Alcohols, Phenols and Ethers

Question1

Given below are two statements :
Statement (I) : p-nitrophenol is more acidic than m-nitrophenol and o-nitrophenol.
Statement (II) : Ethanol will give immediate turbidity with Lucas reagent.
In the light of the above statements, choose the correct answer from the options given below :
[27-Jan-2024 Shift 1]

Options:

A. Statement I is true but Statement II is false

B. Both Statement I and Statement II are true

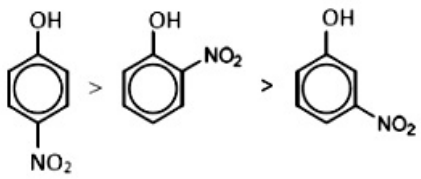
C. Both Statement I and Statement II are false

D. Statement I is false but Statement II is true

Answer: A

Solution:

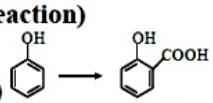
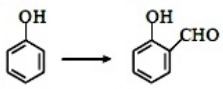
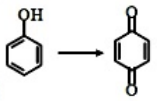
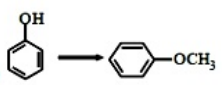
Acidic strength



Ethanol give lucas test after long time
Statement (I) ⟶ correct
Statement (II) ⟶ incorrect

Question2

Match List-I with List-II.

List – I (Reaction)	List – II (Reagent(s))
(A) 	(I) $Na_2Cr_2O_7, H_2SO_4$
(B) 	(II) (i) NaOH (ii) CH_3Cl
(C) 	(III) (i) NaOH, $CHCl_3$ (ii) NaOH (iii) HCl
(D) 	(IV) (i) NaOH (ii) CO_2 (iii) HCl

Choose the correct answer from the options given below:
[27-Jan-2024 Shift 2]

Options:

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

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

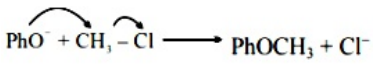
C. (A)-(II), (B)-(I), (C)-(III), (D)-(IV)

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

Answer: D

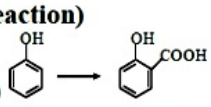
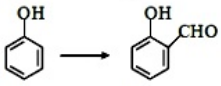
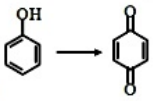
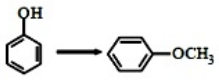
Solution:

(A) ⟶ Kolbe Schmidt Reaction
(B) ⟶ Reimer Tiemann Reaction
(C) ⟶ Oxidation of phenol to p-benzoquinone
(D) ⟶ $PhOH + NaOH \longrightarrow H_2O + PhO^-$



Question3

Match List-I with List-II.

List – I (Reaction)	List – II (Reagent(s))
(A) 	(I) $Na_2Cr_2O_7$, H_2SO_4
(B) 	(II) (i) NaOH (ii) CH_3Cl
(C) 	(III) (i) NaOH, $CHCl_3$ (ii) NaOH (iii) HCl
(D) 	(IV) (i) NaOH (ii) CO_2 (iii) HCl

Choose the correct answer from the options given below: [27-Jan-2024 Shift 2]

Options:

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

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

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

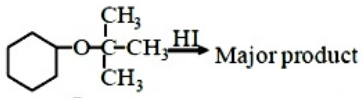
D. (A)-(IV), (B)-(III), (C)-(I), (D)-(II)

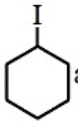
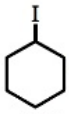
Answer: D

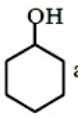
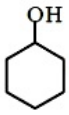
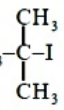
Solution:

Question4

Major product formed in the following reaction is a mixture of:



(1)  and $(CH_3)_3CI$ (2)  and $(CH_3)_3COH$

(3)  and $(CH_3)_3COH$ (4)  and 

[27-Jan-2024 Shift 2]

Options:

A. (1)

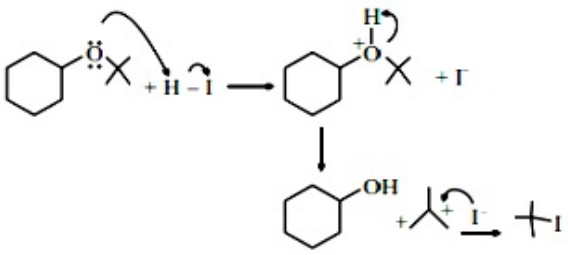
B. (2)

C. (3)

D. (4)

Answer: D

Solution:



Question5

Phenolic group can be identified by a positive:
[27-Jan-2024 Shift 2]

Options:

A. Phthalein dye test

B. Lucas test

C. Tollen's test

D. Carbylamine test

Answer: A

Solution:

Carbylamine Test-Identification of primary amines
Lucas Test - Differentiation between 1˚, 2˚ and 3˚ alcohols
Tollen's Test - Identification of Aldehydes
Phthalein Dye Test - Identification of phenols

Question6

Phenol treated with chloroform in presence of sodium hydroxide, which further hydrolysed in presence of an acid results

[29-Jan-2024 Shift 2]

Options:

A. Salicyclic acid

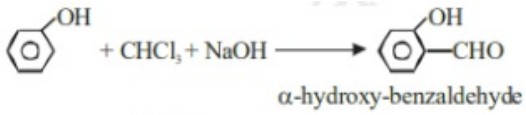
B. Benzene-1,2-diol

C. Benzene-1, 3-diol

D. 2-Hydroxybenzaldehyde

Answer: D

Solution:



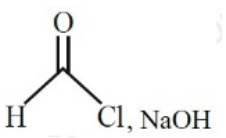
It is Reimer Tiemann Reaction

Question7

Salicylaldehyde is synthesized from phenol, when reacted with
[30-Jan-2024 Shift 2]

Options:

A.



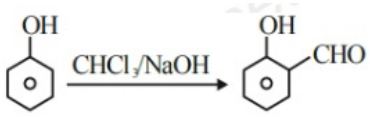
B. CO_2, NaOH

C. CCl_4, NaOH

D. $HCCl_3$, NaOH

Answer: D

Solution:



Question8

Given below are two statements: One is labelled as Assertion A and the other is labelled as Reason R:
Assertion A: Alcohols react both as nucleophiles and electrophiles.
Reason R: Alcohols react with active metals such as sodium, potassium and aluminum to yield corresponding alkoxides and liberate hydrogen.
In the light of the above statements, choose the correct answer from the options given below:
[31-Jan-2024 Shift 1]

Options:

A. A is false but R is true.

B. A is true but R is false.

C. Both A and R are true and R is the correct explanation of A.

D. Both A and R are true but R is NOT the correct explanation of A

Answer: D

Solution:

As per NCERT, Assertion (A) and Reason (R) is correct but Reason (R) is not the correct explanation.

Question9

Given below are two statements: One is labelled as Assertion A and the other is labelled as Reason R:
Assertion A: pK_a value of phenol is 10.0 while that of ethanol is 15.9.
Reason R: Ethanol is stronger acid than phenol.
In the light of the above statements, choose the correct answer from the options given below:
[31-Jan-2024 Shift 1]

Options:

A. A is true but R is false.

B. A is false but R is true.

C. Both A and R are true and R is the correct explanation of A.

D. Both A and R are true but R is NOT the correct explanation of A.

Answer: A

Solution:

Phenol is more acidic than ethanol because conjugate base of phenoxide is more stable than ethoxide.

Question10

Match List - I with List - II.

List-I (Reactants)	List-II Products
(A) Phenol, Zn/Δ	(I) Salicylaldehyde
(B) Phenol, $CHCl_3$, NaOH, HCl	(II) Salicylic acid
(C) Phenol, CO_2, NaOH, HCl	(III) Benzene
(D) Phenol, Conc. HNO_3	(IV) Picric acid

Choose the correct answer from the options given below.
[1-Feb-2024 Shift 2]

Options:

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

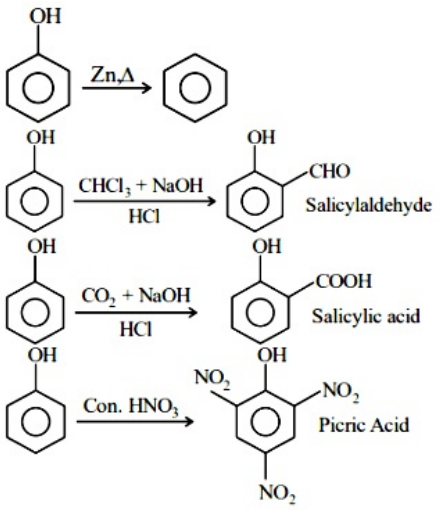
B. (A)-(IV), (B)-(I), (C)-(II), (D)-(III)

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

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

Answer: C

Solution:



Question11

Which among the following has highest boiling point? [1-Feb-2024 Shift 2]

Options:

A. $CH_3CH_2CH_2CH_3$

B. $CH_3CH_2CH_2CH_2 - OH$

C. $CH_3CH_2CH_2\,CHO$

D. $H_5C_2 - O - C_2H_5$

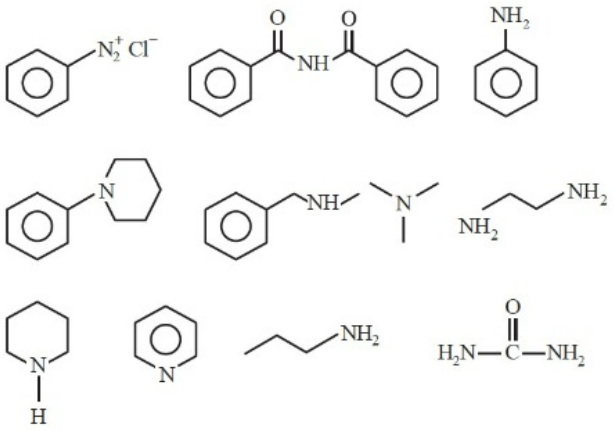
Answer: B

Solution:

Due to H-bonding boiling point of alcohol is High.

Question12

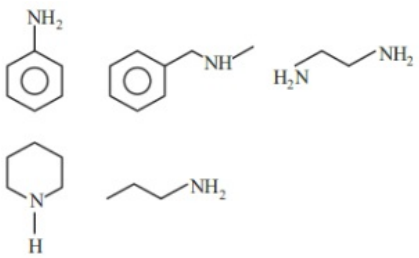
Number of compounds which give reaction with Hinsberg's reagent is_____



[1-Feb-2024 Shift 2]

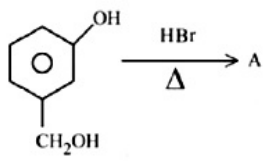
Answer: 5

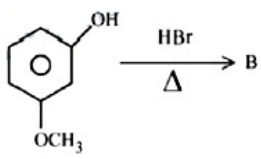
Solution:



Question13

'A' and 'B' formed in the following set of reactions are :

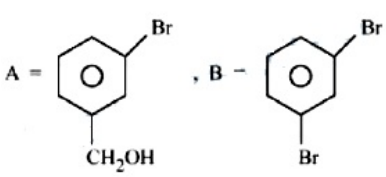




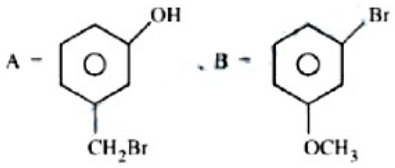
[24-Jan-2023 Shift 1]

Options:

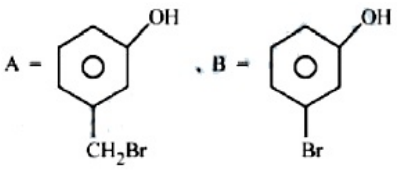
A.



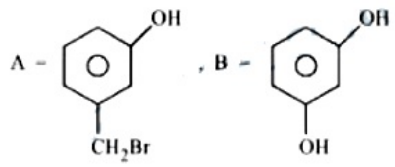
B.



C.

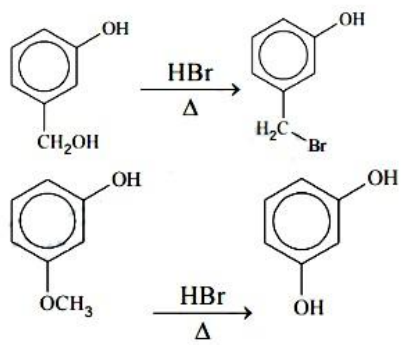


D.



Answer: D

Solution:

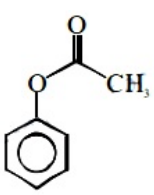


Question14

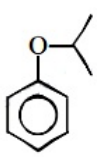
In the cumene to phenol preparation in presence of air, the intermediate is [25-Jan-2023 Shift 1]

Options:

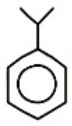
A.



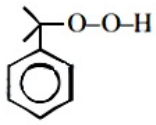
B.



C.

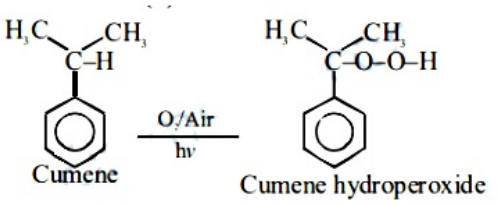


D.



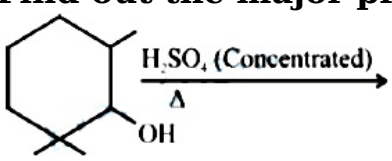
Answer: D

Solution:



Question15

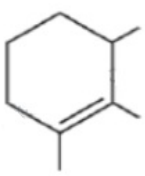
Find out the major product from the following reaction.



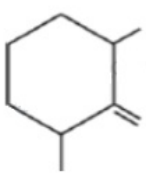
[25-Jan-2023 Shift 2]

Options:

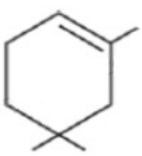
A.



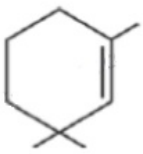
B.



C.

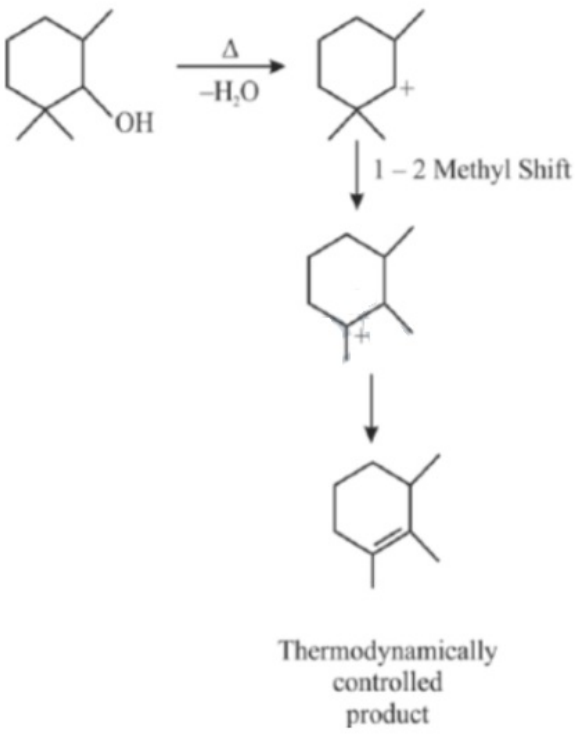


D.



Answer: A

Solution:



Question16

Given below are two statements, one is labelled as Assertion A and the other is labelled as Reason R
Assertion A :- Butylated hydroxyl anisole when added to butter increases its shelf life.
Reason R :- Butylated hydroxyl anisole is more reactive towards oxygen than food.
In the light of the above statements, choose the most appropriate answer from the options given below :-
[25-Jan-2023 Shift 2]

Options:

A. Both A and R are correct and R is the correct explanation of A.

B. A is correct but R is not correct.

C. A is not correct but R is correct.

D. Both A and R are correct but R is NOT the correct explanation of A.

Answer: A

Solution:

Solution:
Butylated hydroxyl anisole is an antioxidant.

Question17

The increasing order of pK_a for the following phenols is
[29-Jan-2023 Shift 1]

Options:

A. 2, 4-Dinitrophenol

B. 4 - Nitrophenol

C. 2, 4, 5-Trimethylphenol

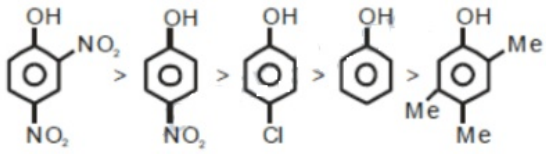
D. Phenol

E. 3-Chlorophenol

Answer: C

Solution:

Order of acidity for following phenol is



- M and −I increases acidity
+M and +I decreases acidity

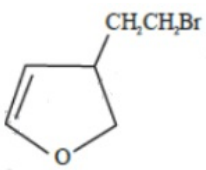
Question18

An organic compound ' A ' with empirical formula C_6H_6O gives sooty flame on burning. Its reaction with bromine solution in low polarity solvent results in high yield of B . B is
[31-Jan-2023 Shift 1]

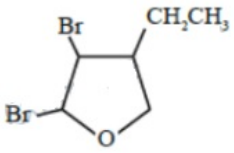
Options:

A.

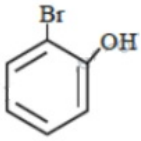
B.



C.



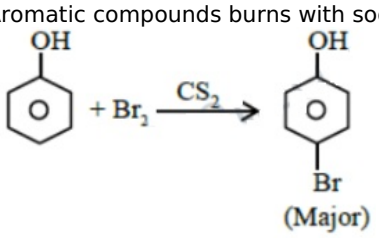
D.



Answer: A

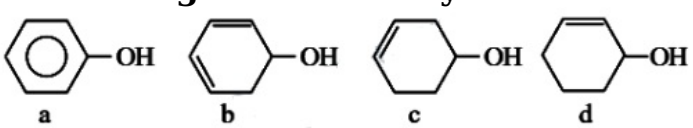
Solution:

Aromatic compounds burns with sooty flame



Question19

Decreasing order of dehydration of the following alcohols is



[1-Feb-2023 Shift 1]

Options:

A. a > d > b > c

B. b > d > c > a

C. b > a > d > c

D. d > b > c > a

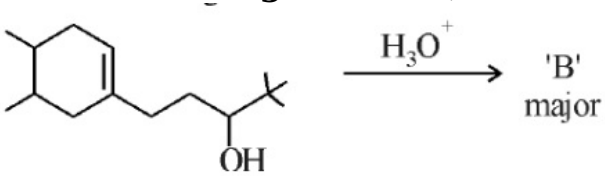
Answer: B

Solution:

Solution:
Dehydration of alcohol is directly proportional to the stability of carbocation.

Question20

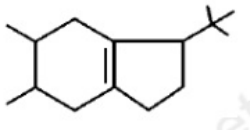
In the following reaction, ' B ' is



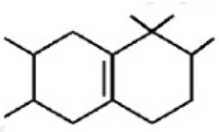
[6-Apr-2023 shift 2]

Options:

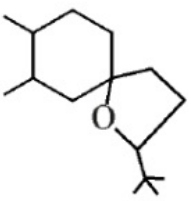
A.



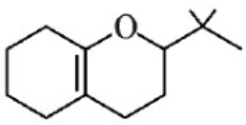
B.



C.

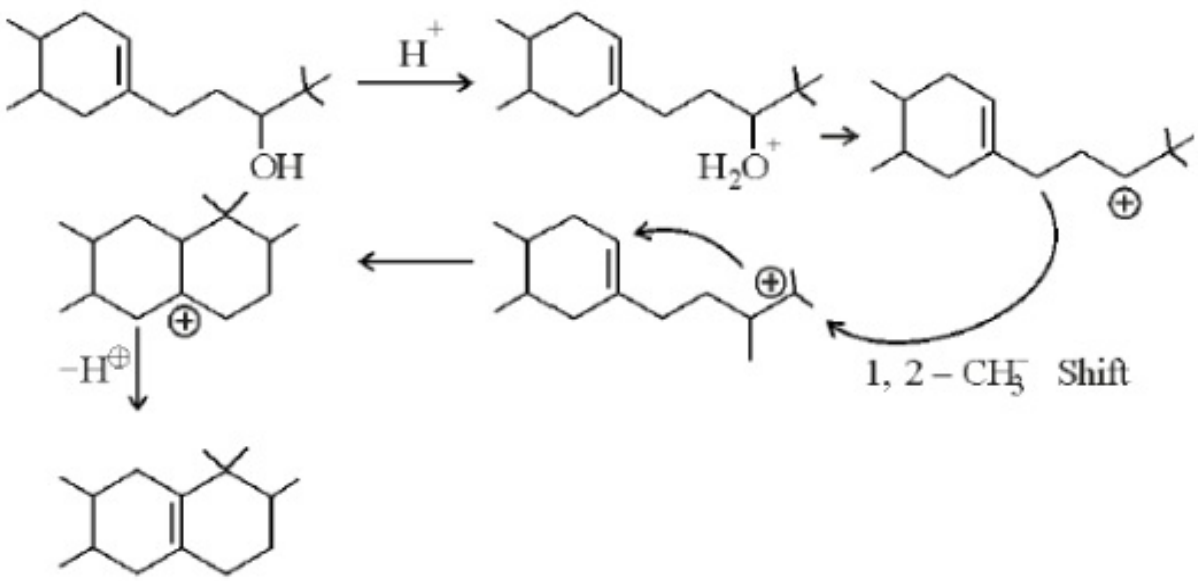


D.



