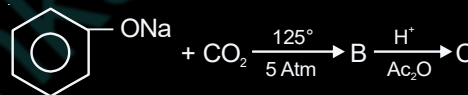
- (1) $\text{II} > \text{IV} > \text{I} > \text{III}$ (2) $\text{I} > \text{II} > \text{III} > \text{IV}$
(3) $\text{III} > \text{I} > \text{II} > \text{IV}$ (4) $\text{IV} > \text{III} > \text{I} > \text{II}$

6. An unknown alcohol is treated with the "Lucas reagent" to determine whether the alcohol is primary, secondary or tertiary. Which alcohol reacts fastest and by what mechanism?

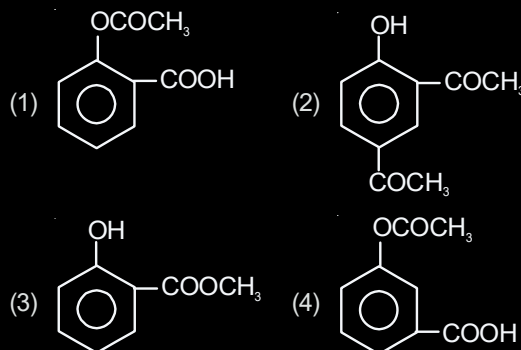
[JEE (Main)-2013]

- (1) Secondary alcohol by $\text{S}_{\text{N}}1$
(2) Tertiary alcohol by $\text{S}_{\text{N}}1$
(3) Secondary alcohol by $\text{S}_{\text{N}}2$
(4) Tertiary alcohol by $\text{S}_{\text{N}}2$

7. Sodium phenoxide when heated with CO_2 under pressure at 125°C yields a product which on acetylation produces C.

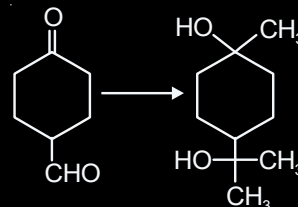


The major product C would be [JEE (Main)-2014]



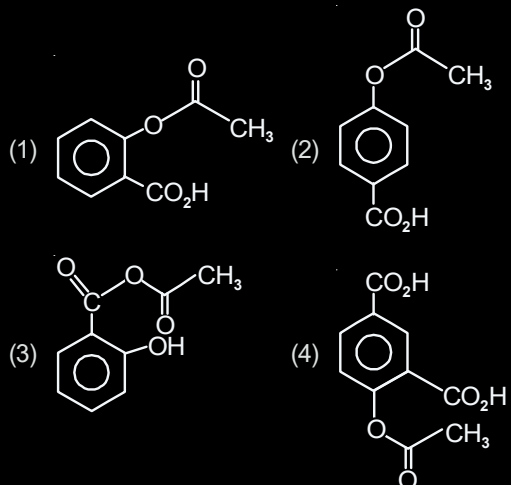
8. The correct sequence of reagents for the following conversion will be

[JEE (Main)-2017]

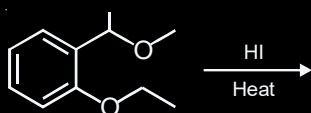


- (1) CH_3MgBr , $[\text{Ag}(\text{NH}_3)_2]^+\text{OH}^-$, $\text{H}^+/\text{CH}_3\text{OH}$
(2) $[\text{Ag}(\text{NH}_3)_2]^+\text{OH}^-$, CH_3MgBr , $\text{H}^+/\text{CH}_3\text{OH}$
(3) $[\text{Ag}(\text{NH}_3)_2]^+\text{OH}^-$, $\text{H}^+/\text{CH}_3\text{OH}$, CH_3MgBr
(4) CH_3MgBr , $\text{H}^+/\text{CH}_3\text{OH}$, $[\text{Ag}(\text{NH}_3)_2]^+\text{OH}^-$

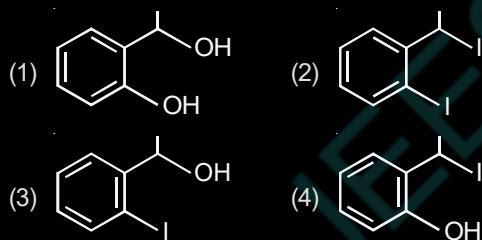
9. Phenol on treatment with CO_2 in the presence of NaOH followed by acidification produces compound X as the major product. X on treatment with $(\text{CH}_3\text{CO})_2\text{O}$ in the presence of catalytic amount of H_2SO_4 produces



10. The major product formed in the following reaction is

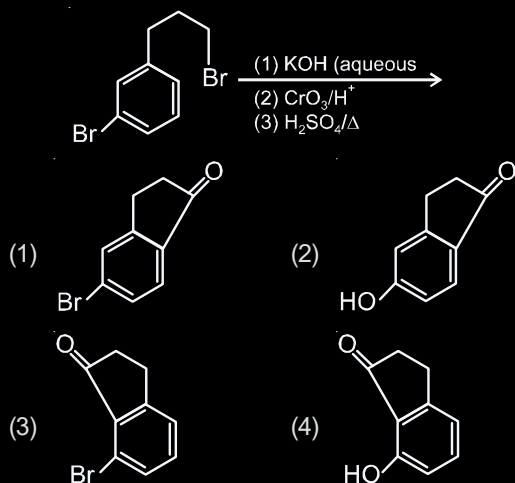


[JEE (Main)-2018]



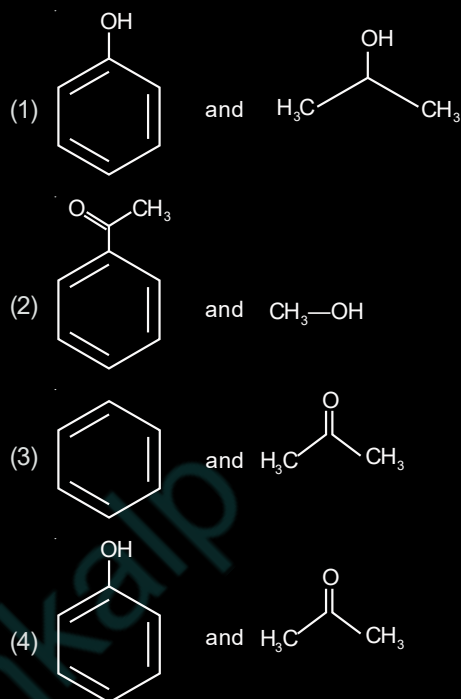
11. The major product of the following reaction is

[JEE (Main)-2019]



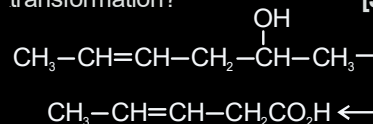
12. The products formed in the reaction of cumene with O_2 followed by treatment with dil. HCl are

[JEE (Main)-2019]



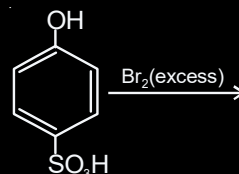
13. Which is the most suitable reagent for the following transformation?

[JEE (Main)-2019]

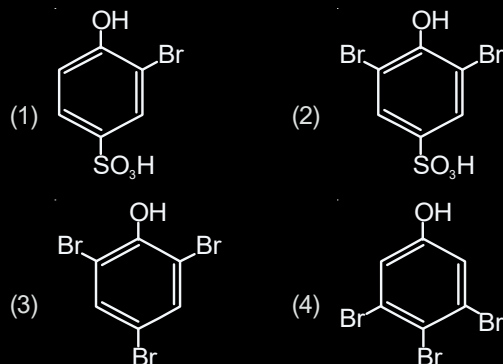


- (1) I_2/NaOH (2) Alkaline KMnO_4
 (3) Tollen's reagent (4) $\text{CrO}_2\text{Cl}_2/\text{CS}_2$

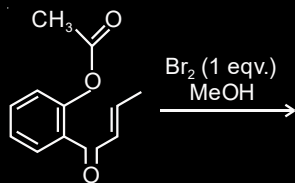
14. The major product of the following reaction is



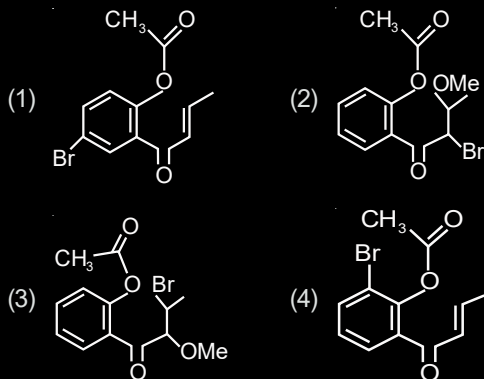
[JEE (Main)-2019]



15. The major product obtained in the following conversion is



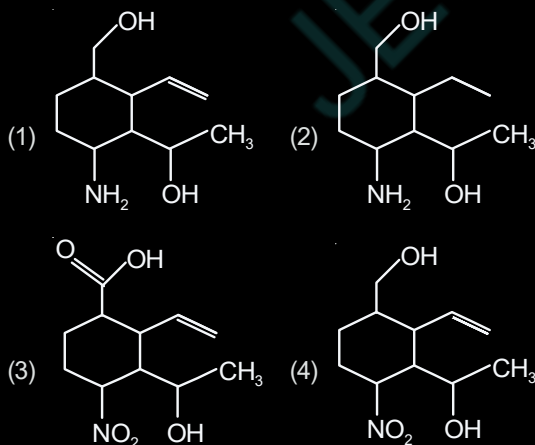
[JEE (Main)-2019]



16. The major product obtained in the following reaction is



[JEE (Main)-2019]

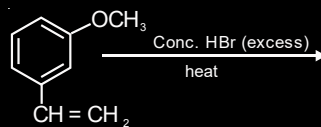


17. $\text{CH}_3\text{CH}_2 - \text{C}(\text{OH})(\text{Ph}) - \text{CH}_3$ cannot be prepared by

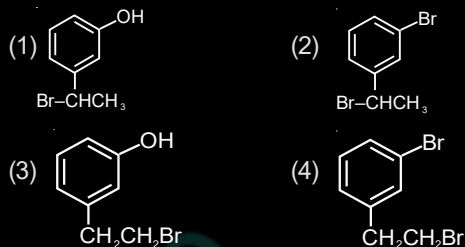
[JEE (Main)-2019]

- (1) $\text{PhCOCH}_2\text{CH}_3 + \text{CH}_3\text{MgX}$
 (2) $\text{CH}_3\text{CH}_2\text{COCH}_3 + \text{PhMgX}$
 (3) $\text{HCHO} + \text{PhCH}(\text{CH}_3)\text{CH}_2\text{MgX}$
 (4) $\text{PhCOCH}_3 + \text{CH}_3\text{CH}_2\text{MgX}$

18. The major product of the following reaction is



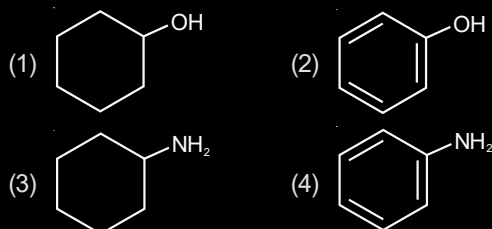
[JEE (Main)-2019]



19. The organic compound that gives following qualitative analysis is

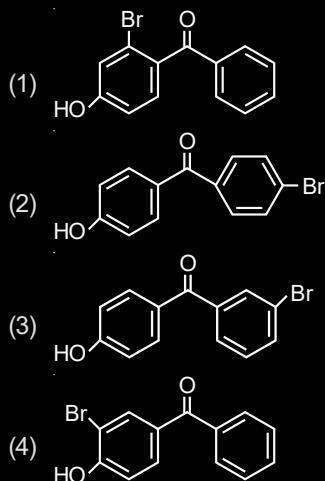
Test	Inference
(a) Dil. HCl	Insoluble
(b) NaOH solution	Soluble
(c) Br_2/water	Decolourization

[JEE (Main)-2019]

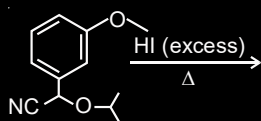


20. p-Hydroxybenzophenone upon reaction with bromine in carbon tetrachloride gives

[JEE (Main)-2019]



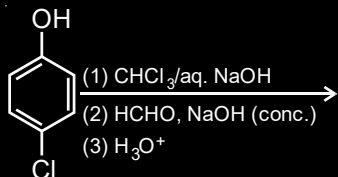
21. The major product of the following reaction is :



[JEE (Main)-2019]

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

22. The major products of the following reaction are :



[JEE (Main)-2019]

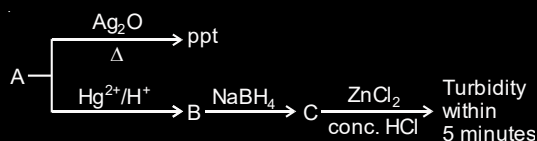
- (1) and Methanol
(2) and Formic acid
(3) and Formic acid
(4) and Methanol

23. What will be the major product when m-cresol is reacted with propargyl bromide ($\text{HC} \equiv \text{C}-\text{CH}_2\text{Br}$) in presence of K_2CO_3 in acetone?

[JEE (Main)-2019]

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

24. Consider the following reactions :

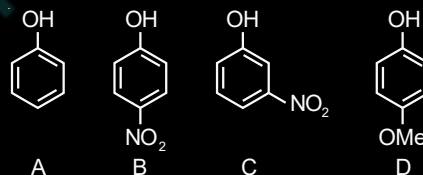


'A' is

[JEE (Main)-2019]

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

25. The increasing order of the pK_a values of the following compounds is



[JEE (Main)-2019]

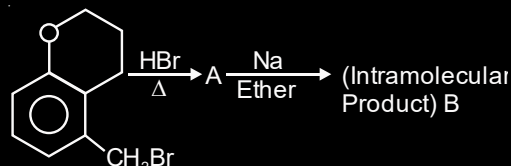
- (1) $\text{D} < \text{A} < \text{C} < \text{B}$ (2) $\text{B} < \text{C} < \text{D} < \text{A}$
(3) $\text{B} < \text{C} < \text{A} < \text{D}$ (4) $\text{C} < \text{B} < \text{A} < \text{D}$

26. 1-methylethylene oxide when treated with an excess of HBr produces:

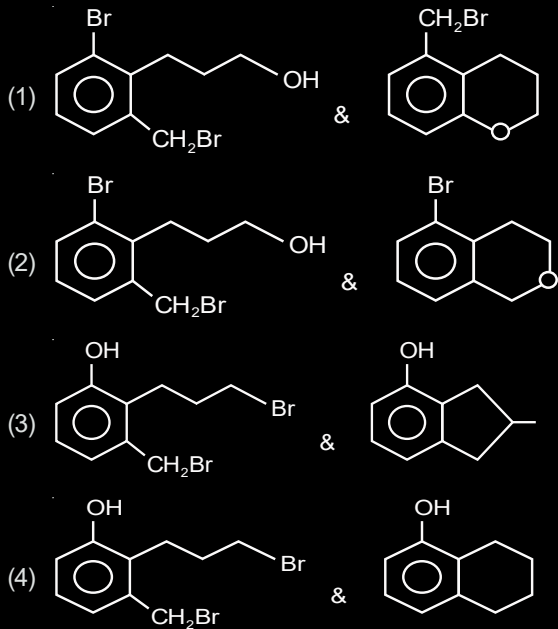
[JEE (Main)-2020]

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

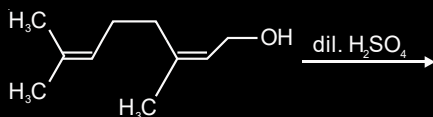
27. In the following reaction sequence, structures of A and B, respectively will be



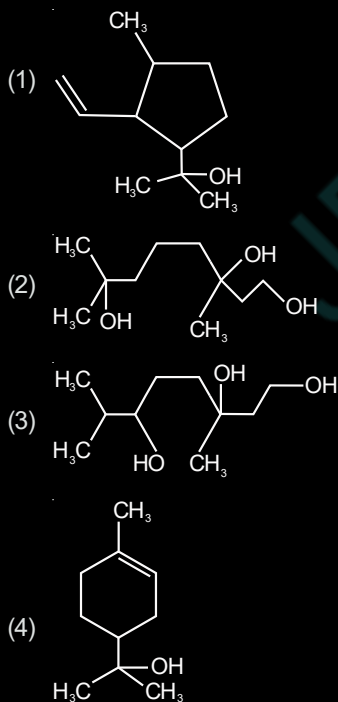
[JEE (Main)-2020]



28. The major product of the following reaction is

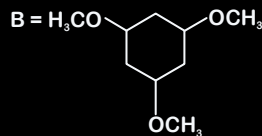
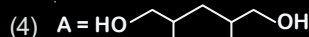
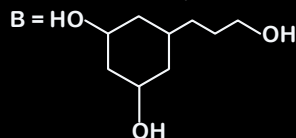
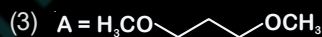
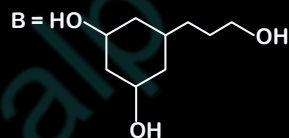
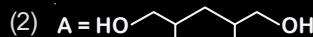
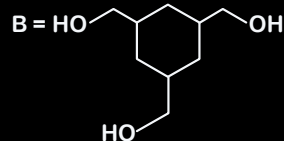
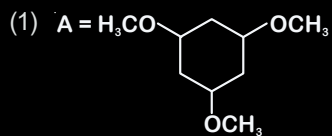


[JEE (Main)-2020]

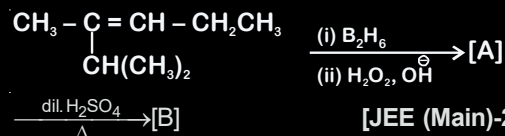


29. Among the compounds A and B with molecular formula $\text{C}_9\text{H}_{18}\text{O}_3$, A is having higher boiling point than B. The possible structures of A and B are

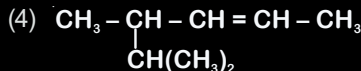
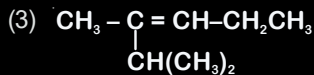
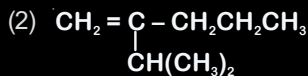
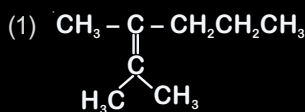
[JEE (Main)-2020]



30. The major product [B] in the following sequence of reactions is



[JEE (Main)-2020]

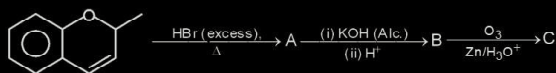


31. Preparation of Bakelite proceeds via reactions

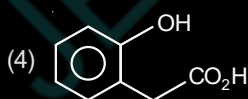
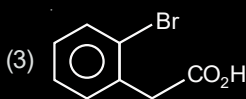
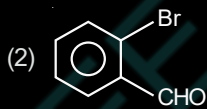
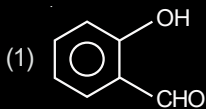
[JEE (Main)-2020]

- (1) Electrophilic substitution and dehydration
- (2) Electrophilic addition and dehydration
- (3) Nucleophilic addition and dehydration
- (4) Condensation and elimination

32. The major aromatic product C in the following reaction sequence will be



[JEE (Main)-2020]

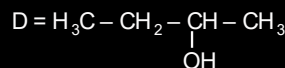
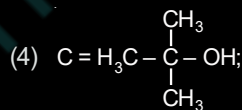
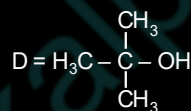
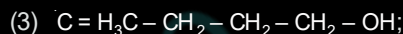
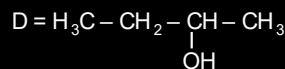
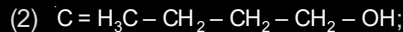
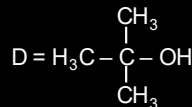
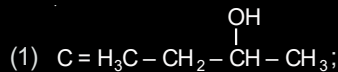


33. Two compounds A and B with same molecular formula ($\text{C}_3\text{H}_8\text{O}$) undergo Grignard's reaction with methylmagnesium bromide to give products C and D. Products C and D show following chemical tests.

Test	C	D
Ceric ammonium nitrate Test	Positive	Positive
Lucas Test	Turbidity obtained after five minutes	Turbidity obtained immediately
Iodoform Test	Positive	Negative

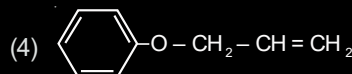
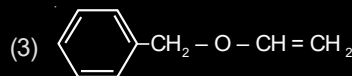
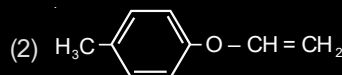
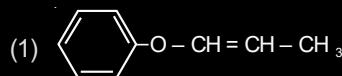
C and D respectively are

[JEE (Main)-2020]

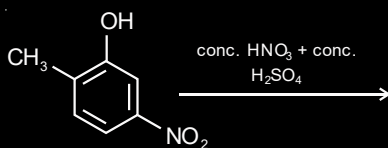


34. An organic compound 'A' ($\text{C}_9\text{H}_{10}\text{O}$) when treated with conc. HI undergoes cleavage to yield compounds 'B' and 'C'. 'B' gives yellow precipitate with AgNO_3 where as 'C' tautomerizes to 'D'. 'D' gives positive iodoform test. 'A' could be

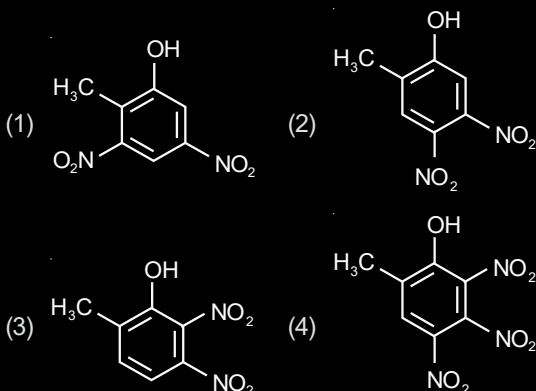
[JEE (Main)-2020]



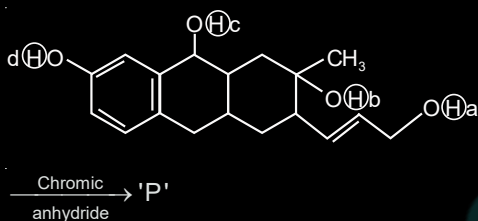
35. The major product of the following reaction is:



[JEE (Main)-2020]



36. Consider the following reaction :

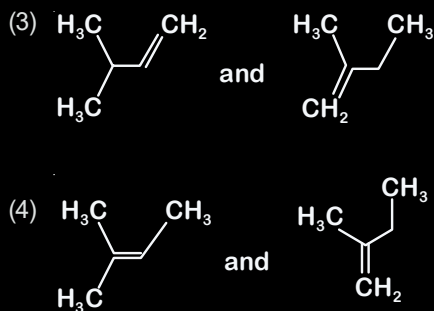
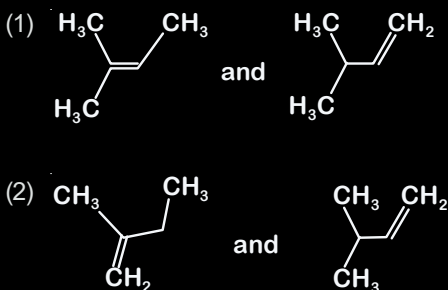


The product 'P' gives positive ceric ammonium nitrate test. This is because of the presence of which of these $-\text{OH}$ group(s)? [JEE (Main)-2020]

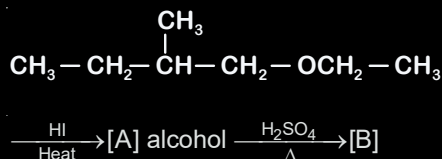
- (1) (d) only
- (2) (c) and (d)
- (3) (b) only
- (4) (b) and (d)

37. When neopentyl alcohol is heated with an acid, it slowly converted into an 85 : 15 mixture of alkenes A and B, respectively. What are these alkenes?