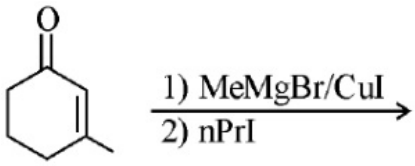
Answer: B

Solution:



Question21

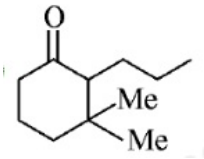
Find out the major product from the following reaction



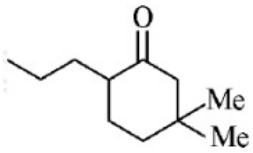
[6-Apr-2023 shift 2]

Options:

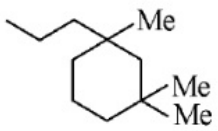
A.



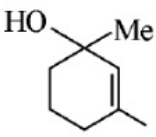
B.



C.

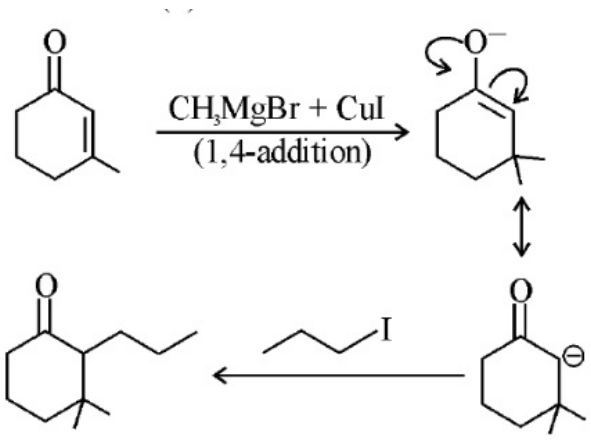


D.



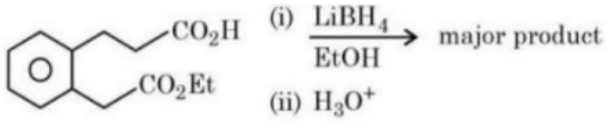
Answer: A

Solution:



Question22

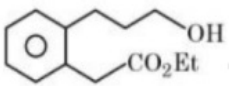
The major product formed in the following reaction is:



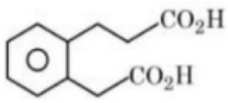
[8-Apr-2023 shift 1]

Options:

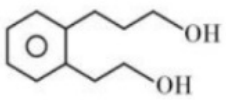
A.



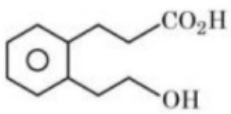
B.



C.

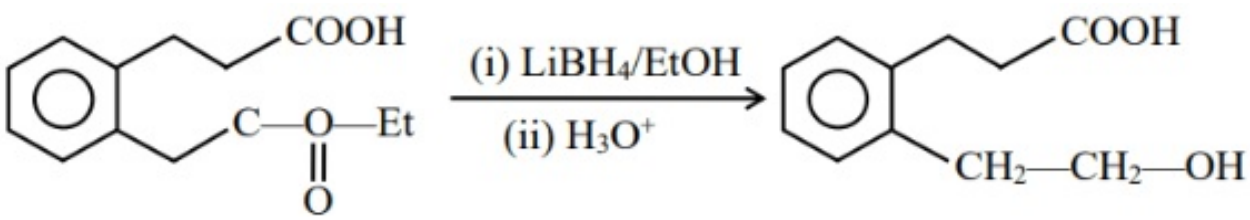


D.



Answer: D

Solution:



Note: Lithium borohydride is commonly used for selective reduction of esters and lactones to the corresponding alcohol.

Question23

A compound ' X ' when treated with phthalic anhydride in presence of concentrated H_2SO_4 yields ' Y ' ' Y ' is used as an acid/base indicator. ' X ' and ' Y ' are respectively:
[8-Apr-2023 shift 2]

Options:

A. Anisole, methyl orange

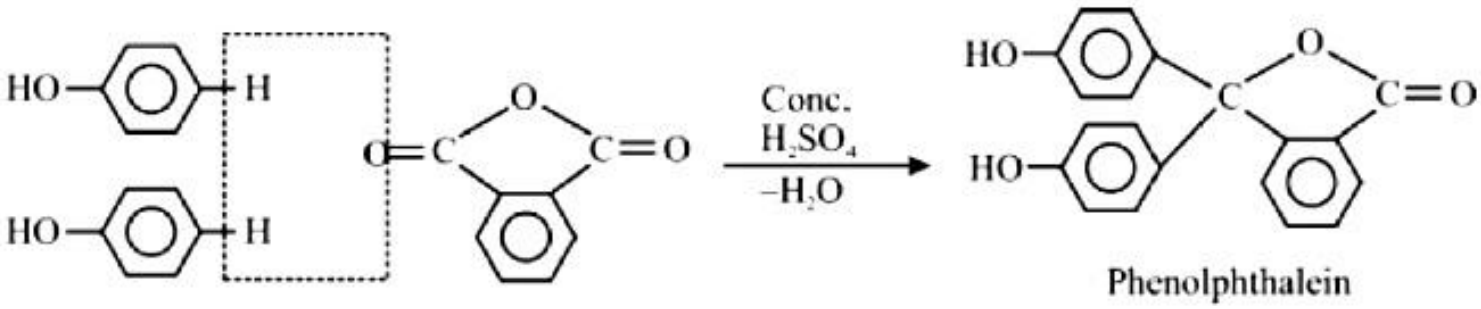
B. Toludine, Phenolphthalein

C. Carbolic acid, Phenolphthalein

D. Salicylaldehyde, Phenolphthalein

Answer: C

Solution:



Question24

Suitable reaction condition for preparation of Methyl phenyl ether is [10-Apr-2023 shift 1]

Options:

A. Benzene, MeBr

B. $PhO^{\ominus}Na^{\oplus}$, MeOH

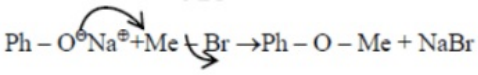
C. $Ph - Br$, $MeO^{\ominus}Na^{\oplus}$

D. $PhO^{\ominus}Na^{\oplus}$, MeBr

Answer: D

Solution:

Williamson;s synthasis :-



Question25

Incorrect method of preparation for alcohols from the following is: [10-Apr-2023 shift 2]

Options:

A. Ozonolysis of alkene.

B. Hydroboration-oxidation of alkene.

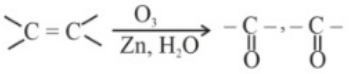
C. Reaction of alkyl halide with aqueous NaOH.

D. Reaction of Ketone with RMgBr followed by hydrolysis.

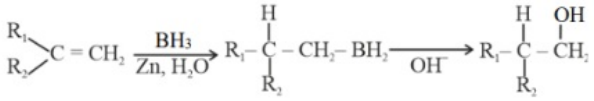
Answer: A

Solution:

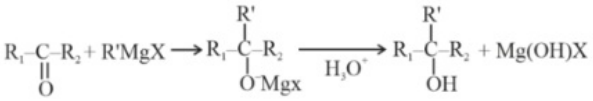
1) Ozonolysis of alkene–



2) Hydroboration – oxidation of alkene

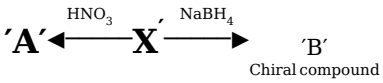


3) $R-X+NaOH \longrightarrow R-OH+NaX$



Question26

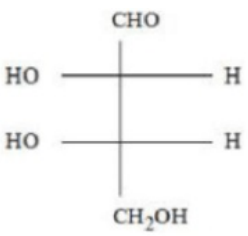
L-isomer of tetrose X($C_4H_8O_4$) gives positive schiff's test and has two chiral carbons. On acetylation. ' X ' yields triacetate. ' X ' undergoes following reactions



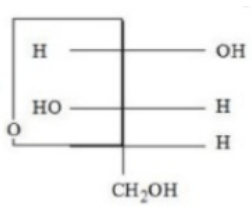
' X ' is
[11-Apr-2023 shift 1]

Options:

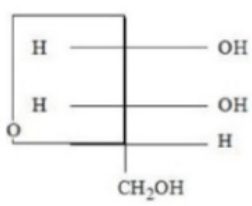
A.



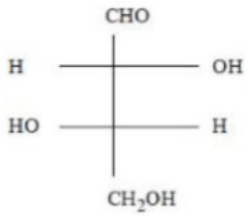
B.



C.

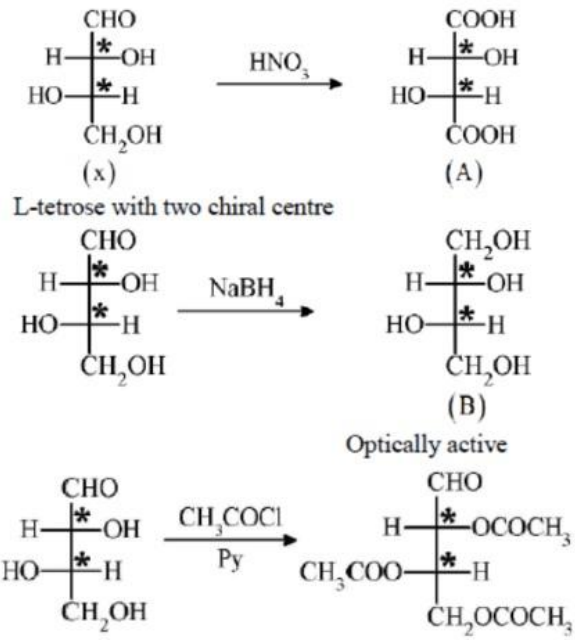


D.



Answer: D

Solution:



(x) gives positive schiff's test due $-CHO$ group
(x) is L-tetrose.

Question27

$$H_3C-CH_2-\underset{\underset{OH}{|}}{CH}-CH_3 \xrightarrow[(ii)\ Mg\ ,\ Dry\ ether]{(i)\ NaI,\ H_3PO_4} \xrightarrow[(iii)D_2O]{} \underset{Product}{[X]}$$

Product [X] formed in the above reaction is: [11-Apr-2023 shift 2]

Options:

A. $H_3C-CH_2-\underset{\underset{D}{|}}{CH}-CH_3$

B. $H_3C-CH_2-CH=CH_2$

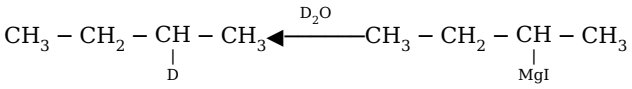
C. $H_3C-CH=CH-CH_3$

D. $H_3C-CH_2-\overset{\overset{H}{|}}{\underset{\underset{OH}{|}}{C}}-CH_3$

Answer: A

Solution:

$$CH_3-CH_2-\underset{\underset{OH}{|}}{CH}-CH_3 \xrightarrow{(i)\ NaI,\ H_3PO_4} CH_3-CH_2-\underset{\underset{I}{|}}{CH}-CH_3$$



Question28

Number of compounds from the following which will not produce orange red precipitate with Benedict solution is _____
Glucose, maltose, sucrose, ribose, 2-deoxyribose, amylose, lactose
[11-Apr-2023 shift 2]

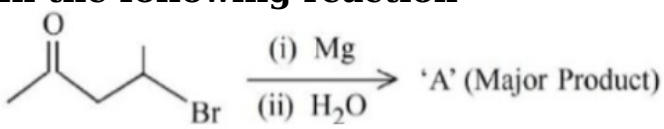
Answer: 2

Solution:

Solution:
Benedict test :
Glucose – ✔
maltose – ✔
sucrose – ×
ribose – ✔
2-deoxyribose – ✔
amylose – ×
lactose – ✔

Question29

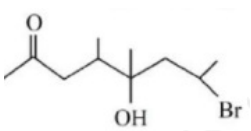
In the following reaction



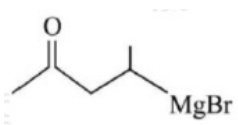
[12-Apr-2023 shift 1]

Options:

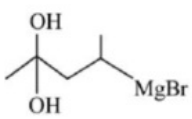
A.



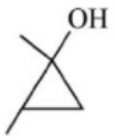
B.



C.

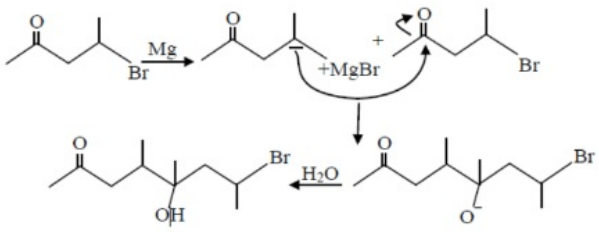


D.



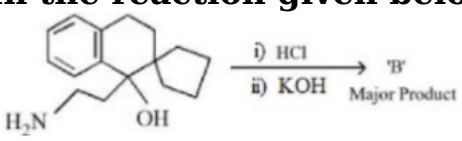
Answer: A

Solution:



Question30

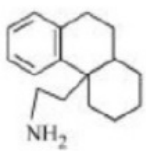
In the reaction given below



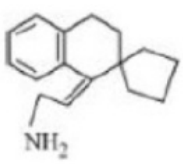
[13-Apr-2023 shift 1]

Options:

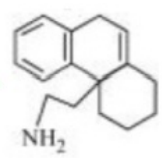
A.



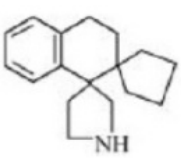
B.



C.

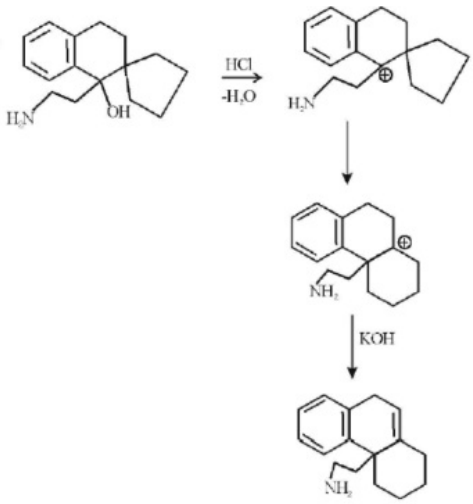


D.

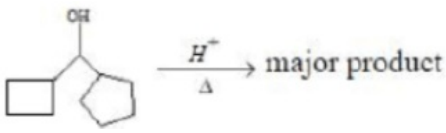


Answer: C

Solution:



Question31



In the above reaction, left hand side and right hand side rings are named as ' A ' and ' B ' respectively. They undergo ring expansion. The correct statement for this process is:
[13-Apr-2023 shift 1]

Options:

A. Finally both rings will become six membered each.

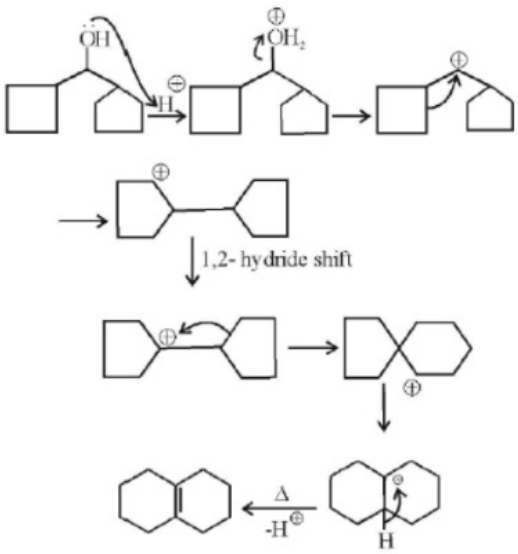
B. Ring expansion can go upto seven membered rings

C. Finally both rings will become five membered each.

D. Only A will become 6 membered.

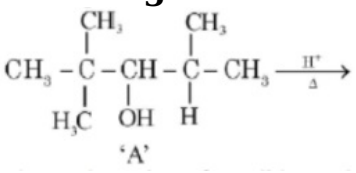
Answer: A

Solution:



Question32

For the given reaction



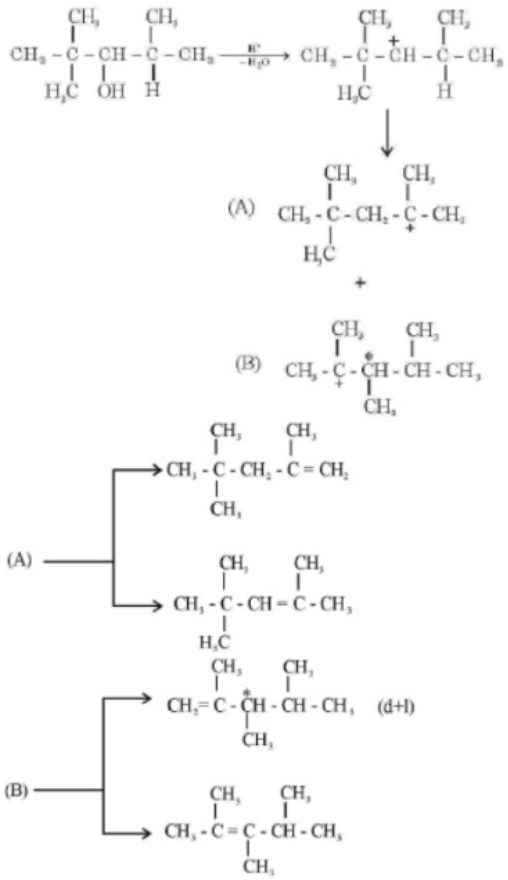
'A'

The total number of possible products formed by tertiary carbocation of A is _____.

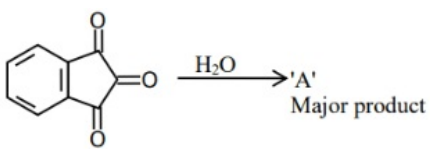
[13-Apr-2023 shift 1]

Answer: 5

Solution:



Question33

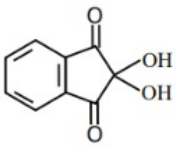


' A ' formed in the above reaction is :

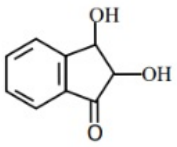
[15-Apr-2023 shift 1]

Options:

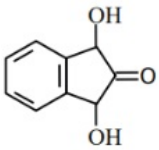
A.



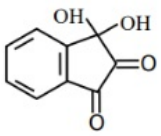
B.



C.

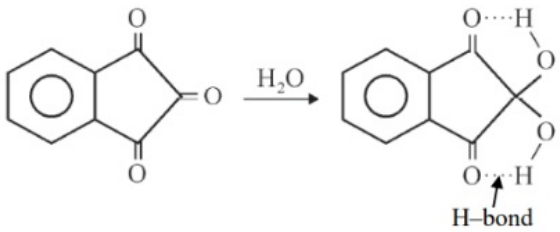


D.