[JEE (Main)-2020]



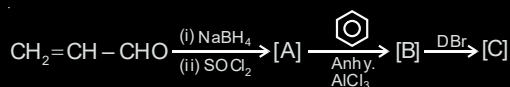
38. The major product [B] in the following reactions is



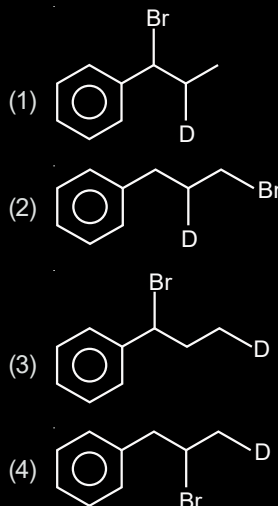
[JEE (Main)-2020]

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

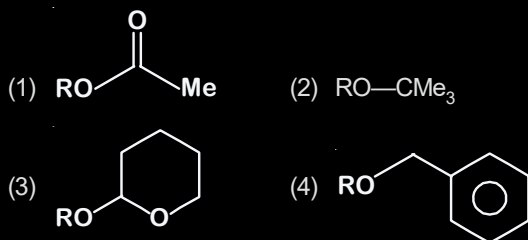
39. The major product [C] of the following reaction sequence will be



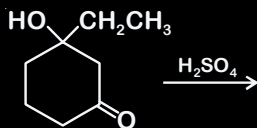
[JEE (Main)-2020]



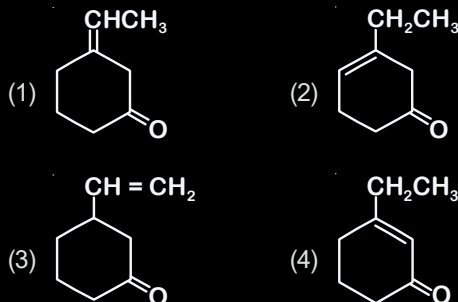
40. Which of the following derivatives of alcohols is unstable in an aqueous base? [JEE (Main)-2020]



41. The major product of the following reaction is



[JEE (Main)-2020]

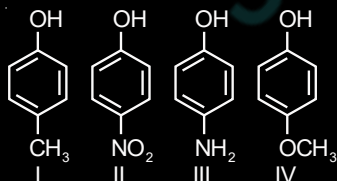


42. A solution of phenol in chloroform when treated with aqueous NaOH gives compound P as a major product. The mass percentage of carbon in P is _____ (to the nearest integer)

(Atomic mass : C = 12; H = 1; O = 16)

[JEE (Main)-2020]

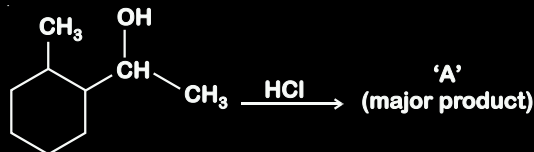
43. The increasing order of boiling points of the following compounds is



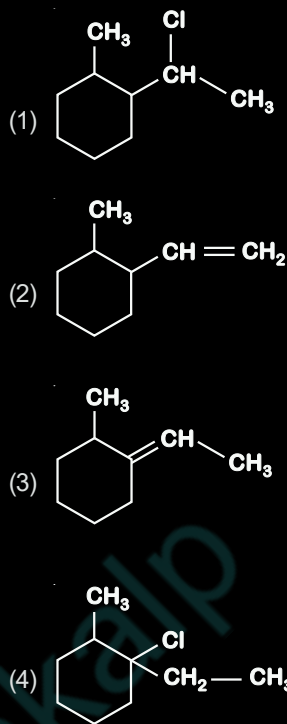
[JEE (Main)-2020]

- (1) $\text{III} < \text{I} < \text{II} < \text{IV}$ (2) $\text{IV} < \text{I} < \text{II} < \text{III}$
- (3) $\text{I} < \text{III} < \text{IV} < \text{II}$ (4) $\text{I} < \text{IV} < \text{III} < \text{II}$

44. What is the final product (major) 'A' in the given reaction?



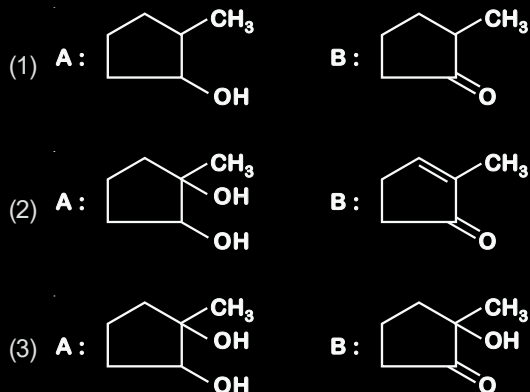
[JEE (Main)-2021]



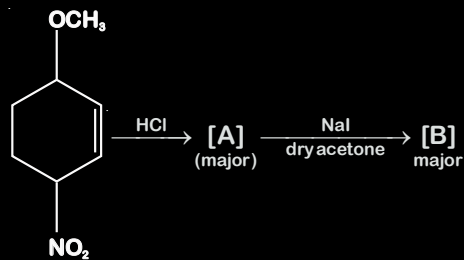
45. Identify Products A and B.



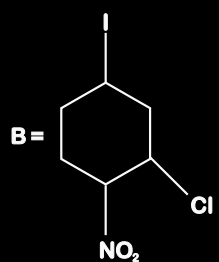
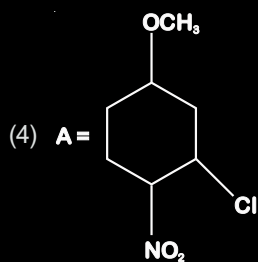
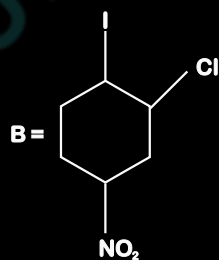
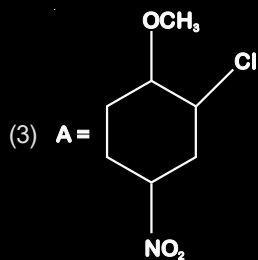
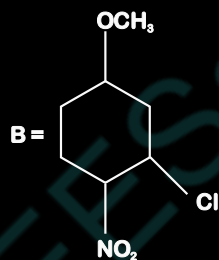
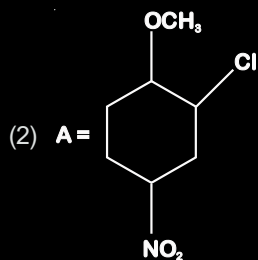
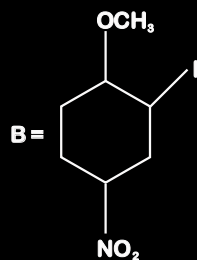
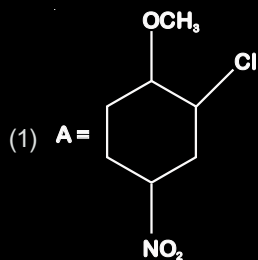
[JEE (Main)-2021]



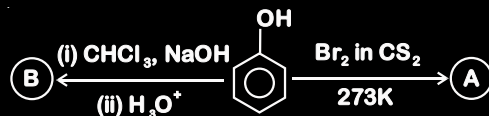
46. Identify A and B in the chemical reaction.



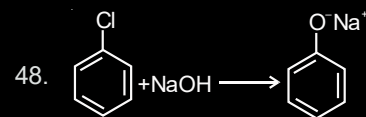
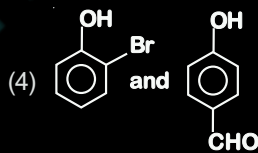
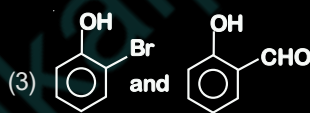
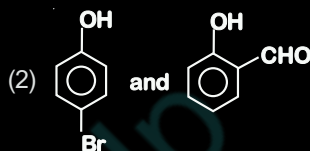
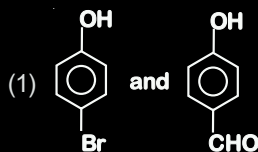
[JEE (Main)-2021]



47. Identify the major products A and B respectively in the following reactions of phenol:



[JEE (Main)-2021]

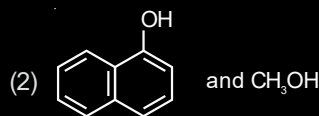
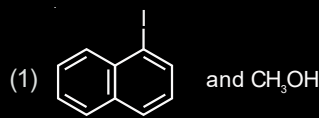


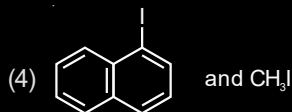
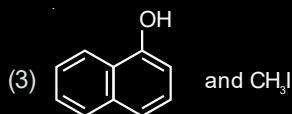
The above reaction requires which of the following reaction conditions? [JEE (Main)-2021]

- (1) 573 K, 300 atm (2) 623 K, Cu, 300 atm
(3) 573 K, Cu, 300 atm (4) 623 K, 300 atm

49. Main Products formed during a reaction of 1-methoxy naphthalene with hydroiodic acid are :

[JEE (Main)-2021]



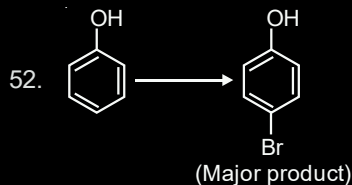
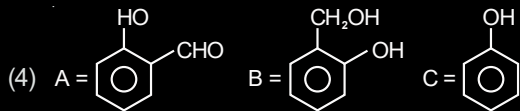
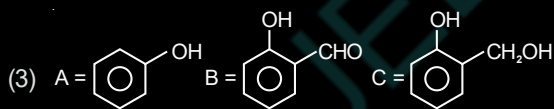
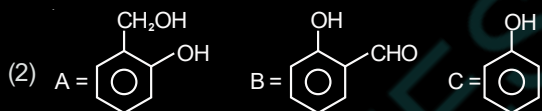
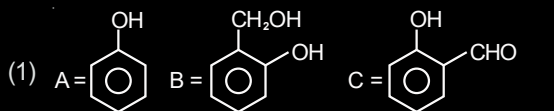


50. To synthesise 1.0 mole of 2-methylpropan-2-ol from Ethylethanoate _____ equivalents of CH_3MgBr reagent will be required. (Integer value)

[JEE (Main)-2021]

51. An organic compound A ($\text{C}_6\text{H}_6\text{O}$) gives dark green colouration with ferric chloride. On treatment with CHCl_3 and KOH , followed by acidification gives compound B. Compound B can also be obtained from compound C on reaction with pyridinium chlorochromate (PCC). Identify A, B and C

[JEE (Main)-2021]



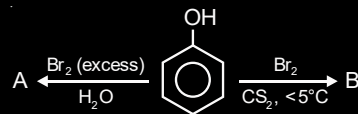
The given reaction can occur in the presence of

- (a) Bromine water (b) Br_2 in CS_2 , 273 K
(c) $\text{Br}_2/\text{FeBr}_3$ (d) Br_2 in CHCl_3 , 273 K

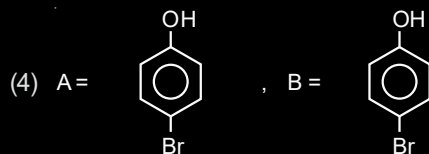
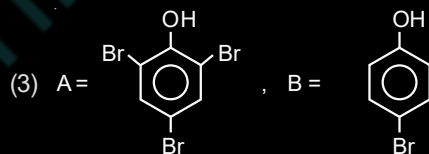
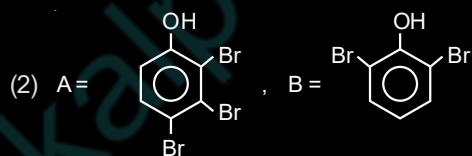
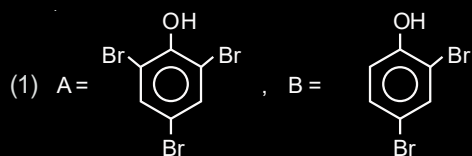
Choose the **correct** answer from the options given below [JEE (Main)-2021]

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

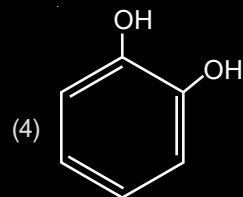
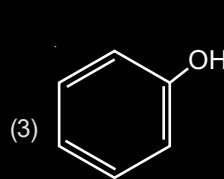
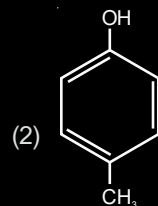
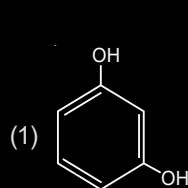
53. The correct options for the products A and B of the following reactions are :



[JEE (Main)-2021]



54. Which one of the following phenols does not give colour when condensed with phthalic anhydride in presence of conc. H_2SO_4 ? [JEE (Main)-2021]



55. Given below are two statements; one is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.

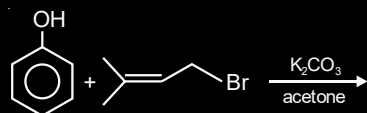
Assertion (A) : Synthesis of ethyl phenyl ether may be achieved by Williamson synthesis.

Reason (R) : Reaction of bromobenzene with sodium ethoxide yields ethyl phenyl ether.

In the light of the above statement, choose the **most appropriate** answer from the options given below: **[JEE (Main)-2021]**

- (1) (A) is not correct but (R) is correct
- (2) (A) is correct but (R) is not correct
- (3) Both (A) and (R) correct but (R) is NOT the correct explanation of (A)
- (4) Both (A) and (R) are correct and (R) is the correct explanation of (A)

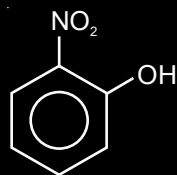
56. The major product of the following reaction, if it occurs by S_N2 mechanism is :



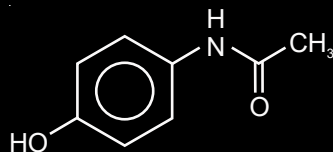
[JEE (Main)-2021]

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

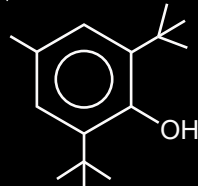
57. The compound/s which will show significant intermolecular H-bonding is/are **[JEE (Main)-2021]**



(a)



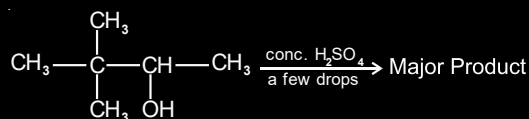
(b)



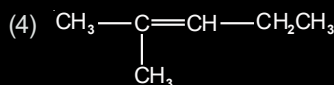
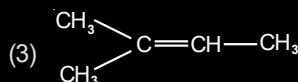
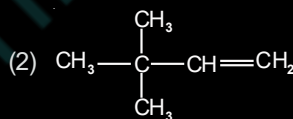
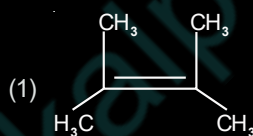
(c)

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

58. The major product formed in the following reaction is :



[JEE (Main)-2021]



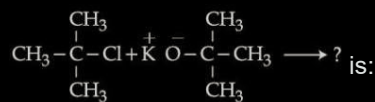
59. Which of the following reagents/reactions will convert 'A' to 'B'?



[JEE (Main)-2022]

- (1) PCC oxidation
- (2) Ozonolysis
- (3) BH_3 , H_2O_2 /OH followed by PCC oxidation
- (4) HBr, hydrolysis followed by oxidation by $\text{K}_2\text{Cr}_2\text{O}_7$

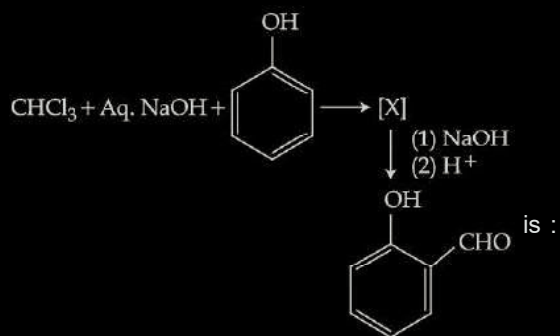
60. The major product in the reaction



[JEE (Main)-2022]

- (1) *t*-Butyl ethyl ether
- (2) 2,2-Dimethyl butane
- (3) 2-Methyl pent-1-ene
- (4) 2-Methyl prop-1-ene

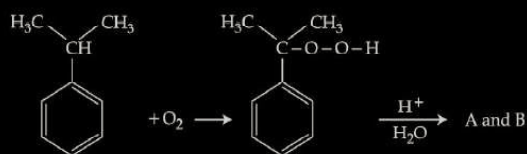
61. The intermediate X, in the reaction :



[JEE (Main)-2022]

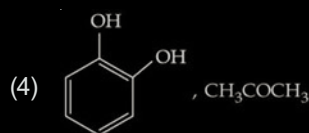
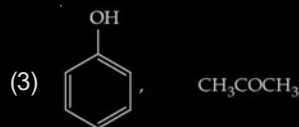
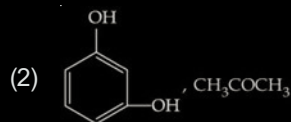
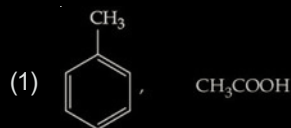
- (1)
- (2)
- (3)
- (4)

62. In the following reaction:



The compound A and B respectively are:

[JEE (Main)-2022]



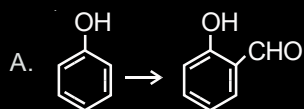
63. Compound 'P' on nitration with dil. HNO_3 yields two isomers (A) and (B) show the intramolecular and intermolecular hydrogen bonding respectively. Compound (P) on reaction with conc. HNO_3 yields a yellow compound 'C', a strong acid. The number of oxygen atoms is present in compound 'C' _____.

[JEE (Main)-2022]

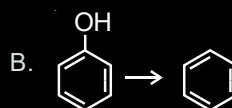
64. Match List I with List II.

List I

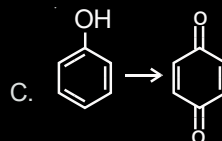
List II



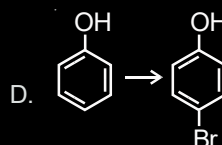
I. Br_2 in CS_2



II. $\text{Na}_2\text{Cr}_2\text{O}_7 / \text{H}_2\text{SO}_4$



III. Zn

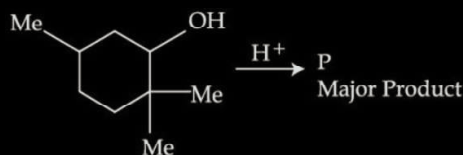


IV. $\text{CHCl}_3 / \text{NaOH}$

Choose the correct answer from the options given below: [JEE (Main)-2022]

- (1) A-IV, B-III, C-II, D-I (2) A-IV, B-III, C-I, D-II
(3) A-II, B-III, C-I, D-IV (4) A-IV, B-II, C-III, D-I

65. The major product (P) of the given reaction is (where, Me is $-\text{CH}_3$)



[JEE (Main)-2022]

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

66. Given below are two statements.

Statement I : Phenols are weakly acidic.

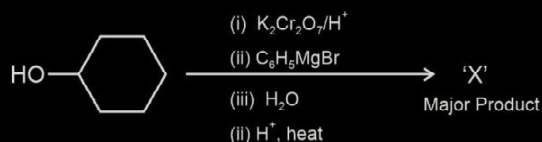
Statement II : Therefore they are freely soluble in NaOH solution and are weaker acids than alcohols and water.

Choose the **most appropriate** option.

[JEE (Main)-2022]

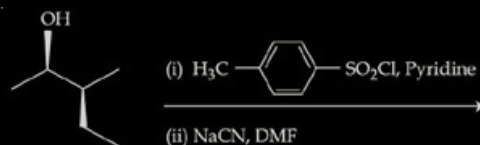
- (1) Both **Statement I** and **Statement II** are correct.
(2) Both **Statement I** and **Statement II** are correct.
(4) **Statement I** is correct but **Statement II** is incorrect.
(4) **Statement I** is incorrect but **Statement II** is correct.

67. In the given reaction,



the number of sp^2 hybridised carbon(s) in compound 'X' is _____. [JEE (Main)-2022]

68. Most stable product of the following reaction is:



[JEE (Main)-2022]

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

69. Given below are two statements:

Statement I: On heating with KHSO_4 , glycerol is dehydrated and acrolein is formed.

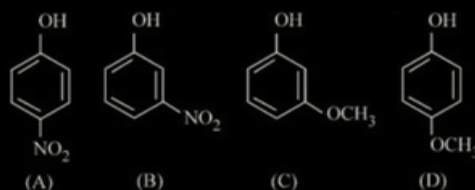
Statement II: Acrolein has fruity odour and can be used to test glycerol's presence.

Choose the **correct** option.

[JEE (Main)-2022]

- (1) Both **Statement I** and **Statement II** are correct.
(2) Both **Statement I** and **Statement II** are incorrect.
(3) **Statement I** is correct but **Statement II** is incorrect.
(4) **Statement I** is incorrect but **Statement II** is correct.

70. Arrange the following in decreasing acidic strength



[JEE (Main)-2022]

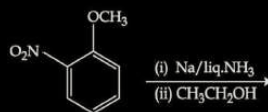
- (1) $\text{A} > \text{B} > \text{C} > \text{D}$ (2) $\text{B} > \text{A} > \text{C} > \text{D}$
(3) $\text{D} > \text{C} > \text{A} > \text{B}$ (4) $\text{D} > \text{C} > \text{B} > \text{A}$

71. A sample of 4.5 mg of an unknown monohydric alcohol, R-OH was added to methylmagnesium iodide. A gas is evolved and is collected and its volume measured to be 3.1 mL. The molecular weight of the unknown alcohol is ____ g/mol. [Nearest integer] **[JEE (Main)-2022]**

72. The difference in the reaction of phenol with bromine in chloroform and bromine in water medium is due to: **[JEE (Main)-2022]**

- (1) Hyperconjugation in substrate
- (2) Polarity of solvent
- (3) Free radical formation
- (4) Electromeric effect of substrate

73. The major product of the following reaction is



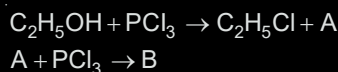
[JEE (Main)-2022]

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

74. Hydrolysis of which compound will give carbolic acid? **[JEE (Main)-2022]**

- (1) Cumene
- (2) Benzenediazonium chloride
- (3) Benzal chloride
- (4) Ethylene glycol ketal

75. The number of non-ionisable protons present in the product B obtained from the following reactions is ____.

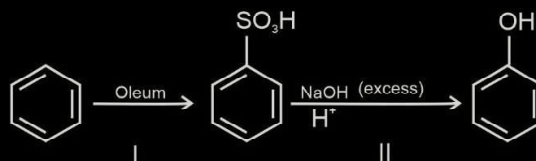


[JEE (Main)-2022]

76. A 100 mL solution of $\text{CH}_3\text{CH}_2\text{MgBr}$ on treatment with methanol produces 2.24 mL of a gas at STP. The weight of gas produced is ____ mg. [nearest integer]

[JEE (Main)-2022]

77. In the following reaction,



the % yield for reaction I is 60% and that of reaction II is 50%. The overall yield of the complete reaction is ____%. [Nearest integer]

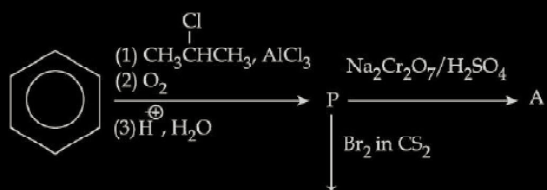
[JEE (Main)-2022]

78. An organic compound 'A' contains nitrogen and chlorine. It dissolves readily in water to give a solution that turns litmus red. Titration of compound 'A' with standard base indicates that the molecular weight of 'A' is 131 ± 2 . When a sample of 'A' is treated with aq. NaOH, a liquid separates which contains N but not Cl. Treatment of the obtained liquid with nitrous acid followed by phenol gives orange precipitate. The compound A is :

[JEE (Main)-2022]

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

79. Identify the major products A and B for the below given reaction sequence.



[JEE (Main)-2022]

(A)

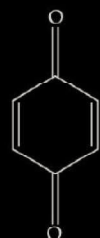


and

(B)



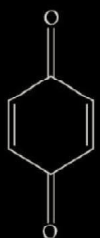
(1)



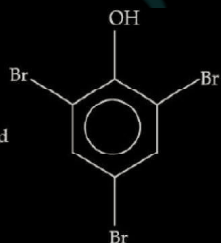
and



(2)



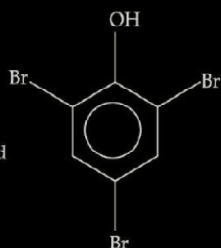
and



(3)

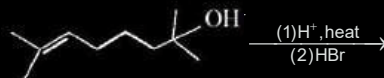


and

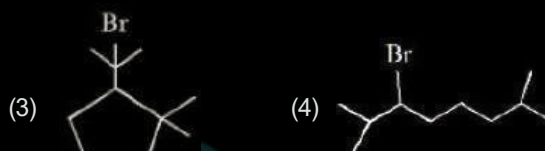
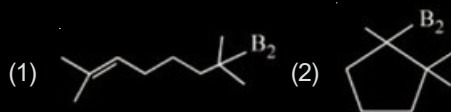


(4)

80. The major product in the given reaction is



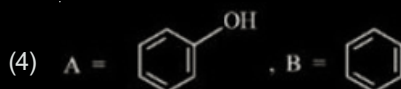
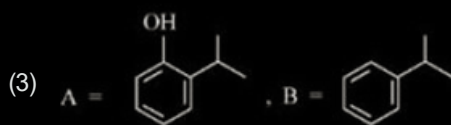
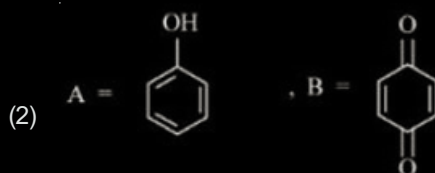
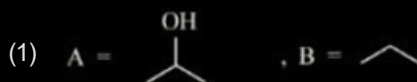
[JEE (Main)-2022]



81. Compound I is heated with Conc. HI to give a hydroxy compound A which is further heated with Zn dust to give compound B. Identify A and B.