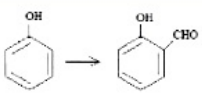
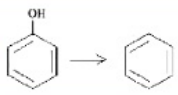
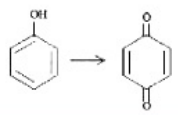
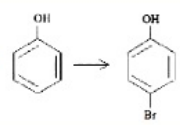
Answer: A

Solution:



Question34

Choose the correct answer from the options given below:

	List-I		List-II
(A)	A. 	I.	Br_2 in CS_2
(B)	B. 	II.	$Na_2Cr_2O_7/H_2SO_4$
(C)	C. 	III.	Zn
(D)	D. 	IV.	$CHCl_3/NaOH$

[27-Jun-2022-Shift-2]

Options:

A. A-IV, B-III, C-II, D-I

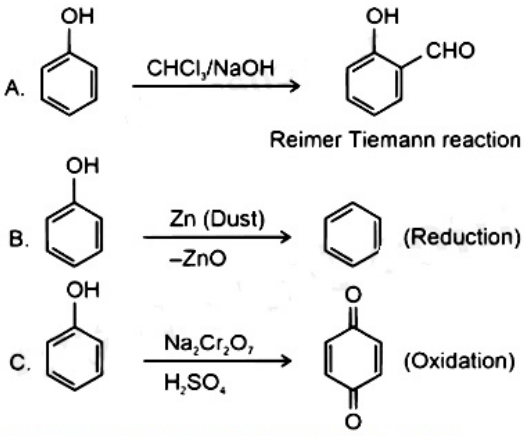
B. A-IV, B-III, C-I, D-II

C. A-II, B-III, C-I, D-IV

D. A-IV, B-II, C-III, D-I

Answer: A

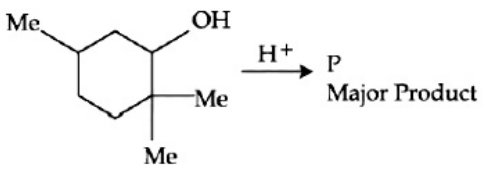
Solution:



∴ Correct match is (A) - IV, (B) - III, (C) - II, (D) - I

Question35

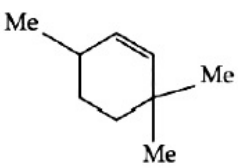
The major product (P) of the given reaction is (where, Me is $-CH_3$)



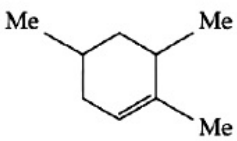
[28-Jun-2022-Shift-2]

Options:

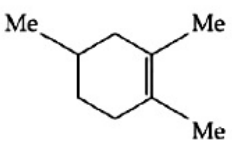
A.



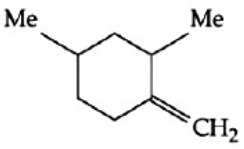
B.



C.

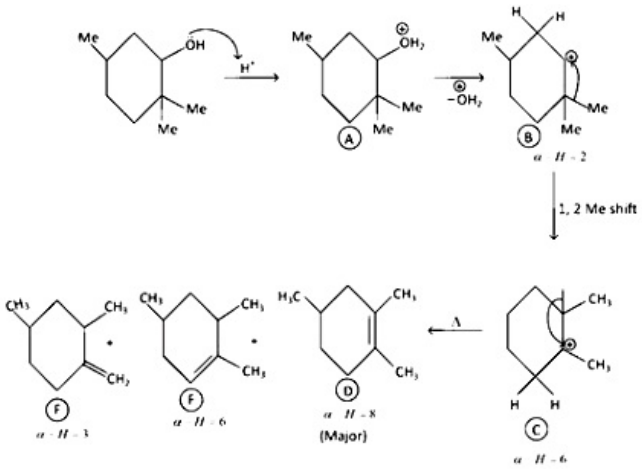


D.



Answer: C

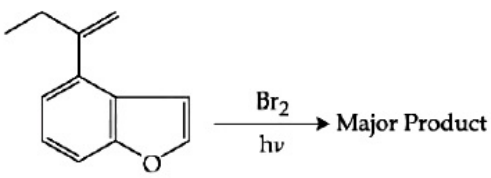
Solution:



(1) In compound A, positive charge on O atom is not stable that is why $\overset{\oplus}{O}H_2$ get's removed.
(2) In Carbocation (B), two $\alpha - H$ present and after 1, 2-methyl shift number of $\alpha - H$ becomes six so it becomes more stable as far carbocation when number of α-H increases stability increases.
(3) Among product D, E and F, D is major product as in case of alkene most stable, alkene are those which have more $\alpha - H$. And every reactant produce that product which is more stable.

Question36

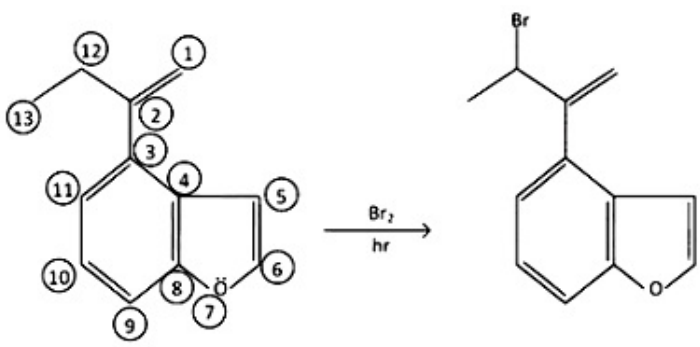
The major product of the following reaction contains _____bromine atom(s).



[28-Jun-2022-Shift-2]

Answer: 1

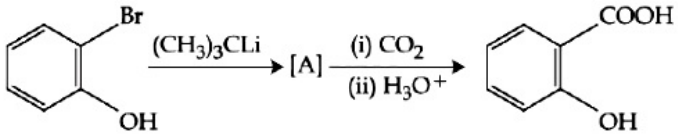
Solution:



Here only carbon 12th and 13th is not taking part in the resonance. All other carbons are taking part in resonance and lone pair of O is also taking part in the resonance.
As because of resonance stability of compound increases Br will not attack to any carbon which is taking part in the resonance and decrease the stability of compound.
So, Br can only attack 12 th carbon or 13 th carbon atom but 12th carbon is a alpha carbon and it can easily donate H^+ion and add Br^-ion and increase stability.

Question37

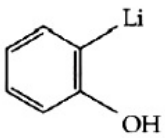
In the given conversion the compound A is :



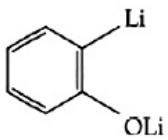
[29-Jun-2022-Shift-1]

Options:

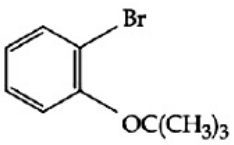
A.



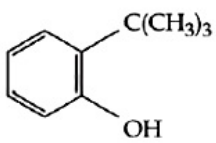
B.



C.

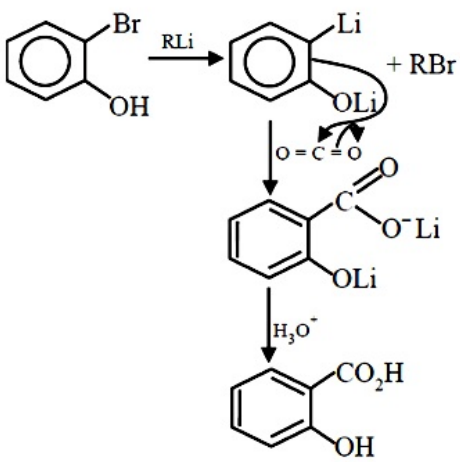


D.



Answer: B

Solution:



Question38

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 :
[29-Jun-2022-Shift-1]

Options:

A. Both Statement I and Statement II are correct.

B. Both Statement I and Statement II are incorrect.

C. Statement I is correct but Statement II is incorrect.

D. Statement I is incorrect but Statement II is correct.

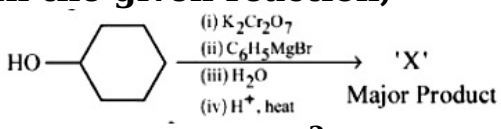
Answer: C

Solution:

Phenol are weakly acidic. Phenol is more acidic than alcohol & H_2O statement (I) is correct. (II) is incorrect.

Question39

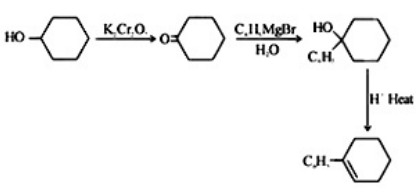
In the given reaction,



the number of sp^2 hybridised carbon(s) in compound ' X ' is __
[29-Jun-2022-Shift-2]

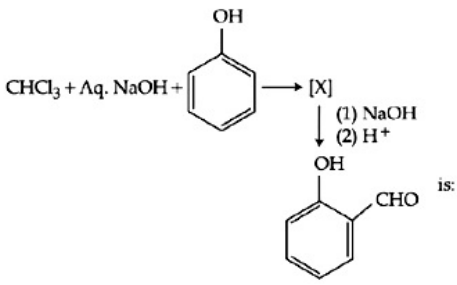
Answer: 8

Solution:



Question40

The intermediate X, in the reaction :

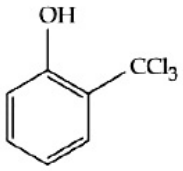


is:

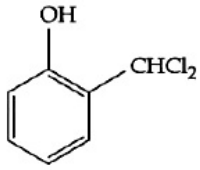
[25-Jun-2022-Shift-1]

Options:

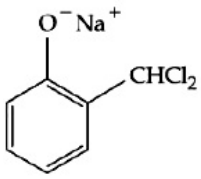
A.



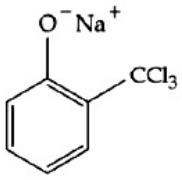
B.



C.



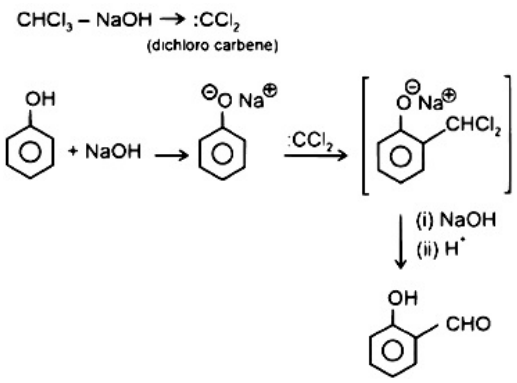
D.



Answer: B

Solution:

Solution:



Question41

Hex-4-ene-2-ol on treatment with PCC gives 'A'. 'A' on reaction with sodium hypoiodite gives ' B ', which on further heating with soda lime gives ' C '. The compound ' C ' is :
[24-Jun-2022-Shift-2]

Options:

A. 2-pentene

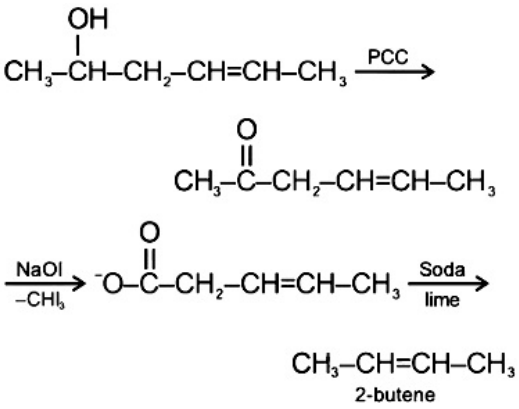
B. proponaldehyde

C. 2-butene

D. 4-methylpent-2-ene

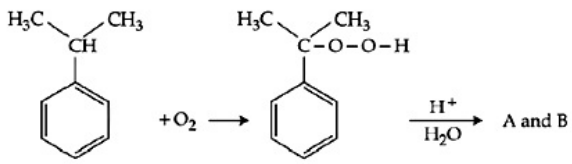
Answer: B

Solution:



Question42

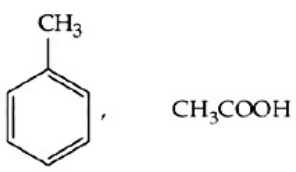
In the following reaction :



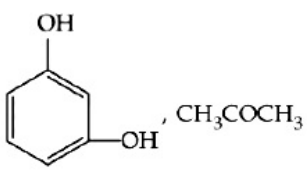
The compounds A and B respectively are : [25-Jun-2022-Shift-1]

Options:

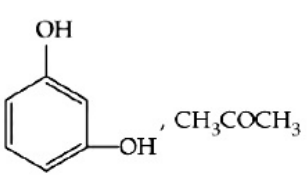
A.



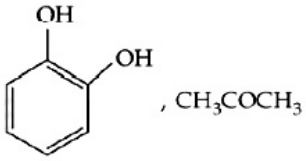
B.



C.



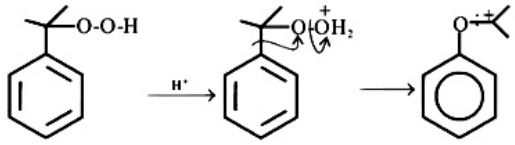
D.

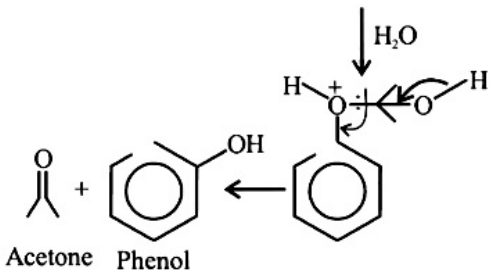


Answer: D

Solution:

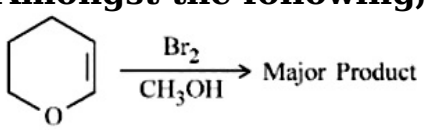
Given reaction is cumene-Peroxide method for the preparation of phenol. In this reaction





Question43

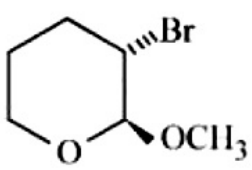
Amongst the following, the major product of the given chemical reaction is



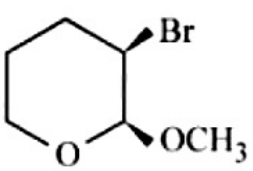
[25-Jun-2022-Shift-2]

Options:

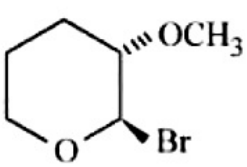
A.



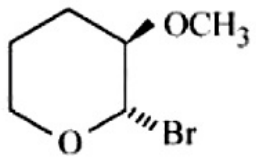
B.



C.

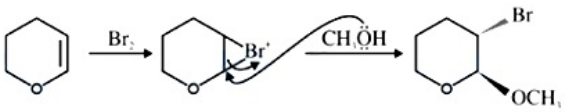


D.



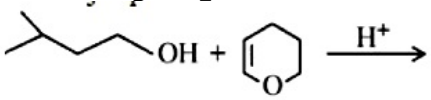
Answer: B

Solution:



Question44

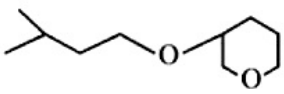
The major product formed in the following reaction, is



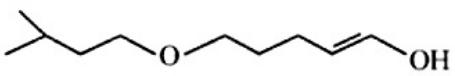
[25-Jun-2022-Shift-2]

Options:

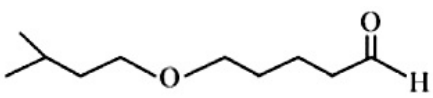
A.



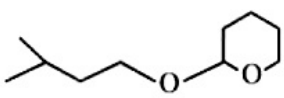
B.



C.

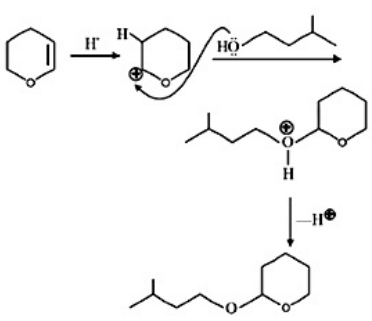


D.



Answer: D

Solution:



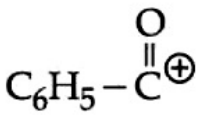
Question45

$(C_7H_5O_2)_2 \xrightarrow{hv} [X] \rightarrow 2C_6H_5 + 2CO_2$

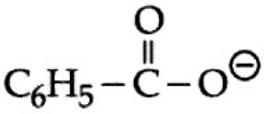
Consider the above reaction and identify the intermediate ' X '
[26-Jun-2022-Shift-1]

Options:

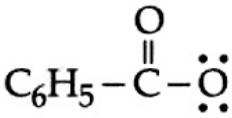
A.



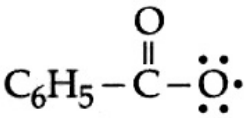
B.



C.

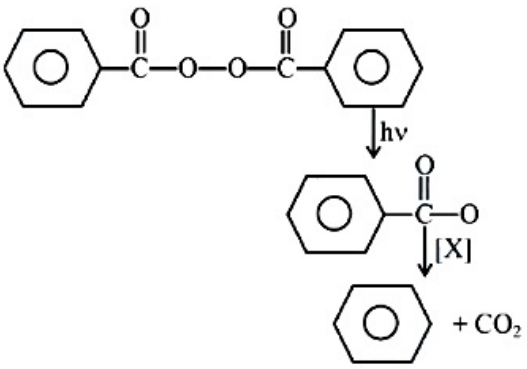


D.



Answer: A

Solution:



Question46

Oxidation of toluene to benzaldehyde can be easily carried out with which of the following reagents?
[26-Jun-2022-Shift-2]

Options:

A. CrO_3 /acetic acid, H_3O^+

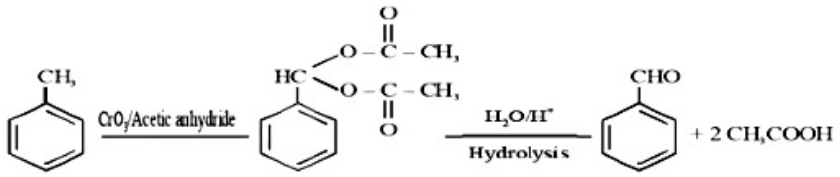
B. CrO_3 /acetic anhydride, H_3O^+

C. $KMnO_4$ / HCl, H_3O^+

D. CO / HCl, anhydrous $AlCl_3$

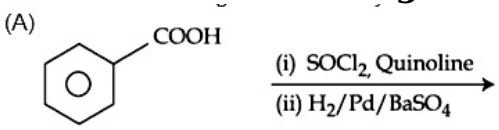
Answer: B

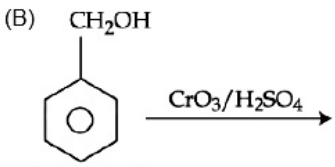
Solution:

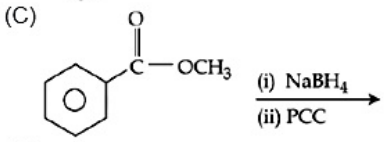


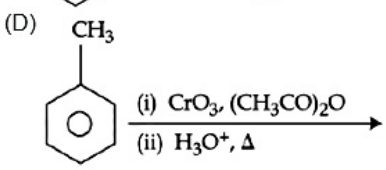
Question47

Which of the following reactions will yield benzaldehyde as a product?

(A) 

(B) 

(C) 

(D) 

[27-Jun-2022-Shift-1]

Options:

A. (B) and (C)

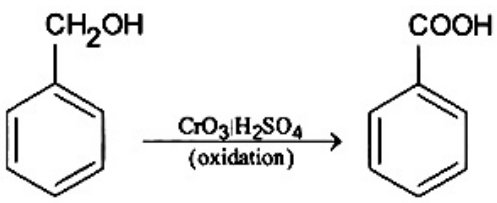
B. (C) and (D)

C. (A) and (D)

D. (A) and (C)

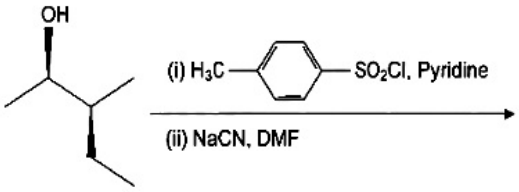
Answer: C

Solution:



Question48

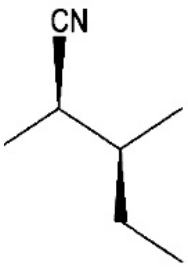
Most stable product of the following reaction is:



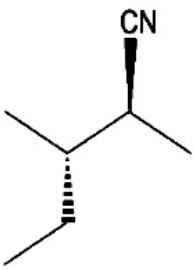
[25-Jul-2022-Shift-1]

Options:

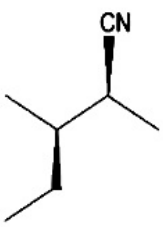
A.



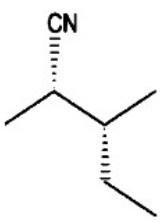
B.



C.

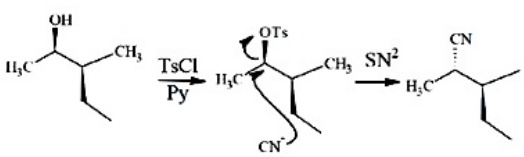


D.



Answer: B

Solution:



Question49

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.
[25-Jul-2022-Shift-1]

Options:

A. Both Statement I and Statement II are correct.

B. Both Statement I and Statement II are incorrect.

C. Statement I is correct but Statement II is incorrect.

D. Statement I is incorrect but Statement II is correct.

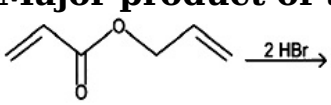
Answer: B

Solution:

Acrolein has a pungent, suffocating odour.
Acrolein is used to detect presence of glycerol

Question50

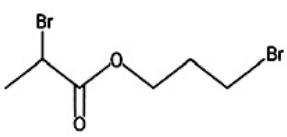
Major product of the following reaction is :



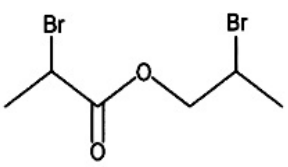
[25-Jul-2022-Shift-2]

Options:

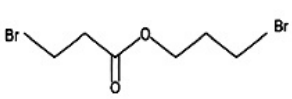
A.



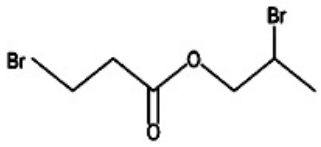
B.



C.

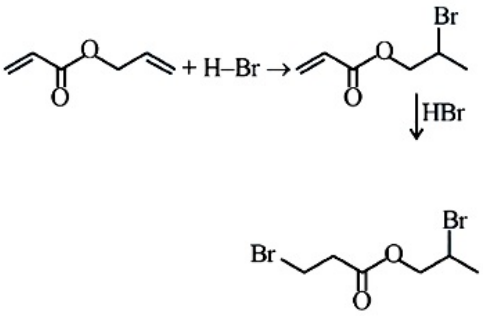


D.



Answer: D

Solution:



Question51

The difference in the reaction of phenol with bromine in chloroform and bromine in water medium is due to :
[26-Jul-2022-Shift-1]

Options:

A. Hyperconjugation in substrate

B. Polarity of solvent

C. Free radical formation

D. Electromeric effect the substrate

Answer: B

Solution:

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

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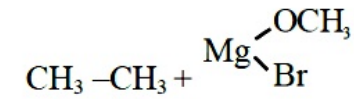
Question52

A 100 mL solution of CH_3CH_2MgBr on treatment with methanol produces 2.24 mL of a gas at STP. The weight of gas produced is _____ mg. [nearest integer]
[26-Jul-2022-Shift-2]

Answer: 3

Solution:

$CH_3–CH_2–MgBr + CH_3OH \longrightarrow$



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

$W = n \times M$

$= 10^{-4} \times 30 = 3\,mg$

Question53

When enthanol 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
[29-Jul-2022-Shift-2]

Options:

A. formaldehyde

B. formic acid

C. glycol

D. ethanoic acid

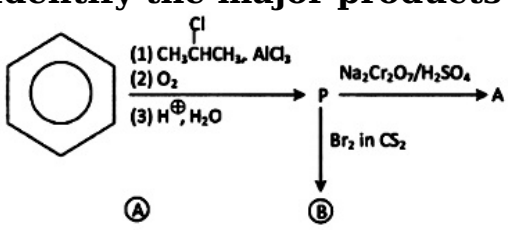
Answer: C

Solution:

$$CH_3 - CH_2 - OH \xrightarrow[\Delta]{\text{Conc. } H_2SO_4} CH_2 = CH_2 \xrightarrow[\text{Bayers reagent}]{\text{Cold dil solution of}} OH - CH_2 - CH_2 - OH(\text{ Glycol })$$

Question54

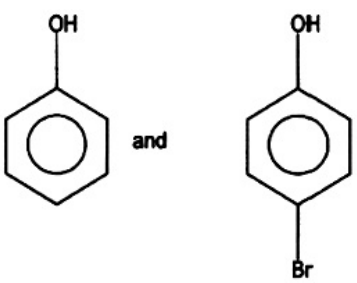
Identify the major products A and B for the below given reaction sequence.



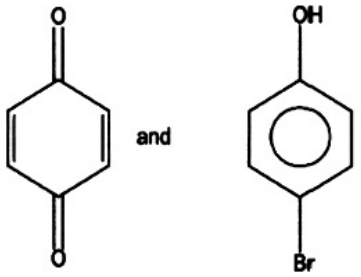
[28-Jul-2022-Shift-1]

Options:

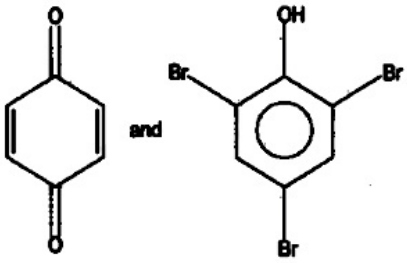
A.



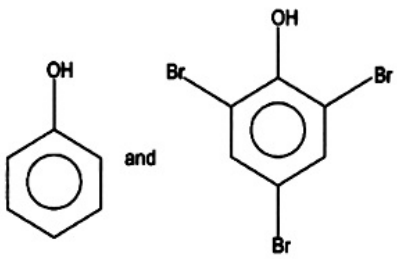
B.



C.

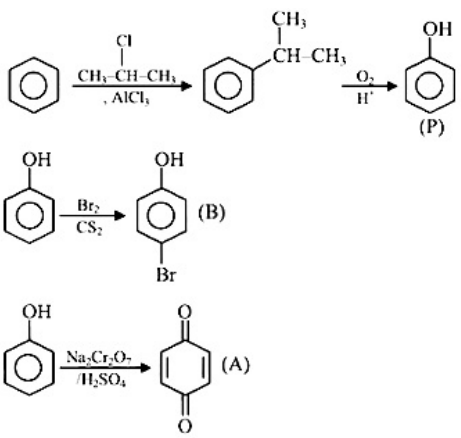


D.



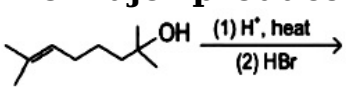
Answer: B

Solution:



Question55

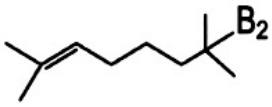
The major product in the given reaction is



[28-Jul-2022-Shift-2]

Options:

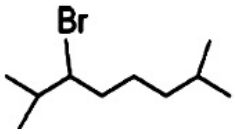
A.



B.

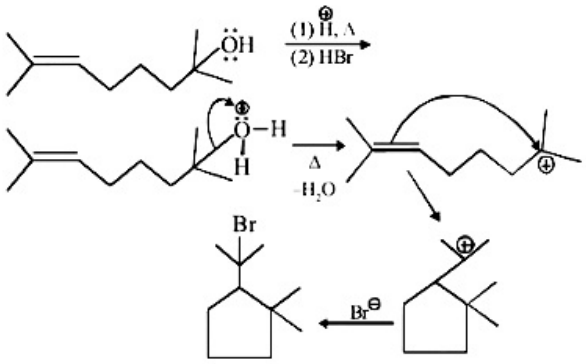
C.

D.



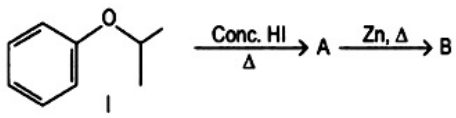
Answer: C

Solution:



Question56

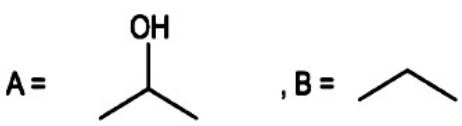
Compound I is heated with Conc. HI to give a hydroxy compound A which is further heated with Zn dust to give compound B. Identify A and B.



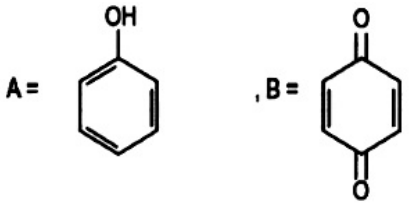
[28-Jul-2022-Shift-2]

Options:

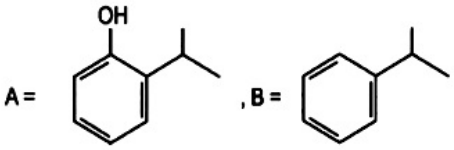
A.



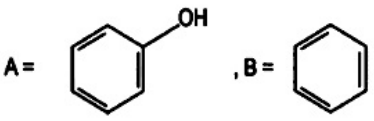
B.



C.

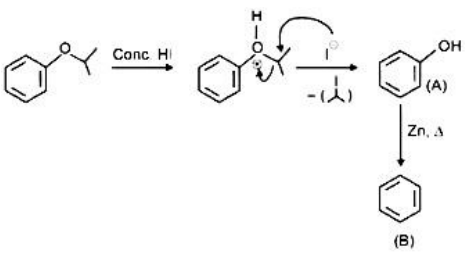


D.



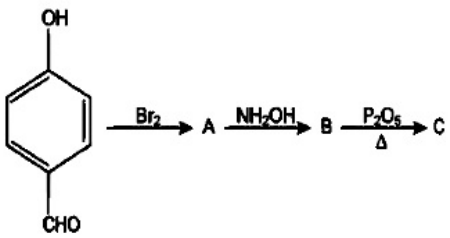
Answer: D

Solution:



Question57

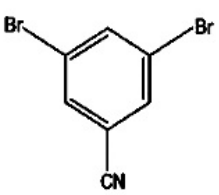
Consider the above reaction sequence, the Product ' C ' is :



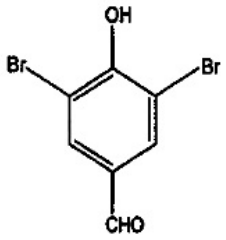
[29-Jul-2022-Shift-1]

Options:

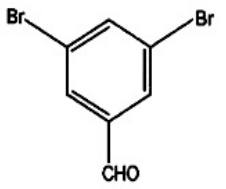
A.



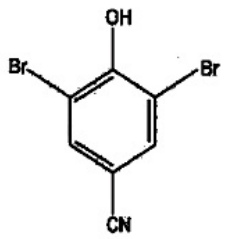
B.



C.

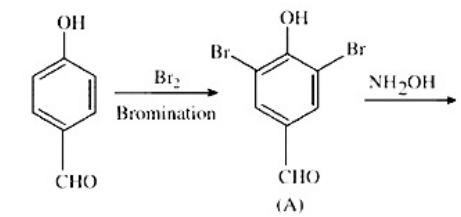


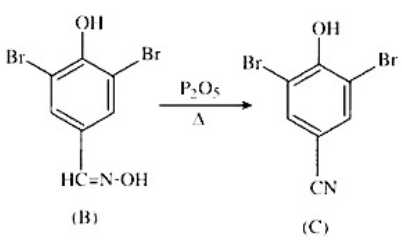
D.



Answer: D

Solution:



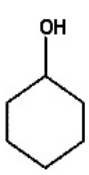


Question58

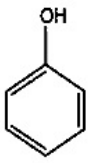
A compound ' X ' is acidic and it is soluble in NaOH solution, but insoluble in $NaHCO_3$ solution. Compound ' X ' also gives violet colour with neutral $FeCl_3$ solution. The compound ' X ' is :
[29-Jul-2022-Shift-1]

Options:

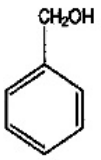
A.



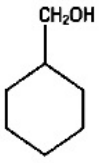
B.



C.

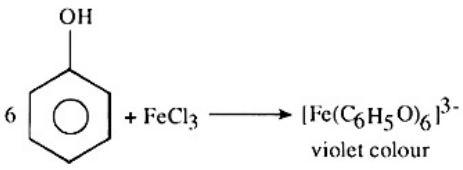


D.



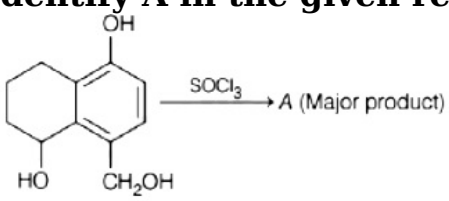
Answer: B

Solution:



Question59

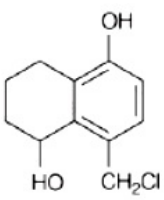
Identify A in the given reaction.



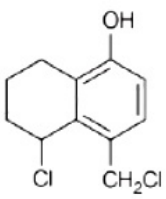
[26 Feb 2021 Shift 2]

Options:

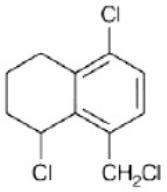
A.



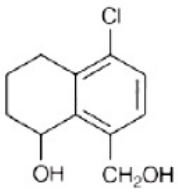
B.



C.



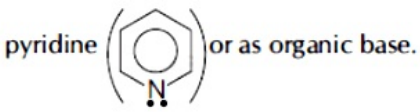
D.

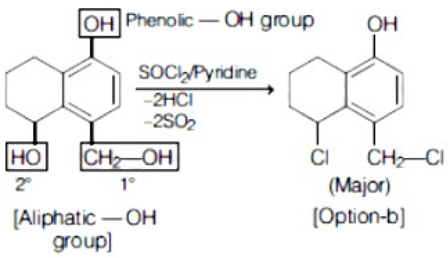


Answer: B

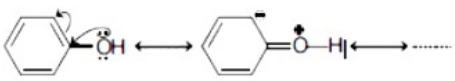
Solution:

Solution:
The given reaction is an application of Darzen's reaction in which an aliphatic alcohol (preferably 1° or 2°) gets converted into the respective alkyl chloride (in pure form) through S_N2 pathway when it uses



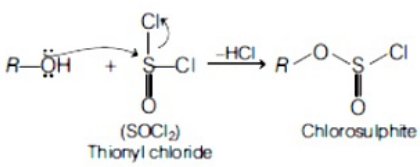


Note Phenolic - OH group does not respond to this reaction as $+R$ effect of phenolic $-OH$ group gives double bond character to the $C-O$ bond.

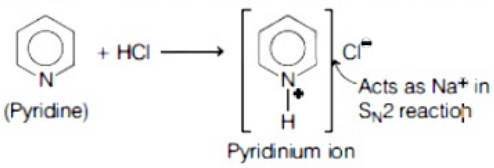


Machanism

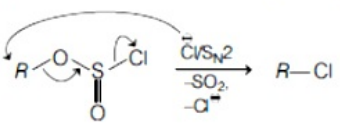
(i) Alcohol react with thionyl chloride to give chlorosulphite and HCl.



(ii) Pyridine reacts with HCl to give pyridinium chloride.



(iii) Chlorosulphite reacts with chloride ion *via.* bimolecular nucleophilic substitution reaction to give alkyl chloride.



Question60

Ceric ammonium nitrate and $CHCl_3$ /alc. KOH are used for the identification of functional groups present in and respectively.
[26 Feb 2021 Shift 2]

Options:

A. alcohol, phenol

B. amine, alcohol

C. alcohol, amine

D. amine, phenol

Answer: C

Solution:

Ceric ammonium nitrate and $CHCl_3$ / alc . KOH are used for the identification of functional groups present in alcohol and amine respectively.
Ceric ammonium nitrate (CAN) test When an alcohol reacts with few drops of CAN, a red complex ammonium nitrate is developed which confirms presence of alcoholic $-OH$ group.

$$\underset{\text{Alcohol}}{3ROH} + \underset{\text{Ceric ammonium}}{(NH_4)_2[Ce(NO_3)_6]} \xrightarrow[\text{Red colour}]{-NH_4NO_3} \underset{\text{Red complex}}{[Ce(NO_3)_4(ROH)_3]}$$

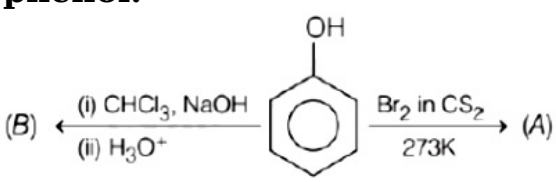
Test with $CHCl_3$ and alcoholic KOH
[Carbylamine test or Saytzeff's isocyanide test]
When a primary amine (aliphatic or aromatic) is heated with alcoholic KOH and chloroform ($CHCl_3$), the isocyanide (carbylamine) is formed as indicated by a foul order.

$$\underset{1^\circ-\text{amine}}{R-NH_2} + CHCl_3 + \underset{\text{(alc.)}}{3KOH} \xrightarrow{\Delta} \underset{\text{Carbylamine}}{R-NC} \; -3KCl - 3H_2O$$

Secondary and tertiary amines do not respond to carbylamine test.

Question61

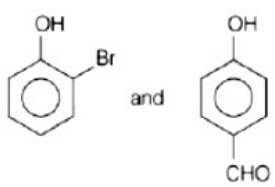
Identify the major products A and B respectively in the following reactions of phenol.



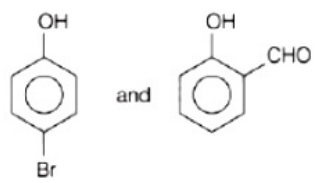
[26 Feb 2021 Shift 1]

Options:

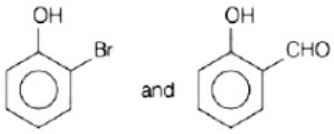
A.



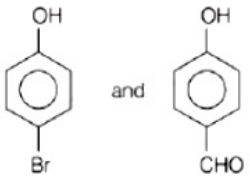
B.



C.



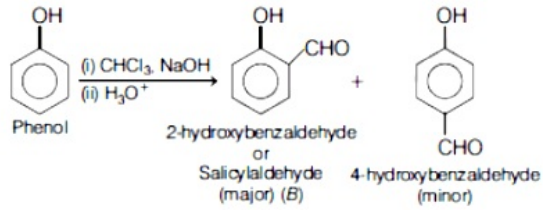
D.



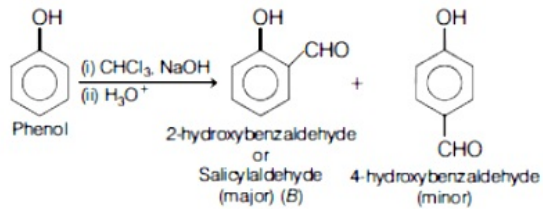
Answer: B

Solution:

Phenol on reaction with Br_2 in CS_2 / $273K$ undergoes an electrophilic substitution reaction by Br^+(electrophile) in aprotic solvent CS_2 to give 4-bromophenol as the major product.



Phenol on reaction with$CH\,Cl_3$, $N\,aOH$ followed by hydrolysis gives Phenol on reaction with $CH\,Cl_3$, $N\,a$ salicylaldehyde as a major product.
It is Reimer-Tiemann reaction. It is also an electrophilic substitution reaction of phenol by dichlorocarbene CCl_2 (electrophilic).



Question62

Given below are two statements:
Statement I o-nitrophenol is steam volatile due to intramolecular hydrogen bonding.
Statement II o-nitrophenol has high melting due to hydrogen bonding.
In the light of the above statements, choose themost appropriate answer from the options given below.
[26 Feb 2021 Shift 1]

Options:

A. Statement I is false but statement II is true

B. Both statement I and statement II are true

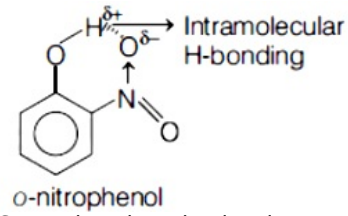
C. Both statement I and statement II are false

D. Statement I is true but statement II is false

Answer: D

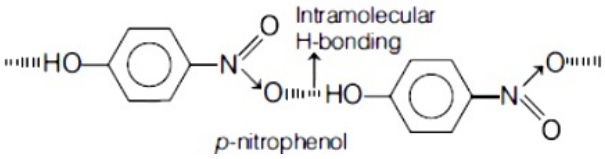
Solution:

Statement I is true. Because of closer proximity (1, 2-positions) of $-OH$ and $-N\,O_2$ groups, o-nitrophenol shows intramolecular hydrogen bonding.



o-nitrophenol

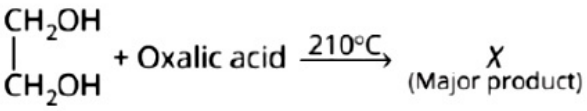
So, o-nitrophenol exists in monomeric state and becomes steam volatile.
Statement II is false, because, due to the presence of intramolecular hydrogen bonding, boiling point and melting point of o-nitrophenol will be lower.
Note p-nitrophenol is the positional isomer of o-nitrophenol. p-nitrophenol shows intermolecular hydrogen bonding and so, it has higher boiling point, melting point and water solubility.



p-nitrophenol

Question63

What is ' X ' in the given reaction?