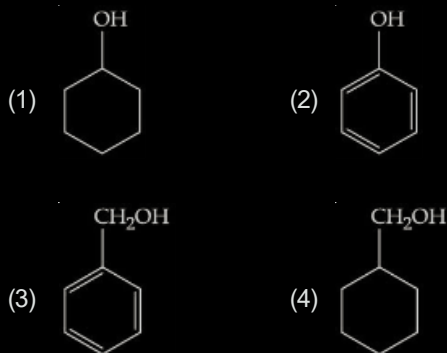


[JEE (Main)-2022]



82. A compound 'X' is acidic and it is soluble in NaOH solution, but insoluble in NaHCO_3 solution. Compound 'X' also gives violet colour with neutral FeCl_3 solution. The compound 'X' is :

[JEE (Main)-2022]



83. When ethanol is heated with conc. H_2SO_4 , a gas is produced. The compound formed, when this gas is treated with cold dilute aqueous solution of Baeyer's reagent, is

[JEE (Main)-2022]

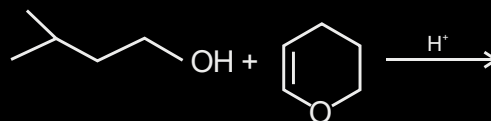
- (1) Formaldehyde (2) Formic acid
(3) Glycol (4) Ethanoic acid?

☐ ☐ ☐

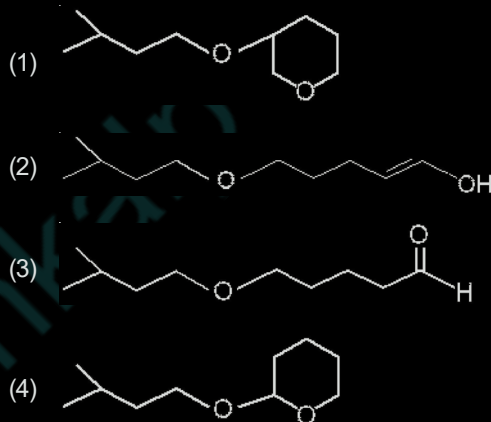
84. A 1.84 mg sample of polyhydric alcoholic compound 'X' of molar mass 92.0 g/mol gave 1.344 mL of H_2 gas at STP. The number of alcoholic hydrogens present in compound 'X' is ____.

[JEE (Main)-2022]

85. The major product formed in the following reaction, is

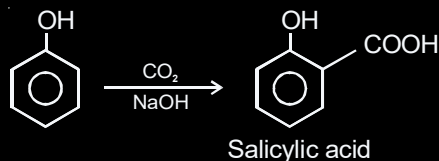


[JEE (Main)-2022]



Alcohols, Phenols and Ethers

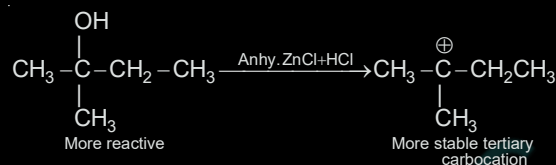
1. Answer (2)



2. Answer (3)

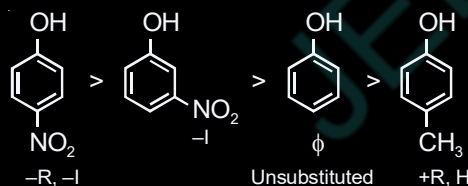
Alcohols which give more stable carbocation is more reactive with Lucas reagent

(Anhy. ZnCl_2 + conc. HCl)



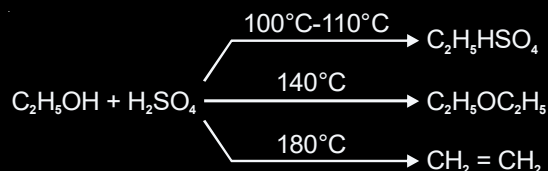
3. Answer (3)

$\text{D} > \text{C} > \text{A} > \text{B}$



Order of acidic strength = $-\text{R} > -\text{I} > \phi > +\text{H} > +\text{R}$

4. Answer (4)



5. Answer (3)

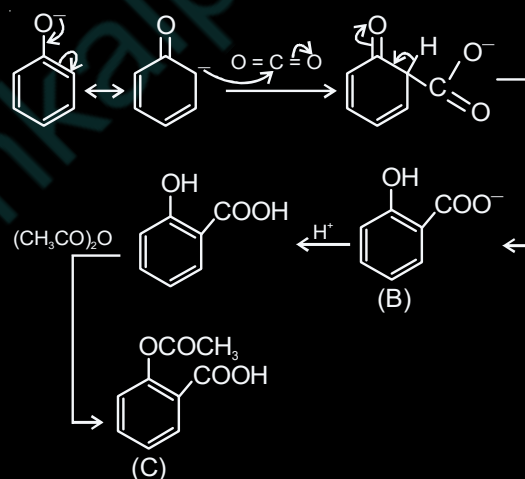
The acidic strength of the given derivatives of phenol is decided by the stability of their conjugate bases. p-nitrophenol is most acidic as $-\text{I}$ and $-\text{R}$ effects of NO_2 group stabilises its conjugate base most effectively. This is followed by p-chlorophenol

due to $-\text{I}$ effect of Cl group, p-cresol due to $+\text{I}$ and $+\text{H}$ effects of CH_3 group which destabilises its conjugate base. p-methoxyphenol is least acidic due to $+\text{R}$ effect of OCH_3 group.

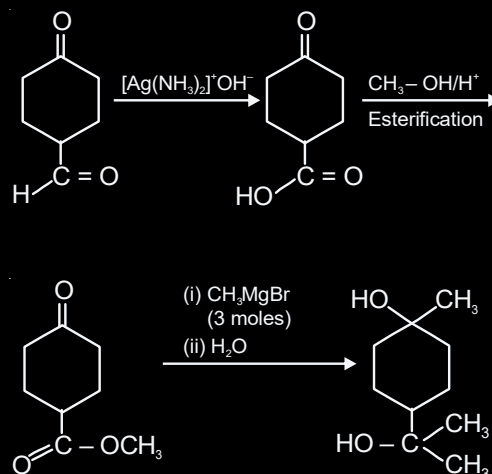
6. Answer (2)

Tertiary alcohol gives instant turbidity with Lucas reagent and the reaction follows $\text{S}_{\text{N}}1$ mechanism due to stability of tertiary carbocation.

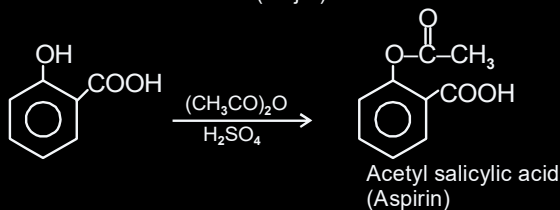
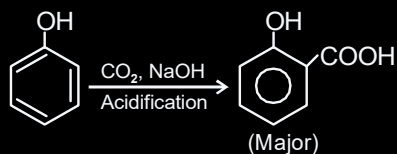
7. Answer (1)



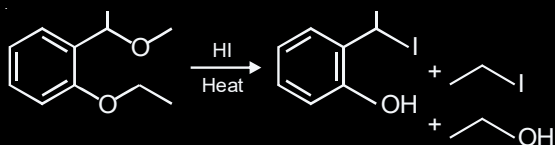
8. Answer (3)



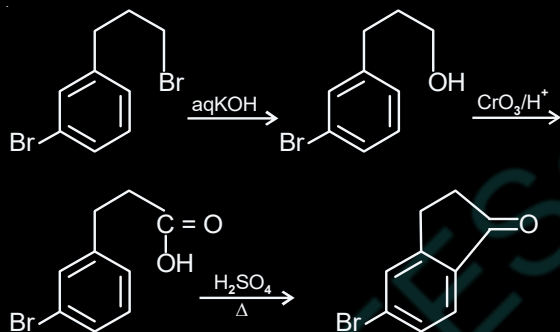
9. Answer (1)



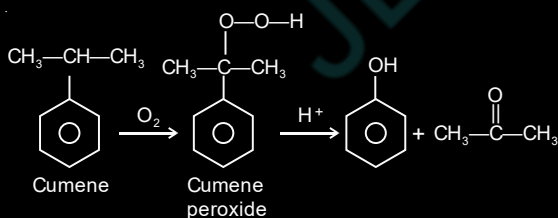
10. Answer (4)



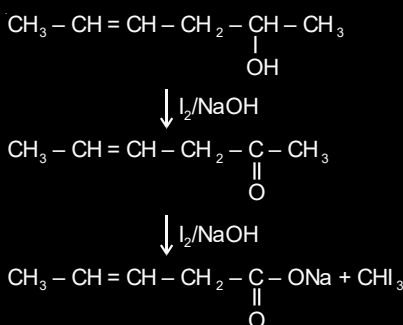
11. Answer (1)



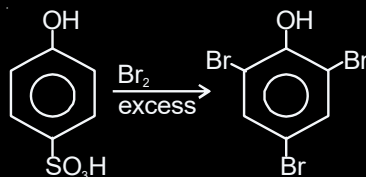
12. Answer (4)



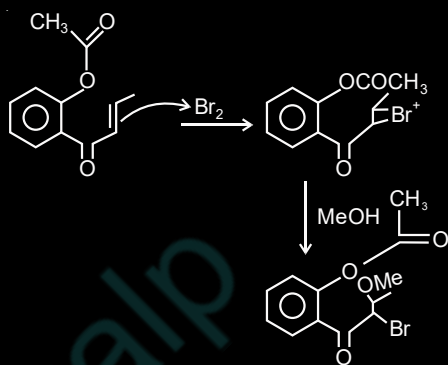
13. Answer (1)



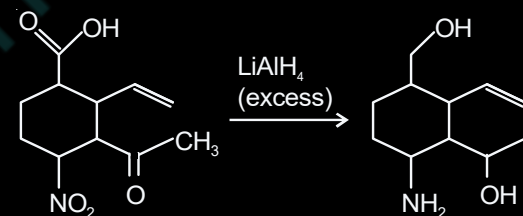
14. Answer (3)



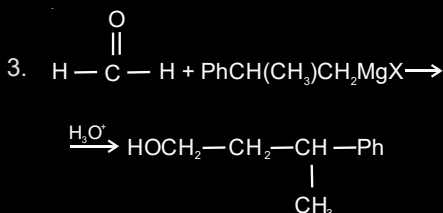
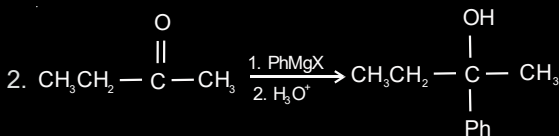
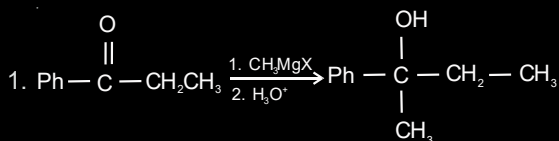
15. Answer (2)

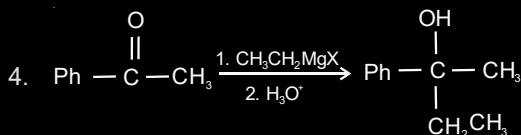


16. Answer (1)



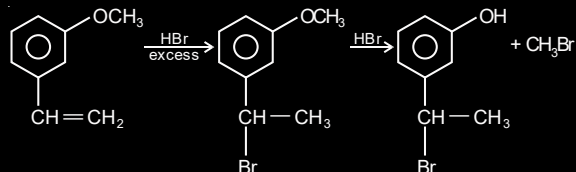
17. Answer (3)



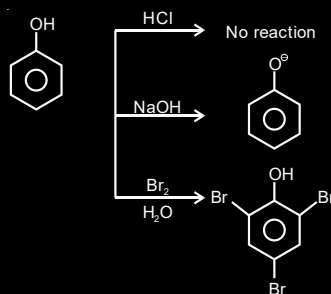


Reaction (3) gives primary alcohol which is different from tertiary alcohol given by the remaining reactions.