[25 Feb 2021 Shift 2]

Options:

A. 

B. 

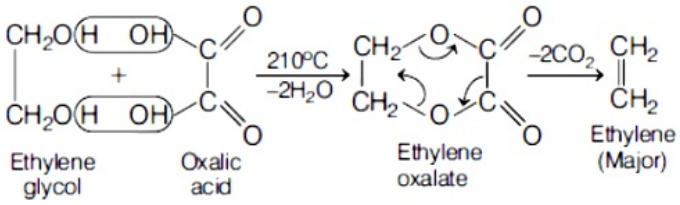
C. 

D. 

Answer: C

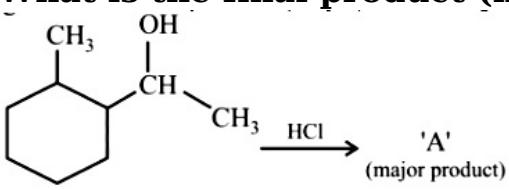
Solution:

When ethylene glycol is heated with oxalic acid at 210˚C, first we get an unstable cyclic-diester (ethylene oxalate) which readily decarboxylate to give ethylene as the major product.



Question64

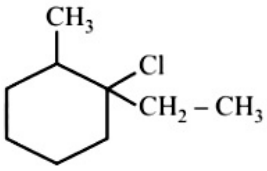
What is the final product (major) 'A' in the given reaction?



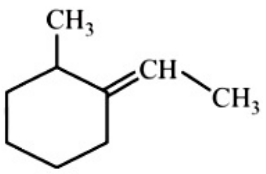
[24 Feb 2021 Shift 1]

Options:

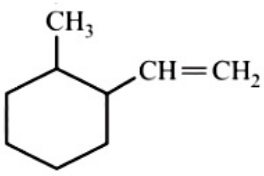
A.



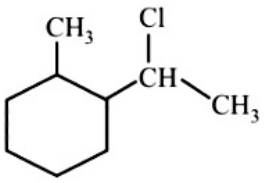
B.



C.

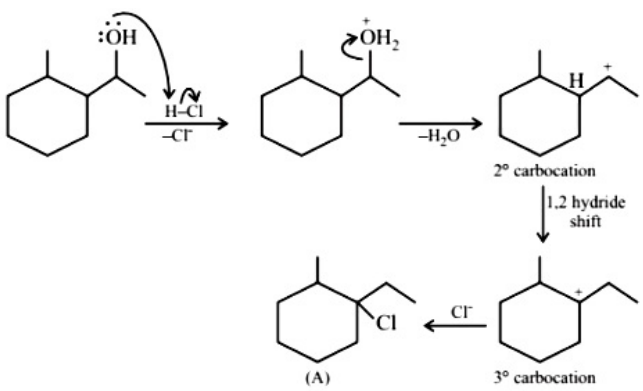


D.



Answer: A

Solution:



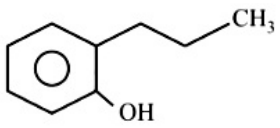
Question65

Which of the following compound gives pink colour on reaction with phthalic anhydride in conc. H_2SO_4 followed by treatment with NaOH ?

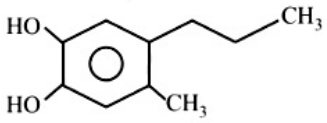
[24 Feb 2021 Shift 1]

Options:

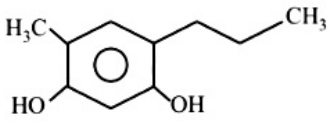
A.



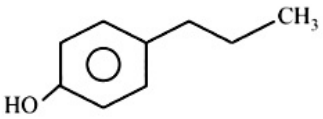
B.



C.

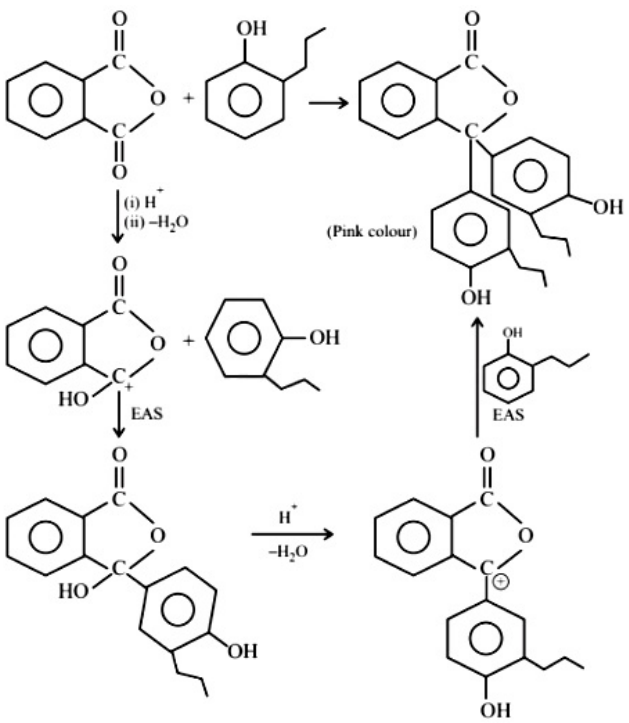


D.

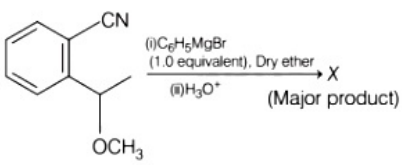


Answer: A

Solution:



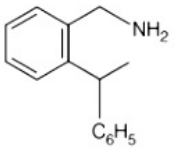
Question66



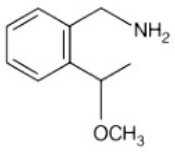
[16 Mar 2021 Shift 2]

Options:

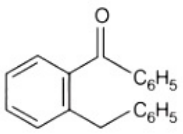
A.



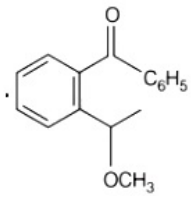
B.



C.



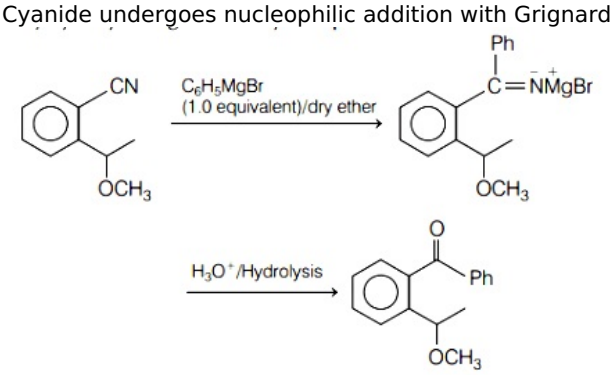
D.



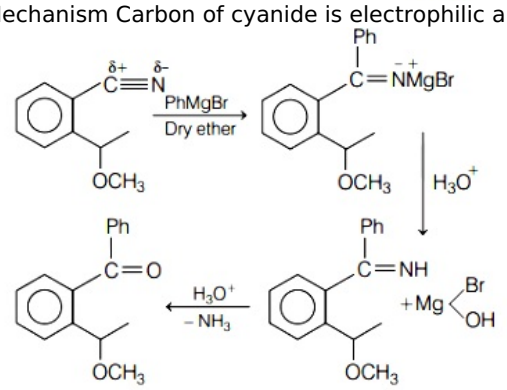
Answer: D

Solution:

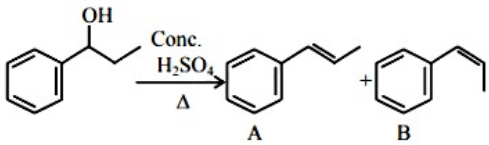
Cyanide undergoes nucleophilic addition with Grignard followed by hydrolysis to give carbonyl compound.



Mechanism Carbon of cyanide is electrophilic and is attacked by nucleophilic phenyl anion.



Question67



Consider the above reaction, and choose the correct statement :
[27 Jul 2021 Shift 2]

Options:

A. The reaction is not possible in acidic medium

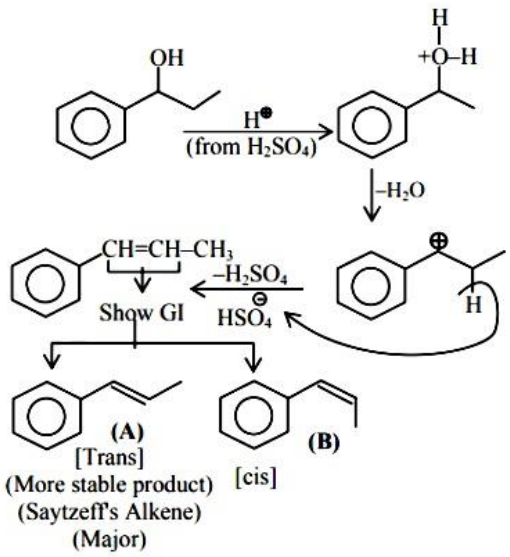
B. Both compounds A and B are formed equally

C. Compound A will be the major product

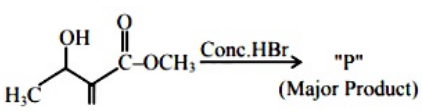
D. Compound B will be the major product

Answer: C

Solution:



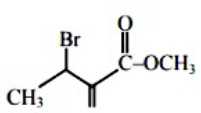
Question68



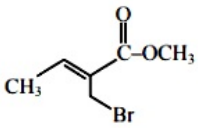
Consider the above reaction, the major product "P" formed is :-
[27 Jul 2021 Shift 2]

Options:

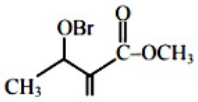
A.



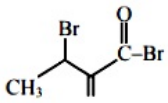
B.



C.

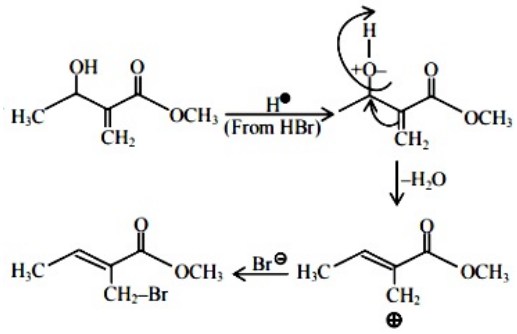


D.

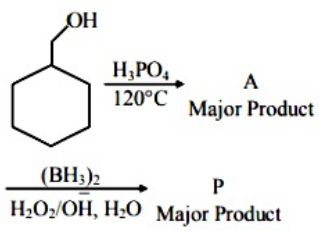


Answer: B

Solution:



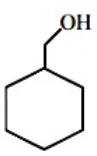
Question69



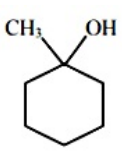
Consider the above reaction and identify the Product P :
[27 Jul 2021 Shift 1]

Options:

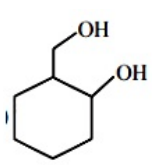
A.



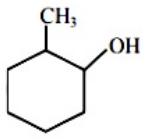
B.



C.

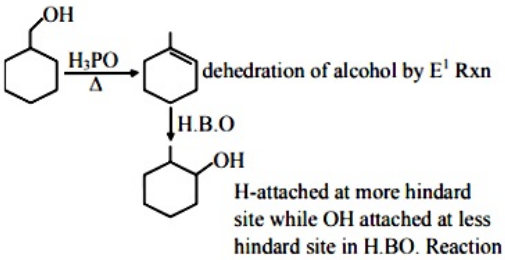


D.



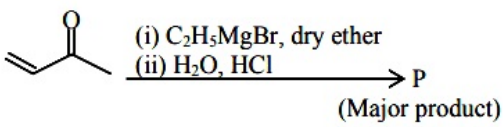
Answer: D

Solution:



Question70

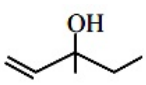
Consider the above reaction, the major product 'P' is:



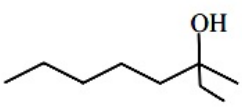
[25 Jul 2021 Shift 1]

Options:

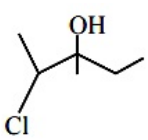
A.



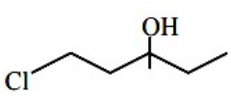
B.



C.

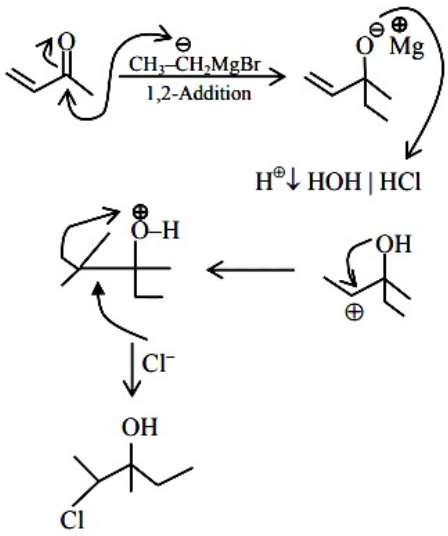


D.



Answer: C

Solution:



Question71

In the given reaction 3-Bromo-2, 2 -dimethyl butane $\xrightarrow{C_2H_5OH}$ 'A' (Major Product) Product A is:

[20 Jul 2021 Shift 1]

Options:

A. 2 -Ethoxy-3, 3 -dimethyl butane

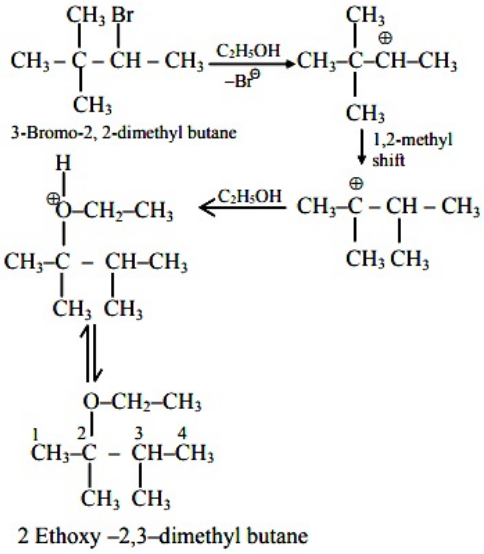
B. 1-Ethoxy-3, 3-dimethyl butane

C. 2-Ethoxy-2, 3 -dimethyl butane

D. 2 -Hydroxy-3, 3 -dimethyl butane

Answer: C

Solution:



Question72

Given below are two statements.
One is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A) Treatment of bromine water with propene yields 1-bromopropan-2-

ol.
Reason (R) Attack of water on bromonium ion follows Markownikoff rule and results in 1-bromopropan-2-ol.
In the light of the above statements, choose the most appropriate answer from the options given below.
[31 Aug 2021 Shift 1]

Options:

A. Both (A) and (R) are true but (R) is not the correct explanation of (A).

B. (A) is false but (R) is true.

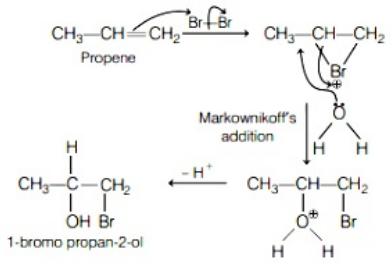
C. Both (A) and (R) are true and (R) is the correct explanation of (A).

D. (A) is true but (R) is false

Answer: C

Solution:

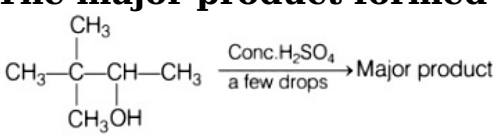
Propene reacts with bromine water to yield 1-bromopropan-2-ol.



Markownikoff's rule states that in an unsymmetrical alkene the electron rich nucleophile adds to the C-atom with lesser number of hydrogen.
Hence, both A and R are true and R is the correct explanation of A.
Hence, correct option is (c).

Question73

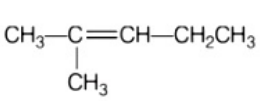
The major product formed in the following reaction is



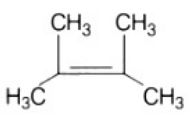
[31 Aug 2021 Shift 1]

Options:

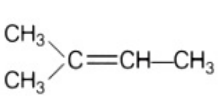
A.



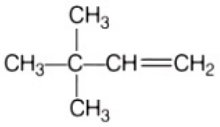
B.



C.



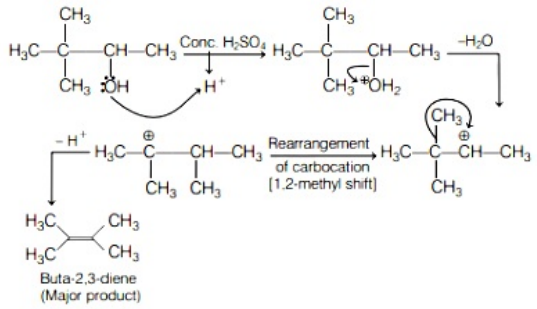
D.



Answer: B

Solution:

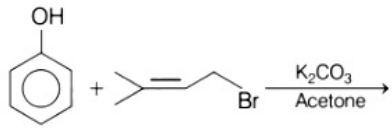
3,3-dimethylbutan-2-ol reacts with concentrated H_2SO_4 to form but-2,3-diene.



Hence, correct option is (b).

Question74

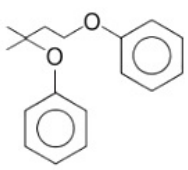
The major product of the following reaction, if it occurs by S_N2 mechanism is



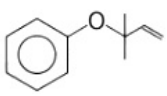
[27 Aug 2021 Shift 2]

Options:

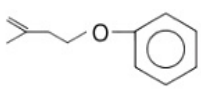
A.



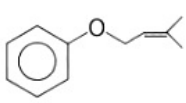
B.



C.



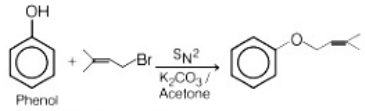
D.



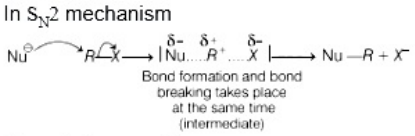
Answer: D

Solution:

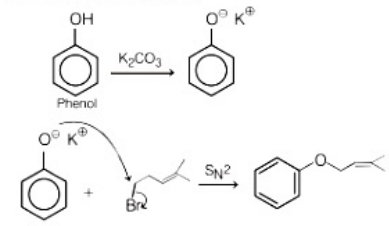
In S_N2 reaction, no formation of carbocation takes place. The nucleophile here which is phenoxide attacks from the back side to the carbon bearing the leaving group (bromide ion).



In S_N2 mechanism



Here, in the question



So, here option (d) is correct.

Question75

Given below are two statements
Statement I Ethyl pent-4-yn-oate on reaction with CH_3MgBr gives a 3° alcohol.
Statement II In this reaction, one mole of ethyl pent-4-yn-oate utilizes two moles of CH_3MgBr. In the light of the above statements, choose the most appropriate answer from the options given below.
[27 Aug 2021 Shift 2]

Options:

A. Both statement I and statement II are false.

B. Statement I is false but statement II is true.

C. Statement I is true but statement II is false.

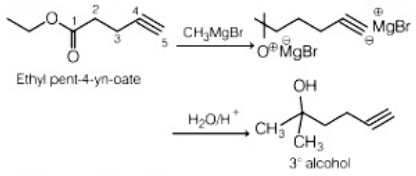
D. Both statement I and statement II are true.