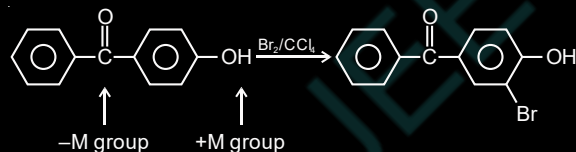
18. Answer (1)



19. Answer (2)

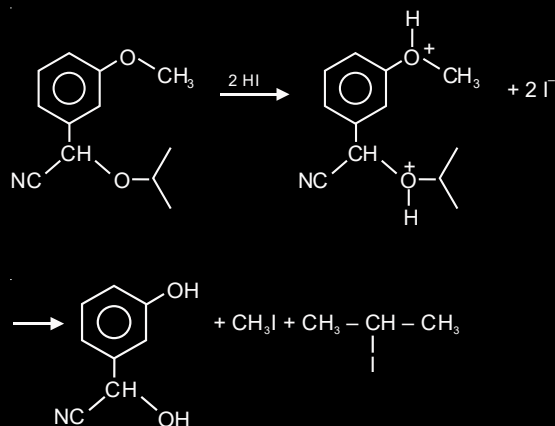


20. Answer (4)

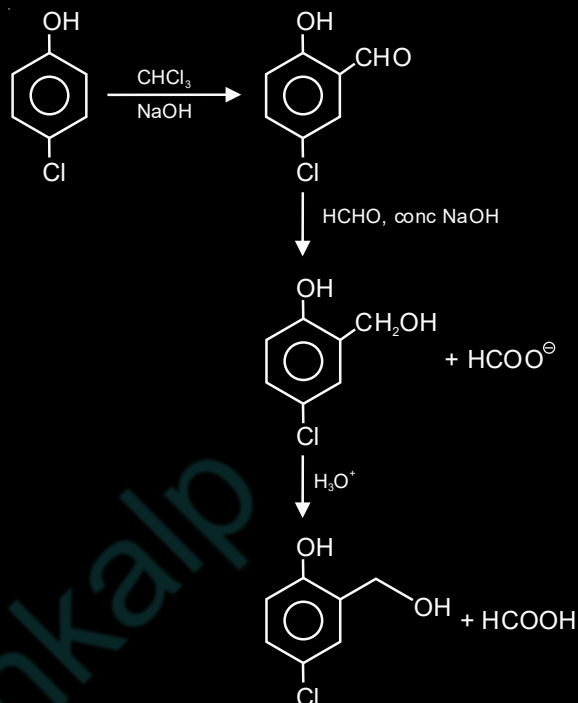


Product will be formed as per -OH group (+M group)

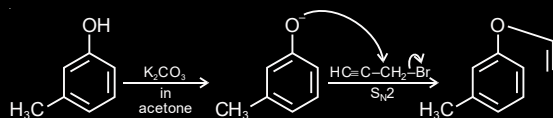
21. Answer (3)



22. Answer (3)

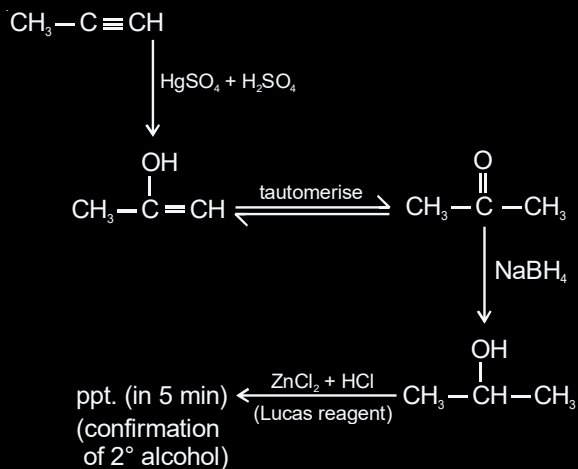


23. Answer (3)



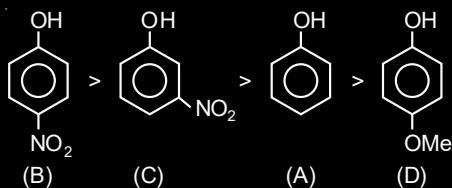
Meta cresol is neutralised by K_2CO_3 . The phenoxide ion attacks at the C-atom carrying Br-atom to give ether following $\text{S}_\text{N}2$ mechanism.

24. Answer (1)



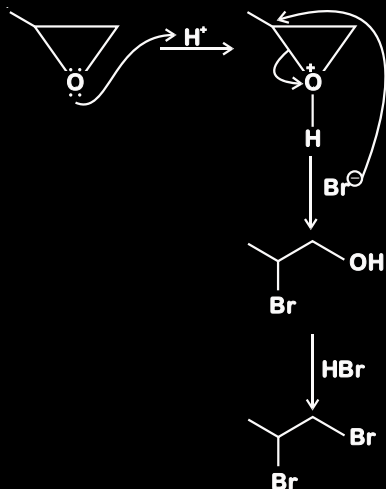
25. Answer (3)

Acidic strength

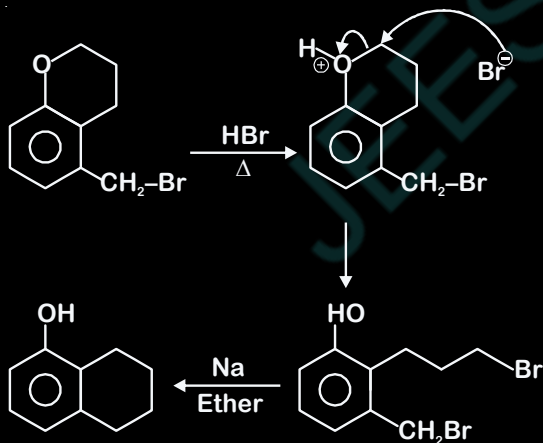


$\therefore pK_a : B < C < A < D$

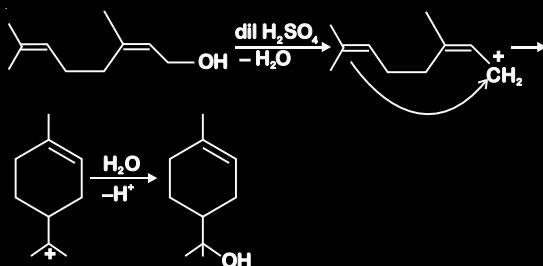
26. Answer (3)



27. Answer (4)



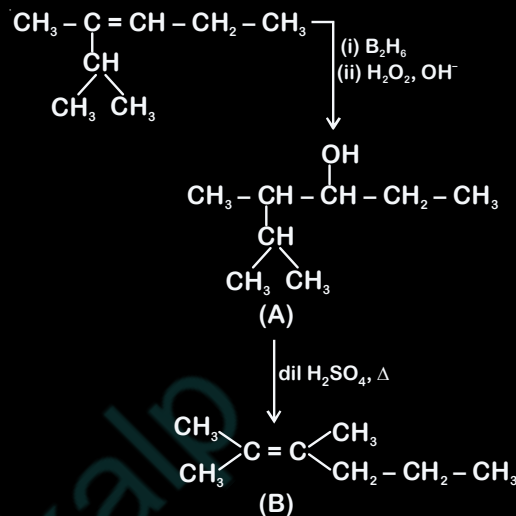
28. Answer (4)



29. Answer (4)

In (A), Intermolecular H-bonding is possible while in (B) there is no inter-molecular H-bonding. So A is having higher boiling point than B.

30. Answer (1)

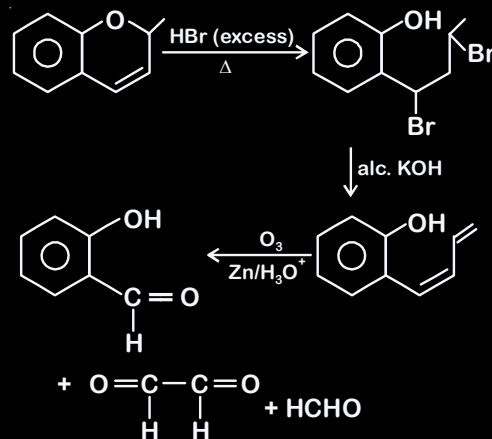


31. Answer (1)

Formation of Bakelite

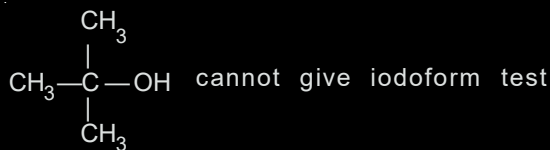
Electrophilic substitution reaction of phenol with formaldehyde followed by dehydration

32. Answer (1)



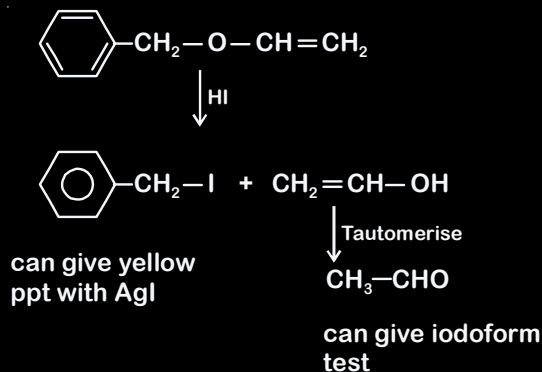
33. Answer (1)

$\text{CH}_3-\text{CH}_2-\text{CH}(\text{OH})-\text{CH}_3$ can give positive CAN test, iodoform test, and with Lucas reagent it takes 5 minutes to give turbidity.

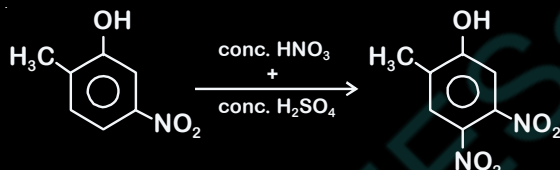


but can give CAN test and Lucas test.

34. Answer (3)

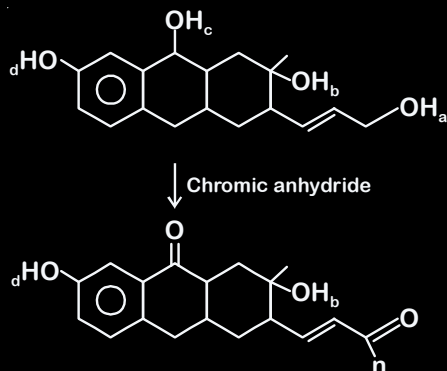


35. Answer (2)



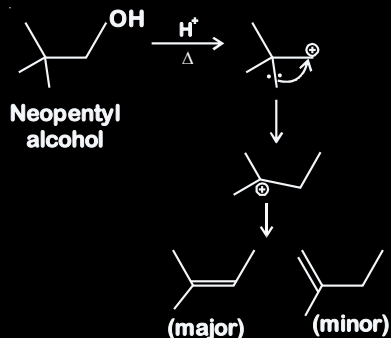
Position of electrophilic attack is directed by the electron donating group present in ring

36. Answer (4)

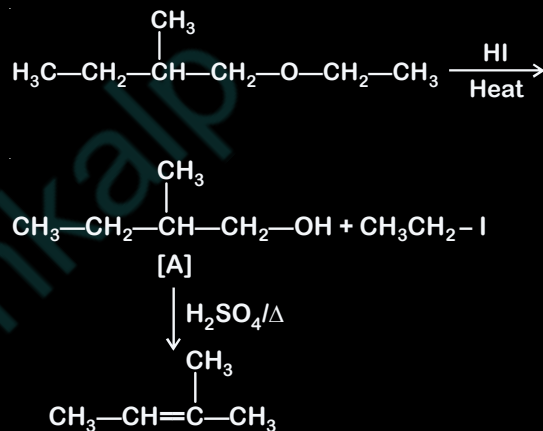


H_b and H_d can give CAN test

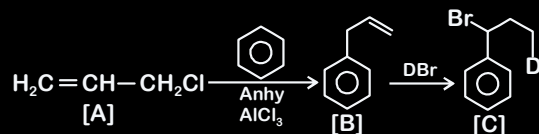
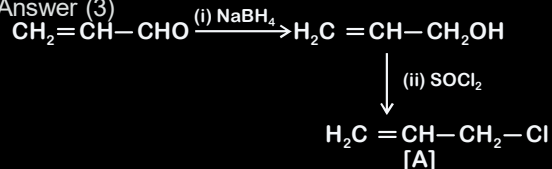
37. Answer (4)



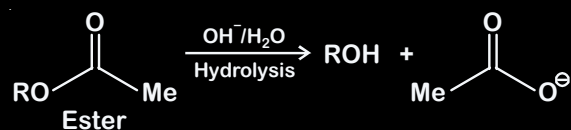
38. Answer (3)



39. Answer (3)

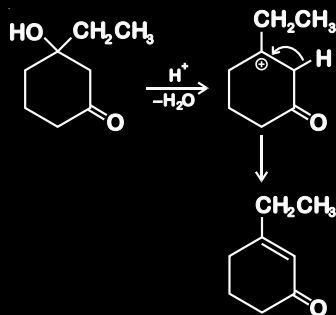


40. Answer (1)

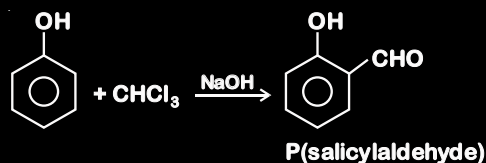


So, Ester is unstable in an aqueous basic solution and undergoes hydrolysis to give alcohol and carboxylate.