Answer: C

Solution:

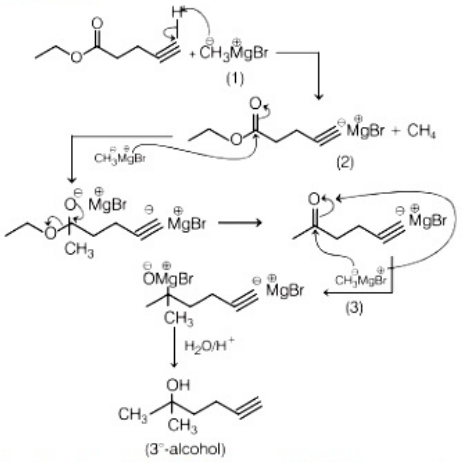
Solution:

Ethyl pent-4-yn-oate on reaction with CH_3MgBr gives 3° alcohol.



∴ Statement I is true.

Mechanism



3 molecules of CH_3MgBr is used for this conversion.

∴ Statement II is false.

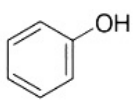
Question76

Which one of the following phenols does not give colour when condensed with phthalic anhydride in presence of conc. H_2SO_4 ?

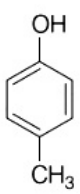
[26 Aug 2021 Shift 2]

Options:

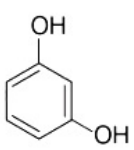
A.



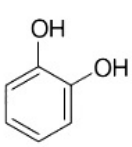
B.



C.



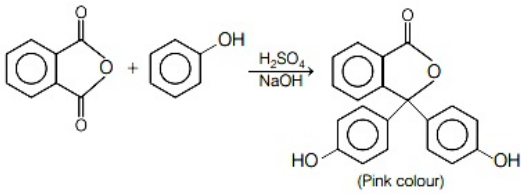
D.



Answer: B

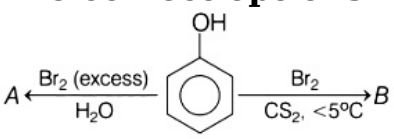
Solution:

Solution:
In the electrophilic substitution reaction, phenol gives ortho and para substituted product in which para is the major product. The electrophilic substitution reaction of phthalic anhydride with phenol is taking place at para position of the phenol. Allthe given molecules have free para position except in p-cresol.
Hence, it does not give colour of phthalic anhydride.
The reaction is as follows :



Question77

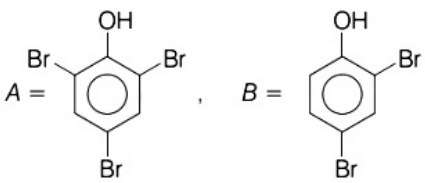
The correct options for the products A and B of the following reactions are



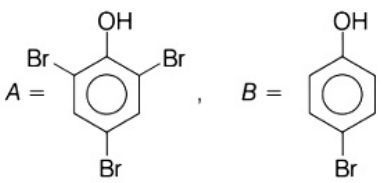
[26 Aug 2021 Shift 1]

Options:

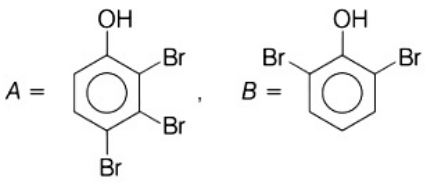
A.



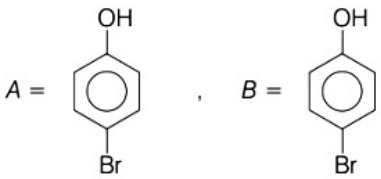
B.



C.



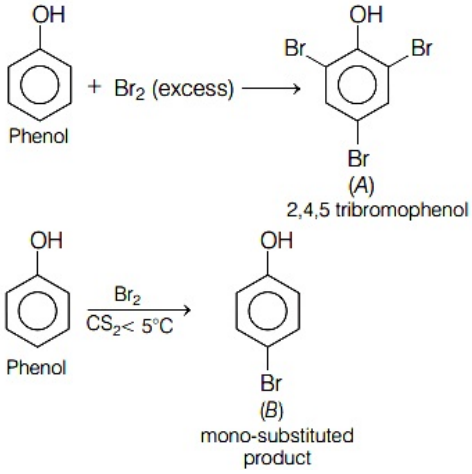
D.



Answer: B

Solution:

Bromination of phenol with excess of bromine and water will result in multiple substitution around ring as water ionises phenol to phenoxide ion, which activities the ring for trisubstitution, while less polar solvent, i.e. CS_2 will give mono-substituted compound.



Question78

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 statements, choose the most appropriate answer from the options given below
[27 Aug 2021 Shift 1]

Options:

A. Both (A) and (R) are correct and (R) is the correct explanation of (A)

B. (A) is correct but (R) is incorrect

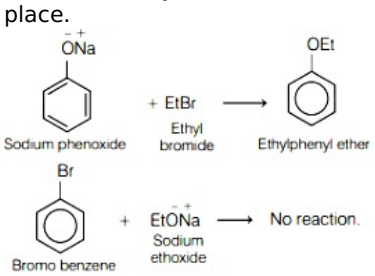
C. (A) is incorrect but (R) is correct

D. Both (A) and (R) are correct but (R) is not the correct explanation of (A)

Answer: B

Solution:

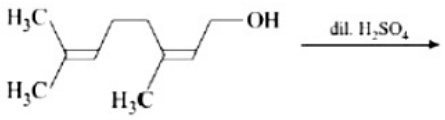
Williamson's synthesis is used to prepare mixed ethers as well as simple ether. To prepare ethyl phenyl ether following reaction take place.



This reaction is not possible as bromine has partial double bond character with benzene ring, so it cannot be dissociated. So, Assertion is correct but Reason is not correct.

Question79

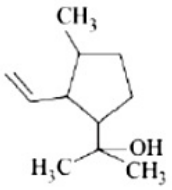
The major product of the following reaction is:



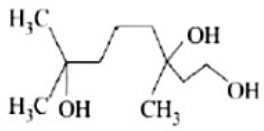
[Jan. 08,2020(I)]

Options:

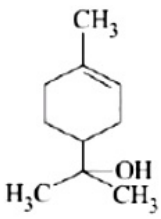
A.



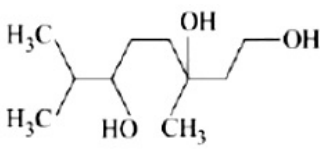
B.



C.

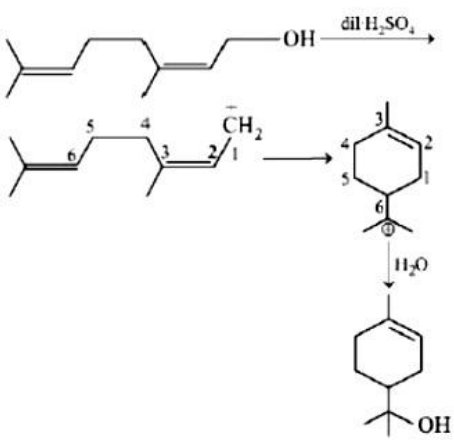


D.



Answer: C

Solution:



Question80

Arrange the following compounds in increasing order of C − OH bond length:

methanol, phenol, p -ethoxyphenol
[Jan. 08,2020(1)]

Options:

A. methanol <p -ethoxyphenol < phenol

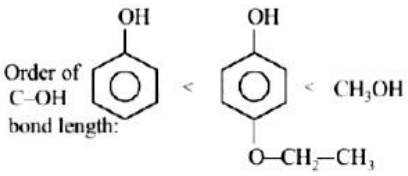
B. phenol < methanol <p -ethoxyphenol

C. phenol <p -ethoxyphenol < methanol

D. methanol < phenol <p -ethoxyphenol

Answer: C

Solution:



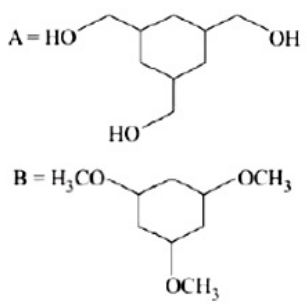
Resonance is a deciding factor to determine the order of bond length in given compounds. Phenol exhibits least $C-OH$ bond length due to resonance, whereas methanol will show maximum bond length due to lack of resonance and p -ethoxyphenol will have some intermediate value of bond length.

Question81

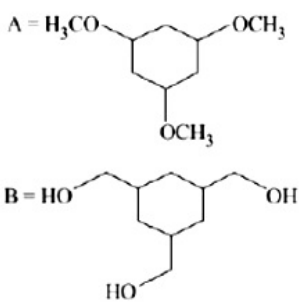
Among the compounds A and B with molecular formula $C_9H_{18}O_3$, A is having higher boiling point the B. The possible structures of A and B are:
[Jan. 08,2020(II)]

Options:

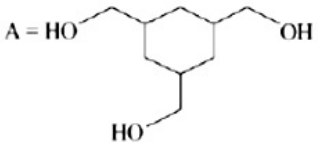
A.

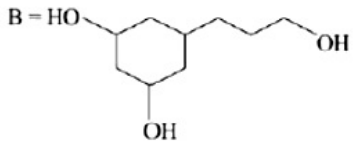


B.

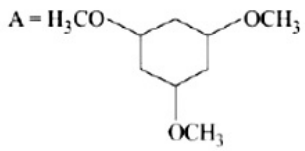


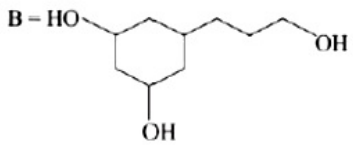
C.





D.





Answer: A

Solution:

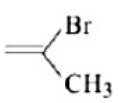
Solution:
In (A),-OH group is present, so inter-molecular Hbonding is possible while in (B), due to methoxy group there is no possibility of Inter-molecular H-bonding. So A is having higher boiling point than B.

Question82

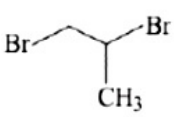
1-methyl ethylene oxide when treated with an excess of HBr produces: [Jan. 07,2020(I)]

Options:

A.



B.

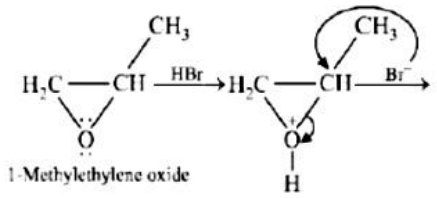


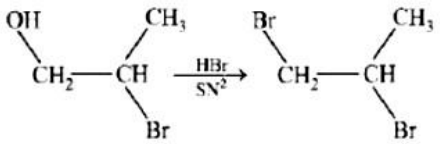
C.

D.

Answer: B

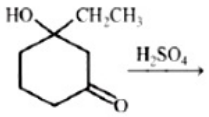
Solution:





Question83

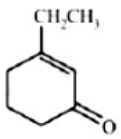
The major product of the following reaction is:



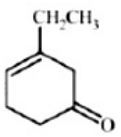
[Sep. 05,2020(II)]

Options:

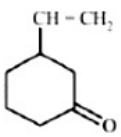
A.



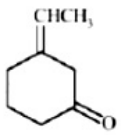
B.



C.

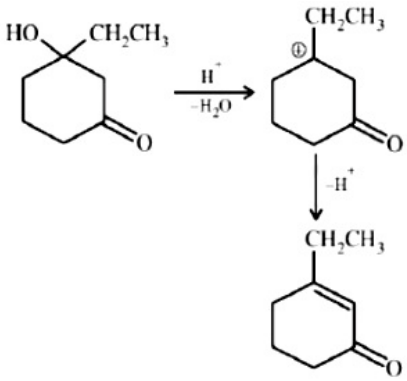


D.



Answer: A

Solution:



Question84

The major product [B] in the following reactions is:

$CH_3 - CH_2 - \overset{CH_3}{\underset{|}{C}}H - CH_2 - OCH_2 - CH_3 \xrightarrow[Heat]{HI} [A]\ alcohal \xrightarrow[\Delta]{H_2SO_4} [B]$

[Sep. 04,2020 (II)]

Options:

A. $CH_2 = CH_2$

B. $CH_3 - CH = \overset{CH_3}{\underset{|}{C}} - CH_3$

C. $CH_3 - CH_2 - \overset{CH_3}{\underset{|}{C}} = CH_2$

D. $CH_3 - CH_2 - CH = CH - CH_3$

Answer: B

Solution:

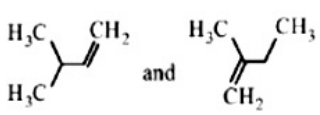
$$H_3C - CH_2 - \overset{CH_3}{\underset{|}{CH}} - CH_2 - O - CH_2 - CH_3 \xrightarrow[Heat]{HI} CH_3 - CH_2 - \underset{[A]}{\overset{CH_3}{\underset{|}{CH}}} - CH_2 - OH + CH_3CH_2 - I \xrightarrow{H_2SO_4/\Delta} CH_3 - \underset{[B]}{CH} = \overset{CH_3}{\underset{|}{C}} - CH_3$$

Question85

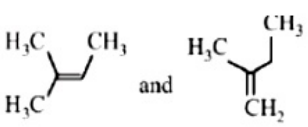
When neopentyl alcohol is heated with an acid, it slowly converted into an 85: 15 mixture of alkenes A and B, respectively. What are these alkenes?
[Sep. 04,2020(I)]

Options:

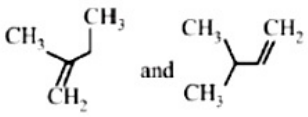
A.



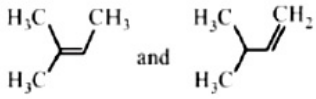
B.



C.

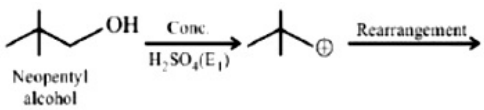


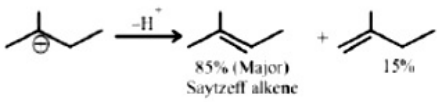
D.



Answer: B

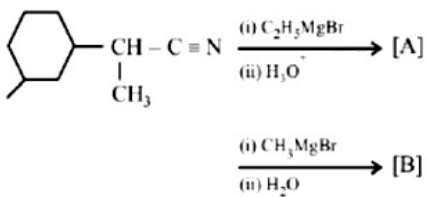
Solution:





Question86

The number of chiral centres present in [B] is _____.



[Sep. 04,2020(I)]

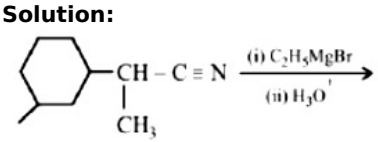
Options:

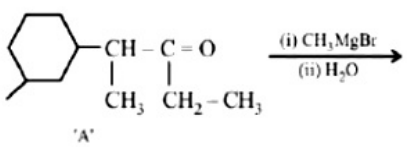
A.

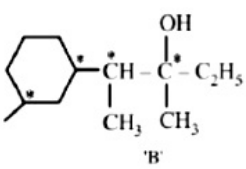
Answer: 4

Solution:

Solution:







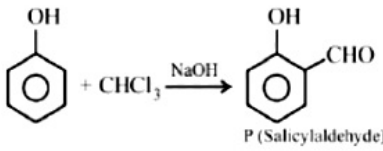
Number of chiral centres, represented as (") in the product (B) = 4

Question87

A solution of phenol in chloroform when treated with aqueous N aOH 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)
[NV, Sep. 06,2020 (II)]

Answer: 69

Solution:

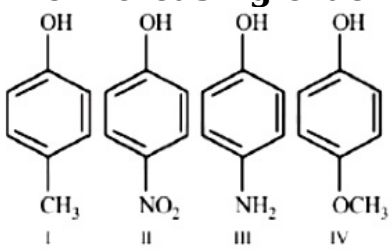


P (Salicylaldehyde)

Molecular formula of product ' $P^{\text{boldsymbol r}} = C_7H_6O_2$
So, mass % of C in 'P'
$= \frac{12 \times 7}{84 + 6 + 32} \times 100 = 68.85\% \approx 69\%$

Question88

The increasing order of boiling points of the following compounds is :



[Sep. 05,2020 (II)]

Options:

A. I < III < IV < II

B. I < IV < III < II

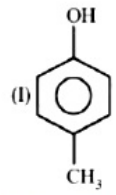
C. IV < I < II < III

D. III < I < II < IV

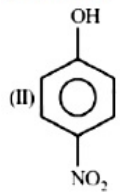
Answer: B

Solution:

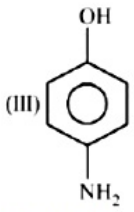
Solution:
(II) and (III) compounds almost have same boiling point. In the given options, option (b) will be the correct answer.



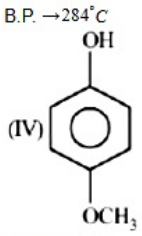
B.P. $\rightarrow 202^{\circ}C$



B.P. $\rightarrow 279^{\circ}C$



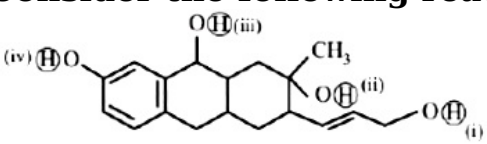
B.P. $\rightarrow 284^{\circ}C$



B.P. $\rightarrow 243^{\circ}C$

Question89

Consider the following reaction:



$\xrightarrow[\text{anhydride}]{\text{Chromic}}$ **´p´ The product 'P' gives positive ceric ammonium nitrate test. This is because of the presence of which of these −OH group(s)?**
[Sep. 03,2020 (II)]

Options:

A. (ii) only

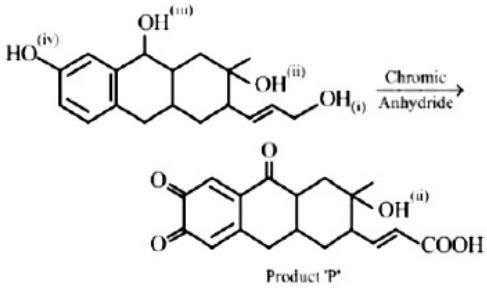
B. (iii) and (iv)

C. (iv) only

D. (ii) and (iv)

Answer: A

Solution:

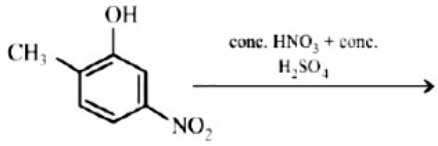


Product 'P'

Generally CAN test is done for alcohols which give pink or red colour. But for phenols and phenolic compounds it gives brown or black colour. So, this test helps to diffirentiate phenols from alcohols.

Question90

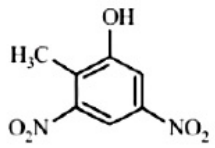
The major product of the following reaction is :



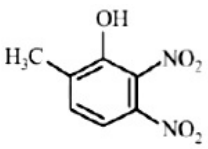
[Sep. 02,2020 (II)]

Options:

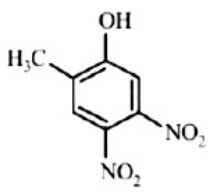
A.



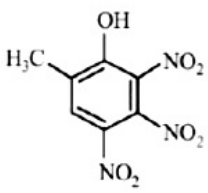
B.



C.

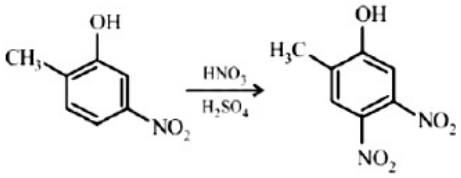


D.



Answer: C

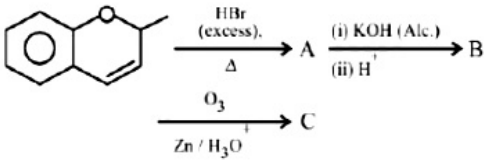
Solution:



It is an example of electrophilic substitution reaction. Position of electrophile is directed by the strong ring activating group ($-OH$), present in the ring.

Question91

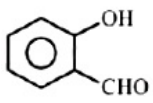
The major aromatic product C in the following reaction sequence will be :



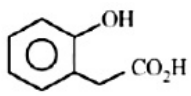
[Sep. 02,2020 (I)]

Options:

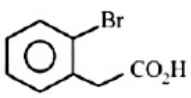
A.



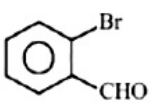
B.



C.

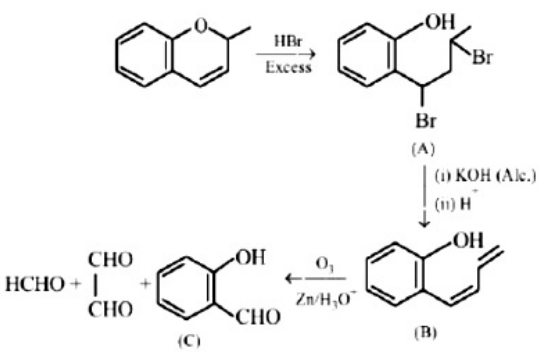


D.