41. Answer (4)



42. Answer (69.00)



$$\therefore \text{mass \% of C in P} = \frac{12 \times 7}{84 + 6 + 32} \times 100$$

$$= 68.85\%$$

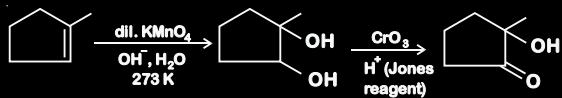
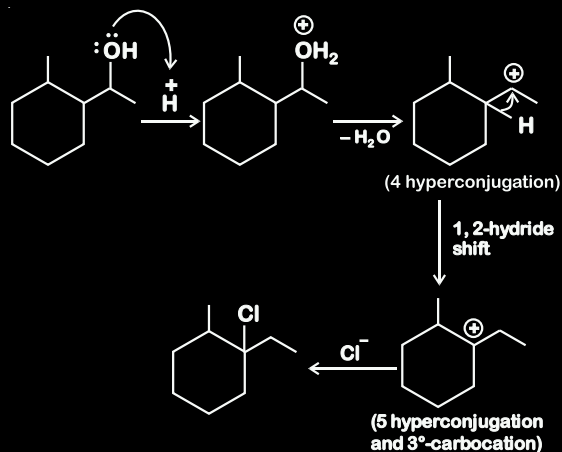
$$\approx 69\%$$

43. Answer (None) Bonus

Order of boiling point of the following compound is
I < IV < II < III

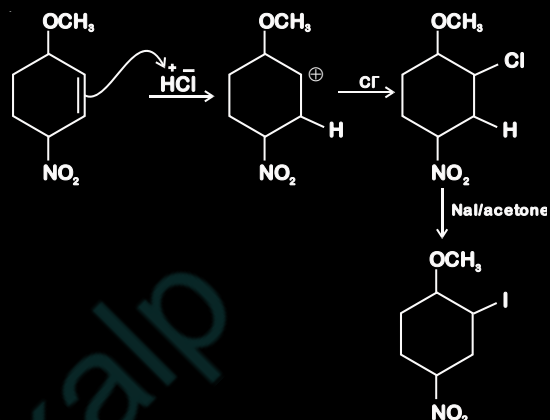
I → B.P.	202°C
II → B.P.	279°C
III → B.P.	284°C
IV → B.P.	243°C

44. Answer (4)



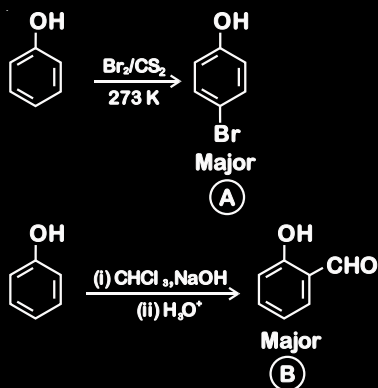
3°-alcohols do not undergo oxidation reaction easily.

46. Answer (1)



Correct option should be (1)

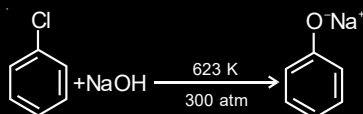
47. Answer (2)



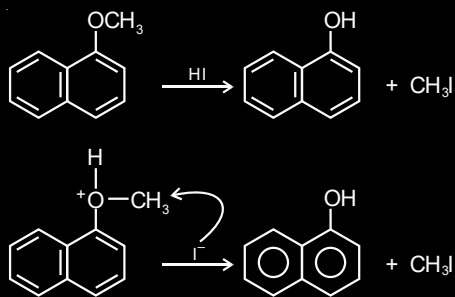
So option (2) is the correct answer

48. Answer (4)

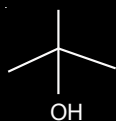
Chlorobenzene is fused with NaOH at 623 K and 300 atmospheric pressure to get sodium phenoxide.



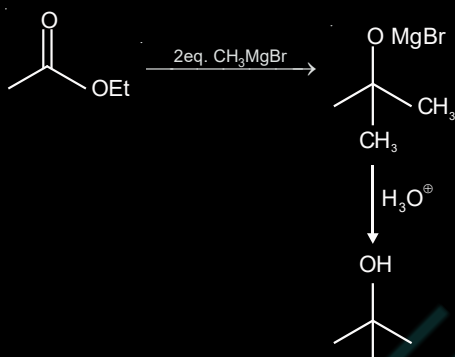
49. Answer (3)



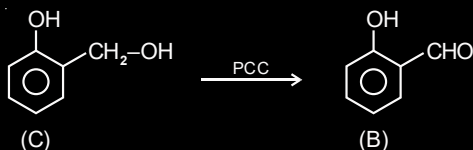
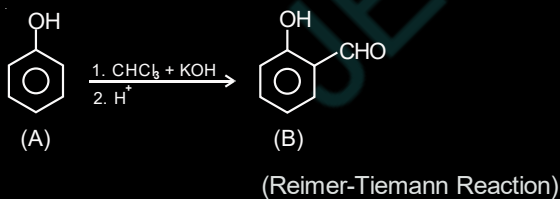
50. Answer (2)



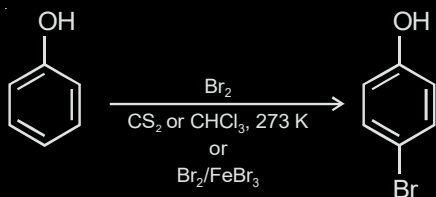
2-methylpropan-2-ol



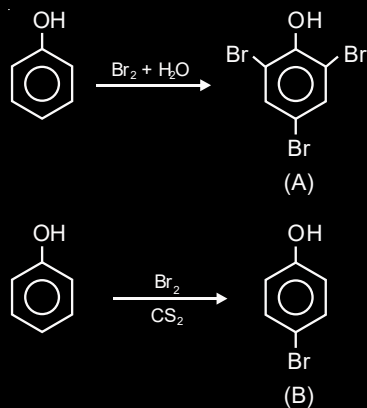
51. Answer (3)



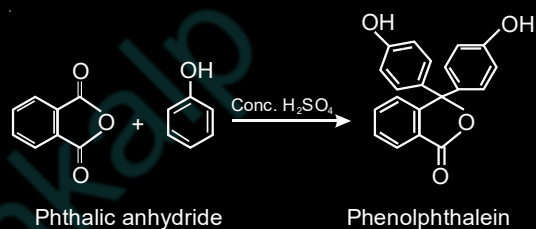
52. Answer (4)



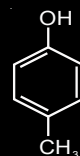
53. Answer (3)



54. Answer (2)



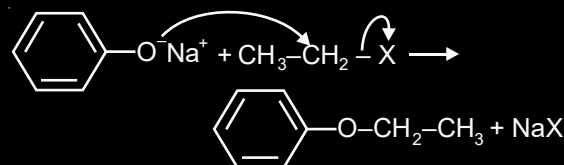
As phthalic anhydride being bulky, electrophilic substitution reaction occurs at para position in phenol or its derivatives



Does not condense with phthalic anhydride because para position is blocked.

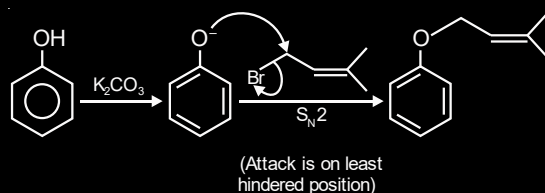
55. Answer (2)

Assertion is correct

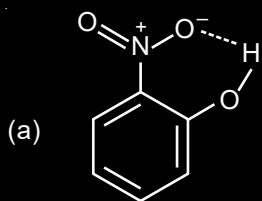


But the reason is not correct because aryl halides do not undergo nucleophilic substitution reactions.

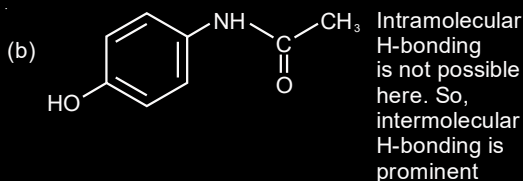
56. Answer (2)



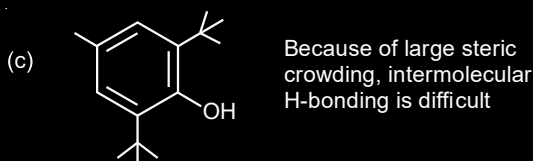
57. Answer (4)



Intramolecular
H-bonding

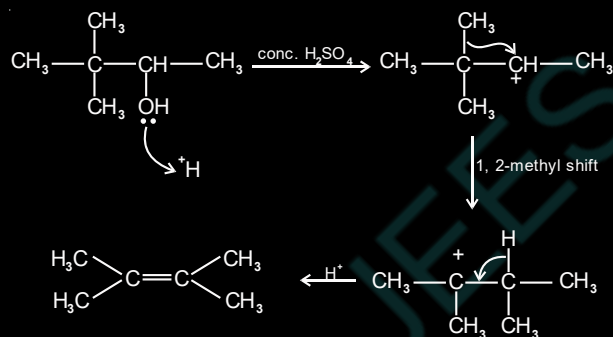


Intramolecular
H-bonding
is not possible
here. So,
intermolecular
H-bonding is
prominent

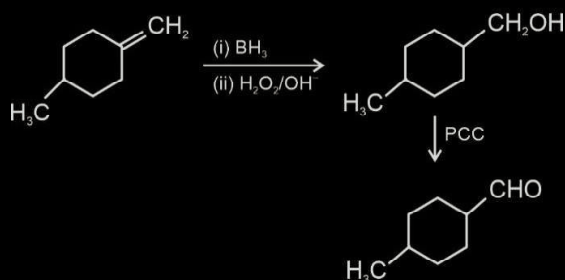


Because of large steric
crowding, intermolecular
H-bonding is difficult

58. Answer (1)

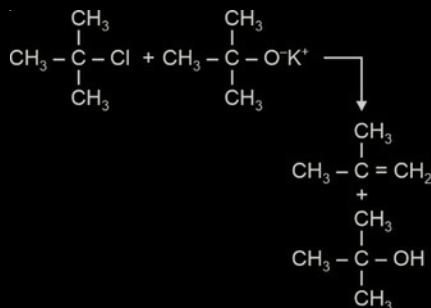


59. Answer (3)

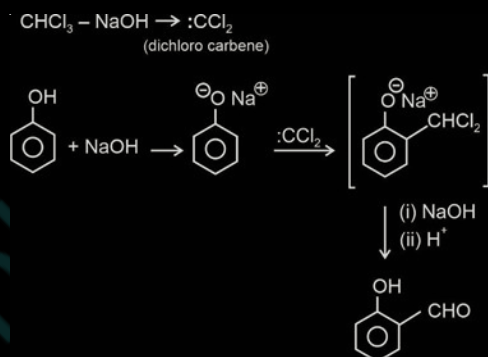


The first step involves addition of H_2O to alkene according to anti-markownikoff's rule while the second step involves oxidation of 1° alcohol to aldehyde.

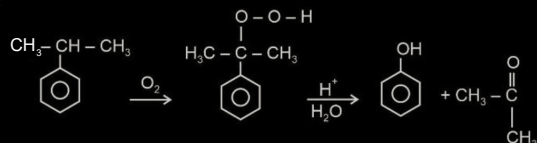
60. Answer (4)



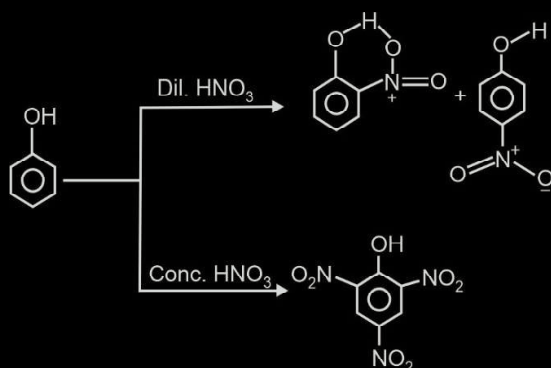
61. Answer (3)



62. Answer (3)

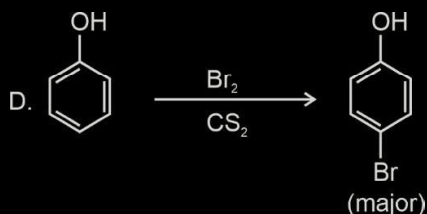
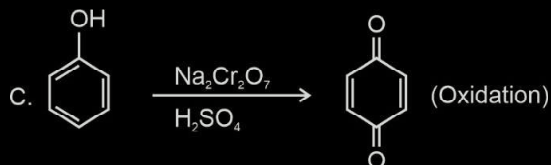
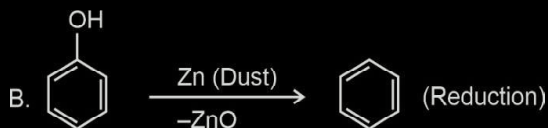
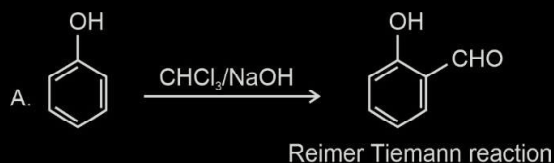


63. Answer (7)



The number of oxygen atoms = 7

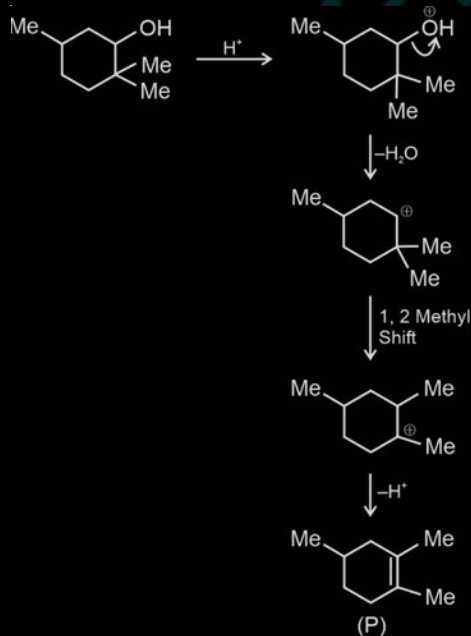
64. Answer (1)



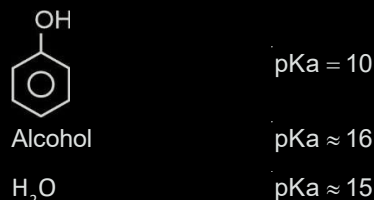
∴ Correct match is

(A) - IV, (B) - III, (C) - II, (D) - I

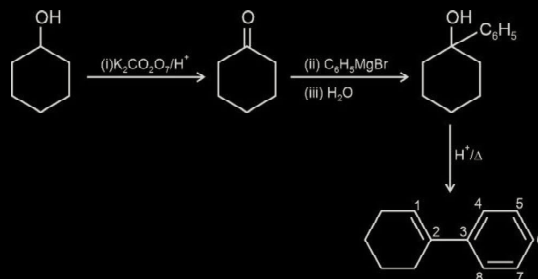
65. Answer (3)



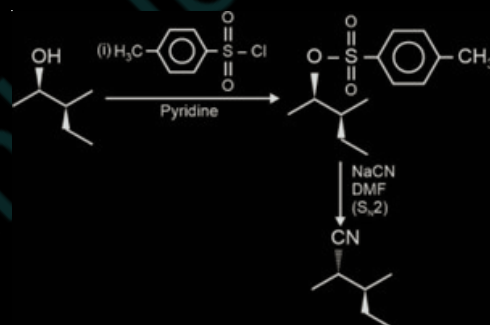
66. Answer (1)



67. Answer (8)



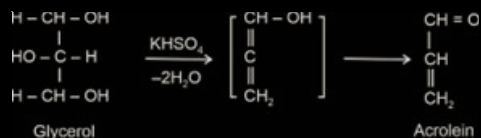
68. Answer (2)



∴ Option (2) is correct option.

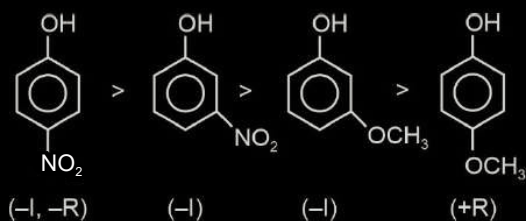
69. Answer (3)

Glycerol, on heating with KHSO_4 , undergoes dehydration to give unsaturated aldehyde called acrolein. So, statement I is correct.

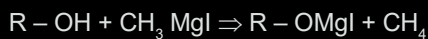


Acrolein has piercing unpleasant smell. So, statement-II is incorrect.

70. Answer (1)



71. Answer (33)



moles of alcohol (ROH) \equiv moles of CH_4

At STP, [Assuming STP]

1 mole corresponds to 22.7 L

$$\text{Hence, } 3.1 \text{ mL} \equiv \frac{3.1}{22700} \text{ mol}$$

$$\text{So, moles of alcohol} = \frac{3.1}{22700}$$

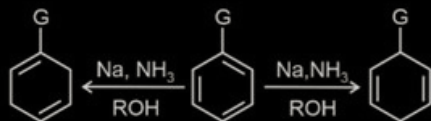
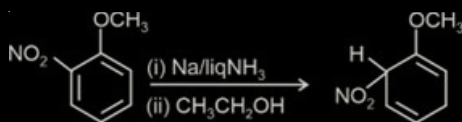
$$\Rightarrow \frac{3.1}{22700} = \frac{4.5 \times 10^{-3}}{M}$$

$$M \approx 33 \text{ g/mol}$$

72. Answer (2)

Phenol gives different products with bromine in chloroform and water medium due to the polarity difference between chloroform and water acting as solvent

73. Answer (1)



(When G = EDG) (When G = EWG)

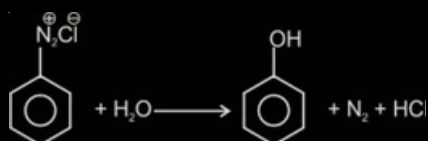
EDG \rightarrow Electron donating group

EWG \rightarrow Electron withdrawing group

74. Answer (2)

Phenol, is known as Carboic acid.

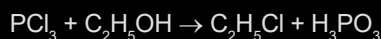
Diazonium salt are hydrolysed to phenols.



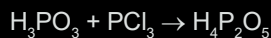
(Carboic acid)

Benzal chloride on hydrolysis gives benzaldehyde

75. Answer (02.00)



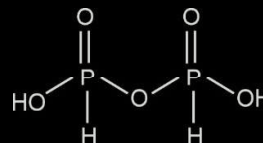
(A)



(A)

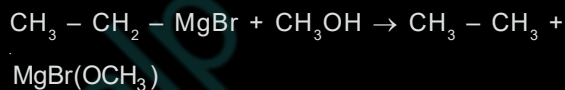
(B)

Structure of $H_4P_2O_5$



Total 2 non-ionizable protons are present

76. Answer (03.00)



As 2.24 ml is formed at STP.

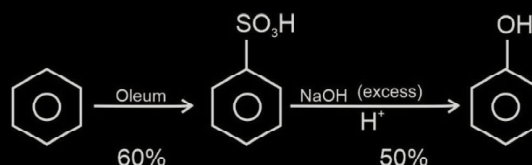
Number of moles of ethane gas produced

$$= \frac{2.24 \times 10^{-3}}{22.4} = 10^{-4} \text{ mol}$$

Mass of ethane produced = $10^{-4} \times 30$

$$= 3 \times 10^{-3} = 3 \text{ mg}$$

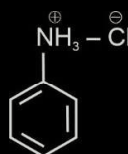
77. Answer (30)



The % yield of the complete reaction is

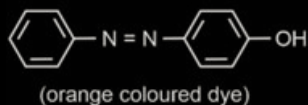
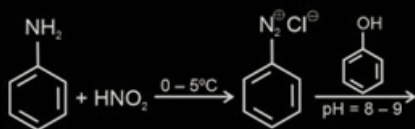
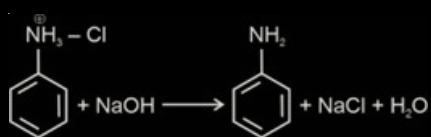
$$\Rightarrow 0.6 \times 0.5 \times 100 = 30\%$$

78. Answer (4)

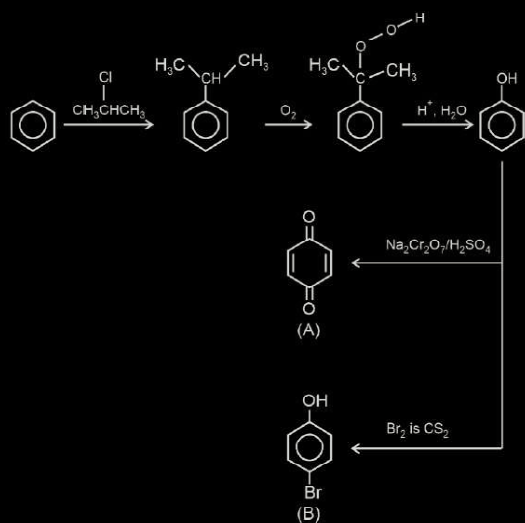


is acidic in nature as it can undergo

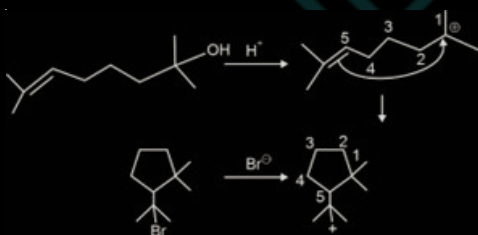
cationic (A) hydrolysis in aqueous solution.



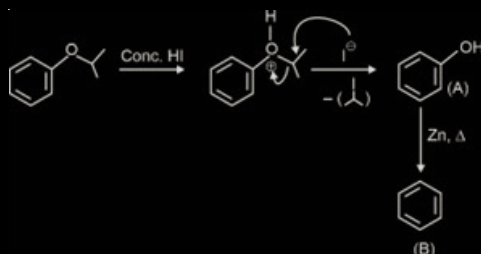
79. Answer (2)



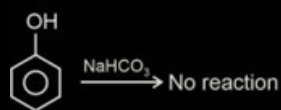
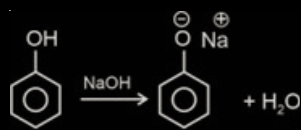
80. Answer (3)



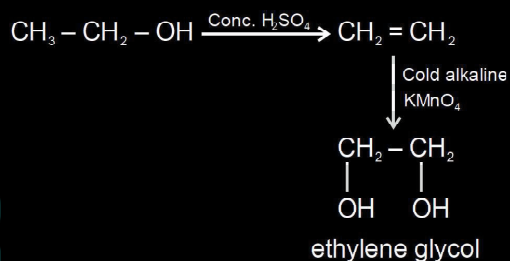
81. Answer (4)



82. Answer (2)



83. Answer (3)



84. Answer (6)

Moles of H_2 produced at STP

$$= \frac{1.344 \times 10^{-3}}{22.4} = 6 \times 10^{-5} \text{ mole}$$

$$\therefore \text{Moles of hydrogen atom produced} = 12 \times 10^{-5} \text{ mol}$$

Moles of organic compound

$$= \frac{1.84 \times 10^{-3}}{92} = 2 \times 10^{-5}$$

\therefore Number of alcoholic hydrogen present

$$= \frac{12 \times 10^{-5}}{2 \times 10^{-5}} = 6$$

85. Answer (4)