Answer: A

Solution:

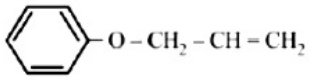


Question92

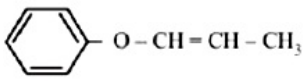
An organic compound 'A' ($C_9H_{10}O$) when treated with conc. HI undergoes cleavage to yield compounds 'B' and 'C'. 'B' gives yellow precipitate with $AgNO_3$ where as 'C tautomerizes to 'D'. 'D' gives positive iodoform test. 'A' could be: [Sep. 02,2020 (II)]

Options:

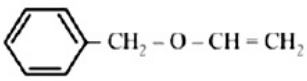
A.



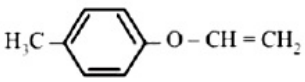
B.



C.

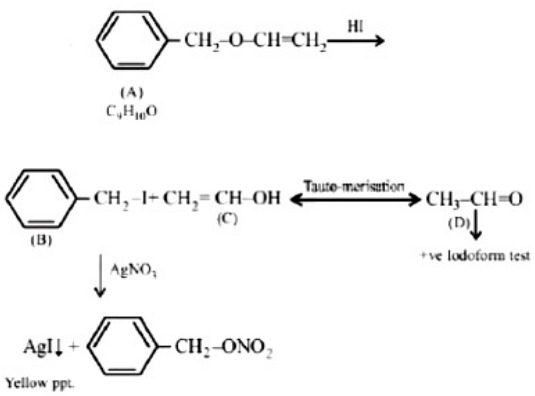


D.



Answer: C

Solution:



Question93

$CH_3CH_2-\overset{\overset{OH}{|}}{\underset{\underset{Ph}{|}}{C}}-CH_3$ cannot be prepared by: [Jan. 12,2019 (I)]

Options:

A. $CH_3CH_2COCH_3 + PhMgX$

B. $PhCOCH_2CH_3 + CH_3MgX$

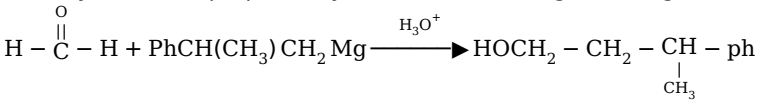
C. $PhCOCH_3 + CH_3CH_2MgX$

D. $HCHO + PhCH(CH_3)CH_2MgX$

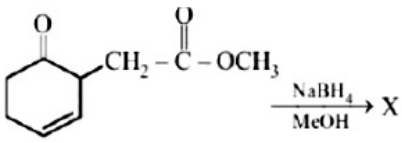
Answer: D

Solution:

Tertiary alcohol is prepared by the reaction of Grignard reagent with a ketone (formaldehyde is used to prepare primary alcohol).



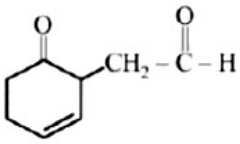
Question94



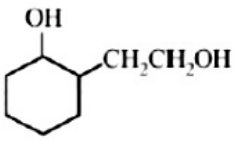
[Jan. 10,2019 (I)]

Options:

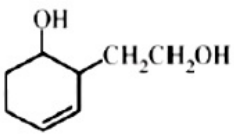
A.



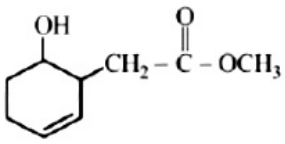
B.



C.



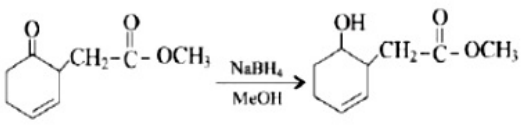
D.



Answer: D

Solution:

Solution:
N aBH $_4$ is a selective reducing agent, used for the reduction of aldehydes and ketones, it does not affect alkene and ester.



Question95

Which is the most suitable reagent for the following transformation?

$CH_3 - CH = CH - CH_2 - \overset{OH}{\underset{|}{CH}} - CH_3 \longrightarrow$
$CH_3 - CH = CH - CH_2CO_2H$
[Jan. 10, 2019 (II)]

Options:

A. Tollen's reagent

B. I_2 / NaOH

C. CrO_2Cl_2 / CS_2

D. alkaline $KMnO_4$

Answer: B

Solution:

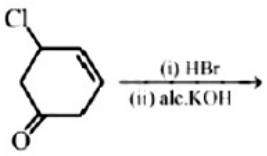
The most suitable reagent for the given reaction is I_2 N aOH (Iodoform reaction).

$$CH_3 - CH = CH - CH_2 - \underset{OH}{\underset{|}{CH}} - CH_3 \xrightarrow{I_2 / N aOH}$$

$$CH_3CH = CH - CH_2 = \underset{O}{\underset{|}{C}} - CH_3 \xrightarrow{I_2 / N aOH} CH_3 - CH = CH - CH_2 - \underset{O}{\underset{||}{C}} - ONa + CH_3$$

Question96

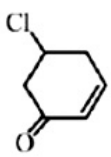
The major product of the following reaction is:



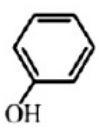
[Jan. 11,2019(1)]

Options:

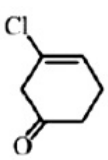
A.



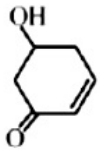
B.



C.

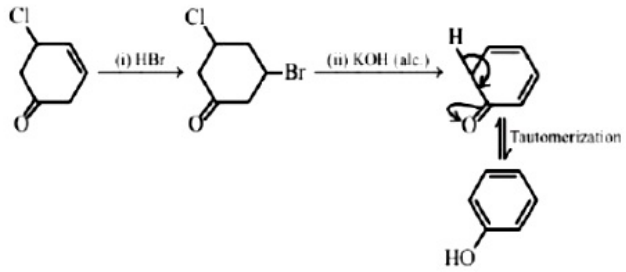


D.



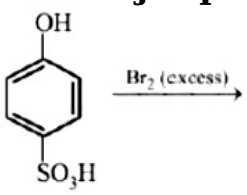
Answer: B

Solution:



Question97

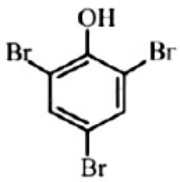
The major product of the following reaction is:



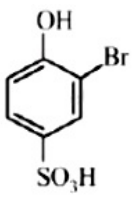
[Jan. 11,2019(I)]

Options:

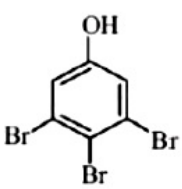
A.



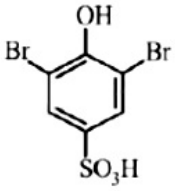
B.



C.

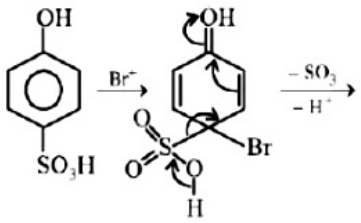


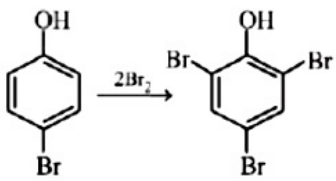
D.



Answer: A

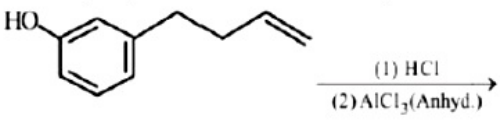
Solution:





Question98

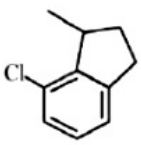
The major product of the following reaction is:



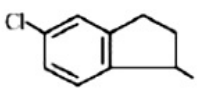
[Jan. 11,2019(II)]

Options:

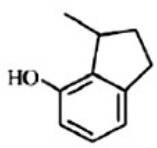
A.



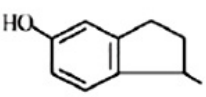
B.



C.

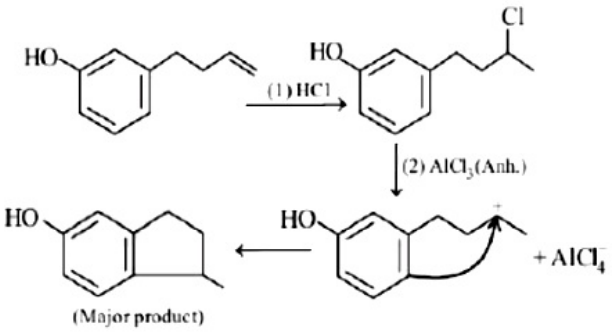


D.



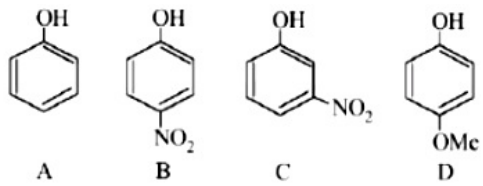
Answer: D

Solution:



Question99

The increasing order of the pK_a values of the following compounds is:



[Jan. 10,2019(I)]

Options:

A. C < B < A < D

B. B < C < D < A

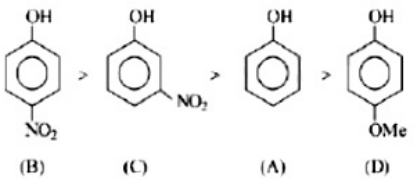
C. D < A < C < B

D. B < C < A < D

Answer: D

Solution:

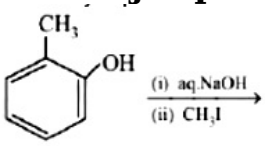
Solution:
Electron withdrawing substituents increase the acid- ic strength, while electron releasing groups decrease the acidic strength.
$\therefore$ Acidic strength $\propto K_a \propto \frac{1}{pK_a}$



pK_a : B < C < A < D

Question100

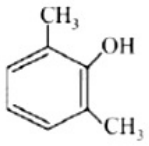
The major product of the following reaction is:



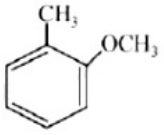
[Jan. 10,2019(II)]

Options:

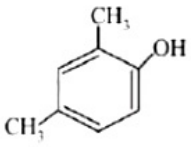
A.



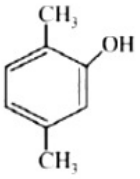
B.



C.



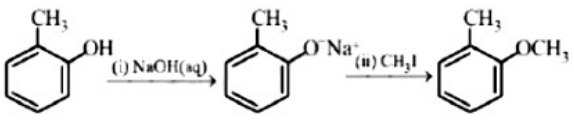
D.



Answer: B

Solution:

Reaction involved:

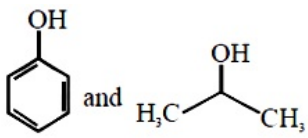


Question101

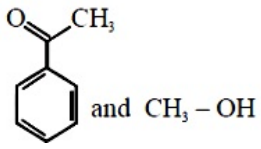
The products formed in the reaction of cumene with O_2 followed by treatment with dil. H Cl are:
[Jan. 9,2019(II)]

Options:

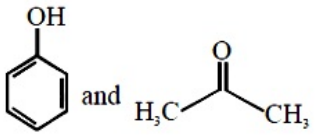
A.



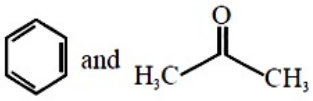
B.



C.



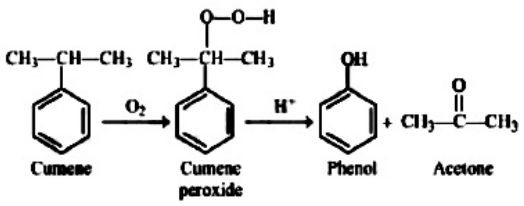
D.



Answer: C

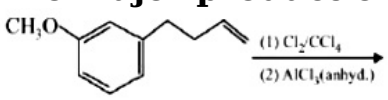
Solution:

Reaction involved:



Question102

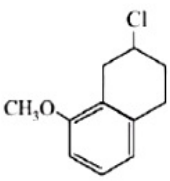
The major product of the following reaction is:



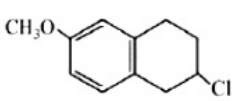
[Jan. 12,2019(I)]

Options:

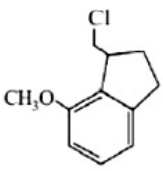
A.



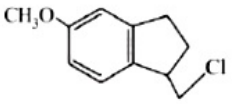
B.



C.

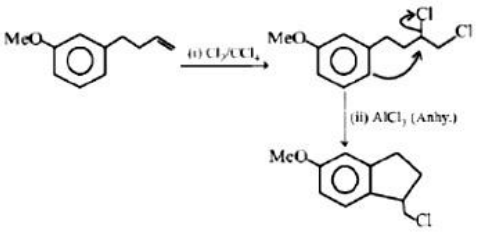


D.



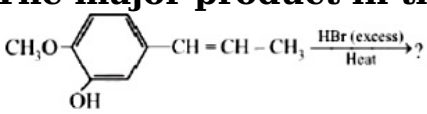
Answer: D

Solution:



Question103

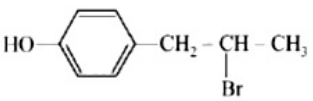
The major product in the following conversion is:



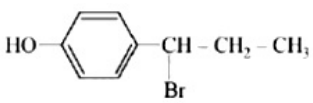
[Jan. 12,2019(II)]

Options:

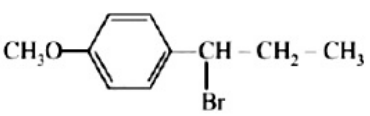
A.



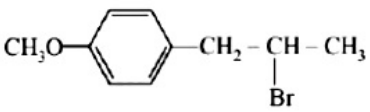
B.



C.

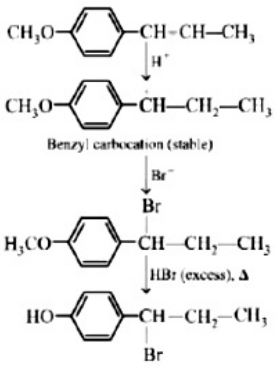


D.



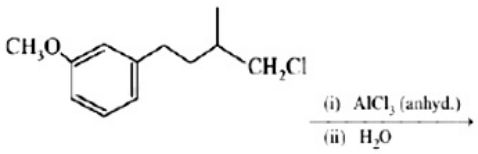
Answer: B

Solution:



Question104

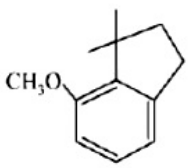
The major product of the following reaction is:



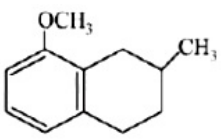
[Jan. 10,2019(I)]

Options:

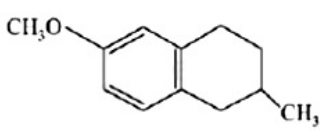
A.



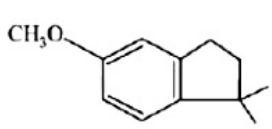
B.



C.

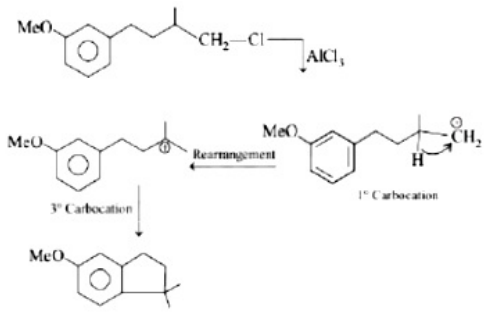


D.



Answer: B

Solution:

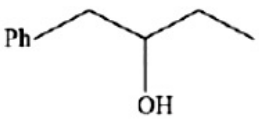


Question105

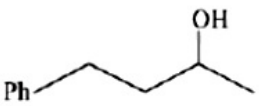
Heating of 2 -chloro- 1 -phenylbutane with EtOK / EtOH gives X as the major product. Reaction of X with Hg $(OAc)_2$ / H_2O followed by $NaBH_4$ gives Y as the major product. Y is:
[April 12, 2019 (II)]

Options:

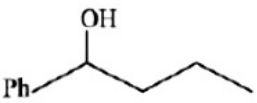
A.



B.



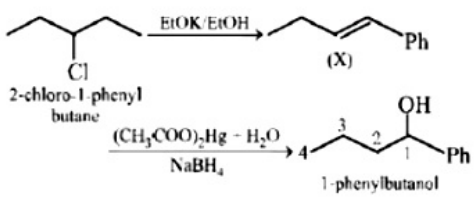
C.



D.

Answer: C

Solution:



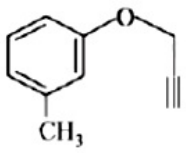
Question106

What will be the major product when m-cresol is reacted with propargyl bromide ($HC \equiv C - CH_2Br$) in presence of K_2CO_3 in acetone?

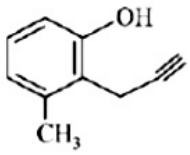
[April 12, 2019 (II)]

Options:

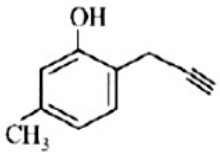
A.



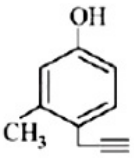
B.



C.

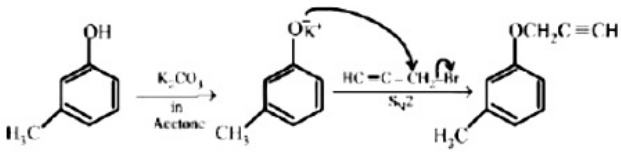


D.



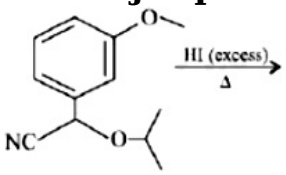
Answer: A

Solution:



Question107

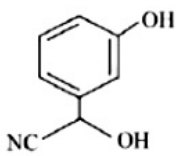
The major product of the following reaction is:



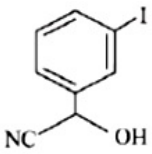
[April 10,2019 (I)]

Options:

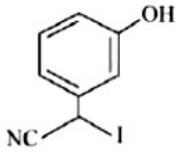
A.



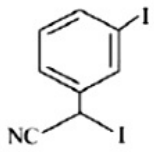
B.



C.

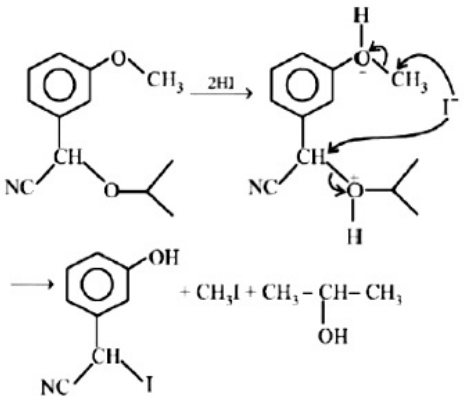


D.



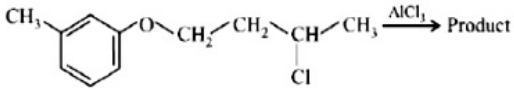
Answer: C

Solution:



Question108

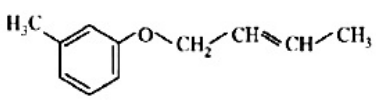
The major product obtained in the given reaction is:



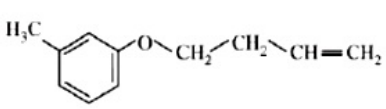
[April 10,2019 (II)]

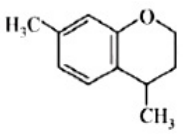
Options:

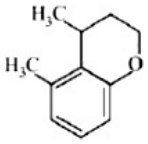
A.



B.

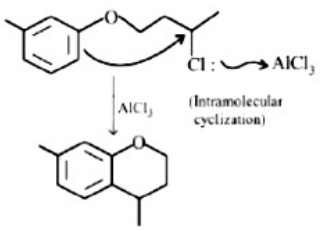


C. 

D. 

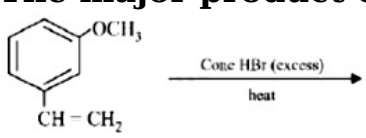
Answer: C

Solution:



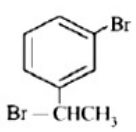
Question109

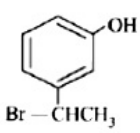
The major product of the following reaction is:

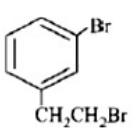


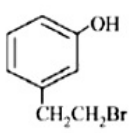
[April 8,2019 (I)]

Options:

A. 

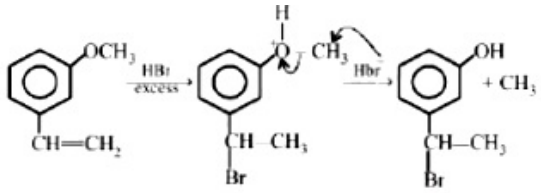
B. 

C. 

D. 

Answer: B

Solution:

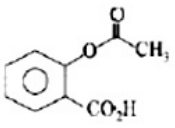


Question110

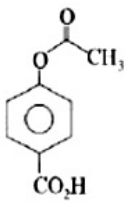
Phenol on treatment with CO_2 in the presence of NaOH followed by acidification produces compound X as the major product. X on treatment with $(CH_3CO)_2O$ in the presence of catalytic amount of H_2SO_4 produces :
[2018]

Options:

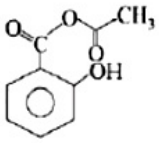
A.



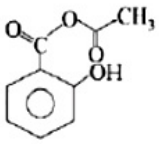
B.



C.

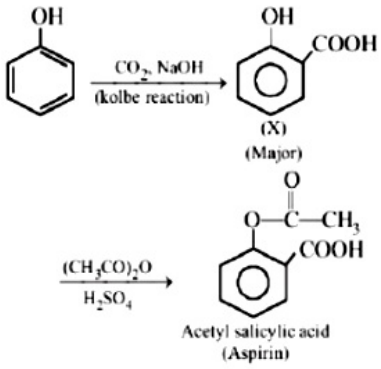


D.



Answer: A

Solution:

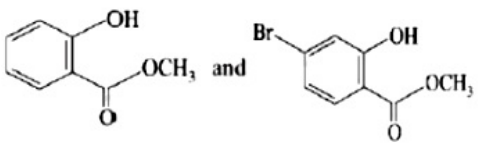


Question111

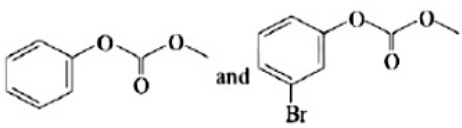
Phenol reacts with methyl chloroformate in the presence of N aOH to form product A. A reacts with Br_2 to form product B. A and B are respectively: [2018]

Options:

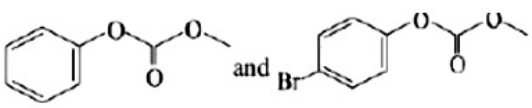
A.



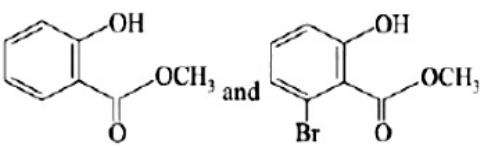
B.



C.

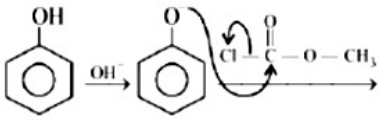


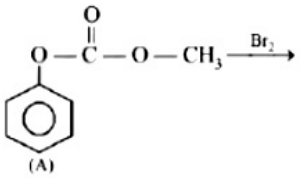
D.



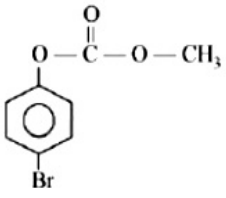
Answer: C

Solution:





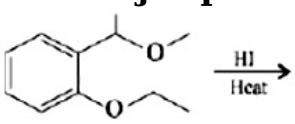
(A)



(B)

Question112

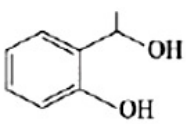
The major product formed in the following reaction is:



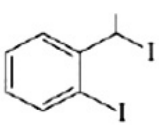
[2018]

Options:

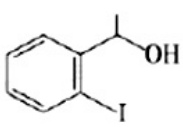
A.



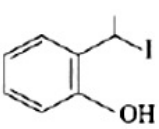
B.



C.

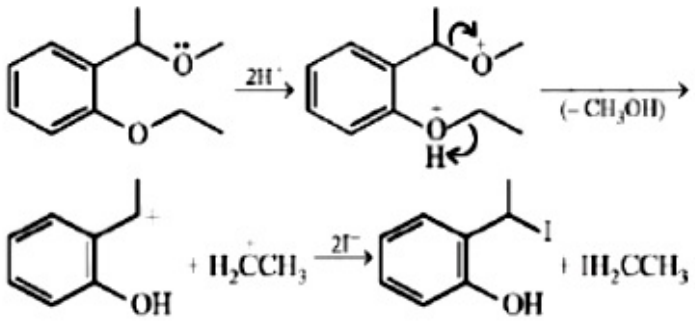


D.



Answer: D

Solution:

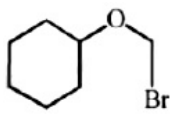


Question113

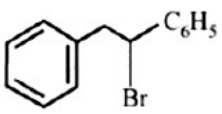
Which of the following, upon treatment with tert-BuONa followed byaddition of bromine water, fails to decolourize the colour of bromine?
[2017]

Options:

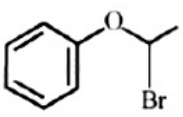
A.



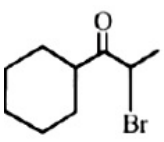
B.



C.



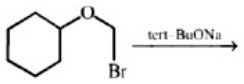
D.

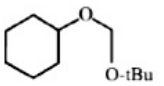


Answer: A

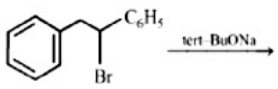
Solution:

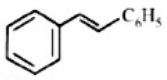
Solution:

(a) 

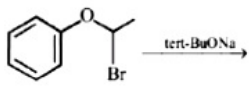


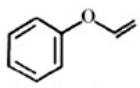
(fails to decolorise the colour of bromine due to absence of unsaturation)

(b) 

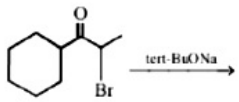


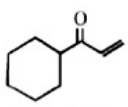
(it decolorises bromine solution)

(c) 



(it decolorises bromine solution)

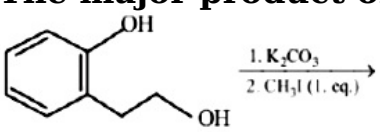
(d) 



(it decolorises bromine solution)

Question114

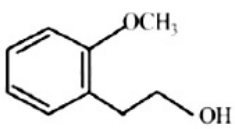
The major product of the following reaction is:



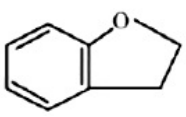
[Online April 8,2017]

Options:

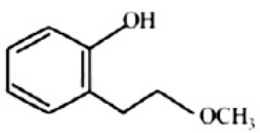
A.



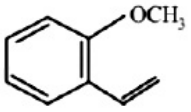
B.



C.

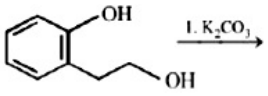


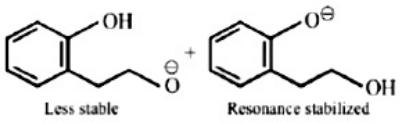
D.

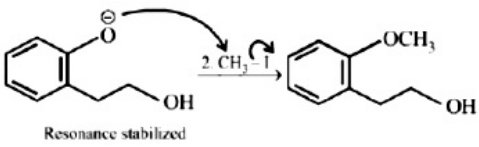


Answer: A

Solution:







Question115

The gas evolved on heating CH_3MgBr in methanol is: [Online April. 9,2016]

Options:

A. Methane

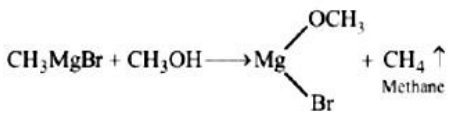
B. Ethane

C. Propane

D. HBr

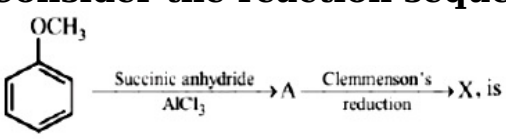
Answer: A

Solution:



Question116

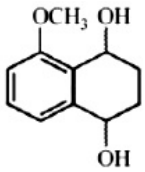
Consider the reaction sequence below:



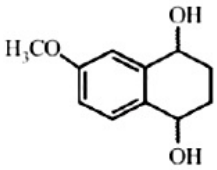
[Online April 10,2016]

Options:

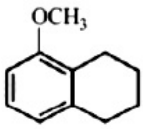
A.



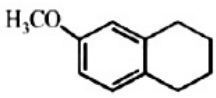
B.



C.

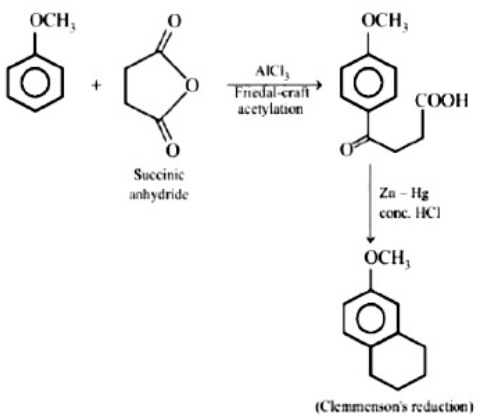


D.



Answer: D

Solution:



Question117

The most suitable reagent for the conversion of $R - CH_2 - OH \rightarrow R - CHO$ is:
[2014]

Options:

A. $KMnO_4$

B. $K_2Cr_2O_7$

C. CrO_3

D. PCC (Pyridinium chlorochromate)

Answer: D

Solution:

An excellent reagent for oxidation of 1° alcohols to aldehydes is PCC (consult Q.3 also).

$$R-CH_2-OH \xrightarrow{PCC} R-CHO$$

Question118

Which one of the following statements is not correct? [Online April 11, 2014]

Options:

A. Alcohols are weaker acids than water

B. Acid strength of alcohols decreases in the following $RCH_2OH > R_2CHOH > R_3COH$

C. Carbon-oxygen bond length in methanol, CH_3OH is shorter than that of $C-O$ bond length in phenol.

D. The bond angle in methanol is 108.9°.

Answer: C

Solution:

Solution:
The $C-O$ bond length in alcohols is $142pm$ and in Phenol it is $136pm$. The $C-O$ bond length in phenol is shorter than that in methanol due to the conjugation of unshared pair of electrons on oxygen with the ring, which imparts double bond character to the $C-O$ bond.

Question119

In the Victor-Meyer's test, the colour given by 1°, 2° and 3° alcohols are respectively: [Online April 12, 2014]

Options:

A. Red, colourless, blue

B. Red, blue, colourless

C. Colourless, red, blue

D. Red, blue, violet

Answer: B

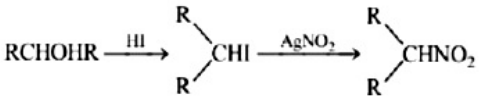
Solution:

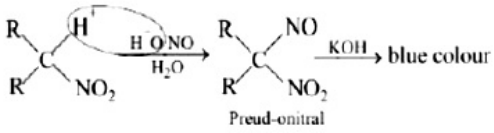
(i)

$$RCH_2OH \xrightarrow{HI} RCH_2I \xrightarrow{AgNO_2} RCH_2NO_2 \xrightarrow{HNO_2} R-\underset{\underset{NOH}{||}}{C}-NO_2 \xrightarrow{KOH} \text{Blood red colour}$$

Nitrolic acid

(ii)





(iii) $R_3COH \xrightarrow{HI} R_3CI \xrightarrow{AgNO_2} R_3CNO_2 \xrightarrow{HNO_2}$ No reaction $\xrightarrow{KOH}$ Colourless

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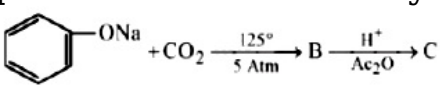
Question120

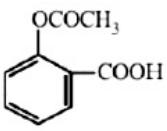
Sodium phenoxide when heated with CO_2 under pressure at 125˚C yields a product which on acetylation produces C



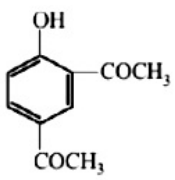
The major product C would be
[2014]

Options:

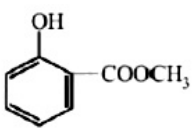
A.



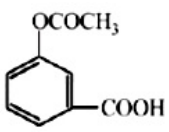
B.



C.

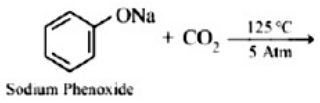


D.

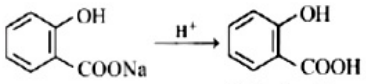


Answer: A

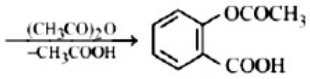
Solution:



Sodium Phenoxide



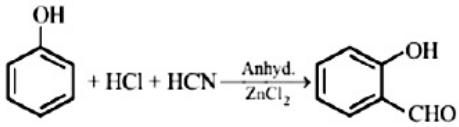
Salicyclic acid



Aspirin
(Acetyl salicyclic acid)

Question121

The following reaction



is known as:
[Online April 11,2014]

Options:

A. Perkin reaction

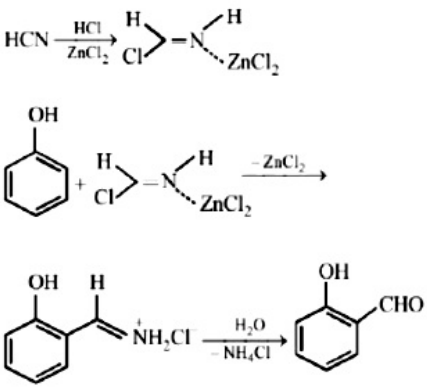
B. Gatterman-Koch Formylation

C. Kolbe's reaction

D. Gattermann reaction

Answer: D

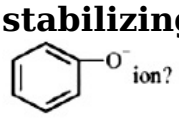
Solution:



Note : Gattermann Koch reaction is a variation of Gattermann reaction, and this reaction involves the use of carbon monoxide instead of HCN.

Question122

Which one of the following substituents at para-position is most effective in stabilizing the phenoxide



ion?

[Online April 19,2014]

Options:

A. $-CH_3$

B. $-OCH_3$

C. $-COCH_3$

D. $-CH_2OH$

Answer: C

Solution:

Electron withdrawing group stabilises the benzene ring due to delocalisation of charge.
$-CH_3$ and $-CH_2OH$ are electron donating group and hence decrease the stability of benzene ring $-OCH_3$ is weaker electron withdrawing group than $-COCH_3$. Hence $COCH_3$ group more stabilizes the phenoxide ion at $p-$ position.

Question123

Which one of the following compounds will not be soluble in sodium bicarbonate?
[Online April 19,2014]

Options:

A. 2,4,6 - Trinitrophenol

B. Benzoicacid

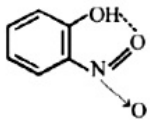
C. o - Nitrophenol

D. Benzene sulphonic acid

Answer: B

Solution:

Solution:
Due to intramolecular hydrogen bonding this will not be soluble in sodium bicarbonate.



Question124

Allyl phenyl ether can be prepared by heating:
[Online April 9,2014]

Options:

A. $C_6H_5Br + CH_2 = CH - CH_2 - ONa$

B. $CH_2 = CH - CH_2 - Br + C_6H_5ONa$

C. $C_6H_5 - CH = CH - Br + CH_3 - ONa$

D. $CH_2 = CH - Br + C_6H_5 - CH_2 - ONa$

Answer: B

Solution:

$C_6H_5ONa + Br - CH_2 - CH = CH_2 \longrightarrow C_6H_5 - O - CH_2 - CH = CH_2 + NaBr$
Allyl phenyl ether

Question125

Williamson synthesis of ether is an example of:
[Online April 19,2014]

Options:

A. Nucleophilicaddition

B. Electrophilic addition

C. Electrophilic substitution

D. Nucleophilic substitution

Answer: D

Solution:

Solution:
This method is suitable for the preparation of a wide variety of unsymmetrical ethers. The nucleophilic substitution of halides with alkoxide leads to desired product.

Question126

An unknown alochol is treated with the "Lucas reagent" to determine whether the alcohol is primary, secondary or tertiary. Which alcohol reacts fastest and by what mechanism:
[2013]

Options:

A. secondary alcohol by S_N1

B. tertiary alcohol by S_N1

C. secondary alcohol by S_N2

D. tertiary alcohol by S_N2

Answer: B

Solution:

Solution:
Reaction of alcohols with Lucas reagent proceeds through carbocation formation. Further 3° carbocations (from tertiary alcohols) are highly stable thus reaction proceeds through S_N1 mechanism.

Question127

Rate of dehydration of alcohols follows the order:
[Online April 9, 2013]

Options:

A. $2^{\circ} > 1^{\circ} > CH_3OH > 3^{\circ}$

B. $3^{\circ} > 2^{\circ} > 1^{\circ} > CH_3OH$

C. $2^{\circ} > 3^{\circ} > 1^{\circ} > CH_3OH$

D. $CH_3OH > 1^{\circ} > 2^{\circ} > 3^{\circ}$

Answer: B

Solution:

The order of dehydration among three type of alcohols is $3^{\circ} > 2^{\circ} > 1^{\circ} > CH_3OH$. This behaviour is related to the relative stabilitics of carbocations ($3^{\circ} > 2^{\circ} > 1^{\circ}$).

Question128

Amongst the following alcohols which would react fastest with conc. HCl and $ZnCl_2$?
[Online April 22, 2013]

Options:

A. pentanol

B. 2 -methyl butanol

C. 2 -pentanol

D. 2 -methyl butan-2-ol

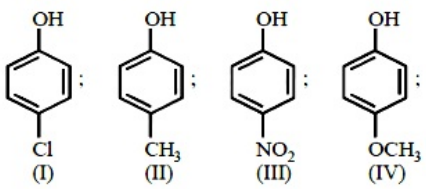
Answer: D

Solution:

Solution:
$ZnCl_2$ + conc. HCl is Lucas reagent. Lucas reagent reacts fastest with tertiary alcohol.
3° alcohol + Lucas reagent = Immediate turbidity

Question129

Arrange the following compounds in order of decreasing acidity:



[2013]

Options:

A. I I > I V > I > I I I

B. I > I I > I I I > I V

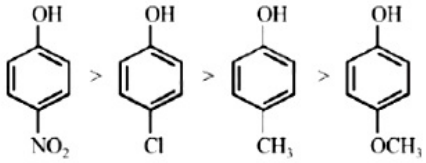
C. I I I > I > I I > I V

D. I V > I I I > I > I I

Answer: C

Solution:

Electron withdrawing substituents like $-NO_2$, $-Cl$ increase the acidity of phenol while electron releasing substituents like-CH_3, $-OCH_3$ decrease acidity. hence the correct order of acidity will be



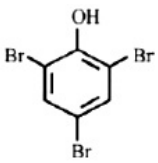
$(-M, -1)$ $(-1 > +M)$ $(+I, +HC)$ $(+M)$

Question130

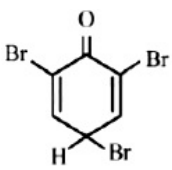
What is the structure of the major product when phenol is treated with bromine water?
[Online April 22,2013]

Options:

A.



B.



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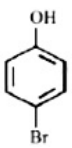

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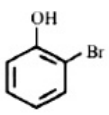
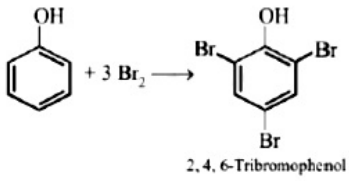


Answer: A

Solution:

Phenol has activating (electron releasing) − OH group and bromine water supplies Br^+ ion easily, hence under such conditions reaction does not stop at monobromo or dibromo stage but a fully brominated (2, 4, 6, -tribromophenol compound is the final product.



2, 4, 6-Tribromophenol

Question131

The reaction of phenol with benzoyl chloride to give phenyl benzoate is known as:
[Online April 23,2013]

Options:

A. Claisen reaction

B. Schotten-Baumann reaction

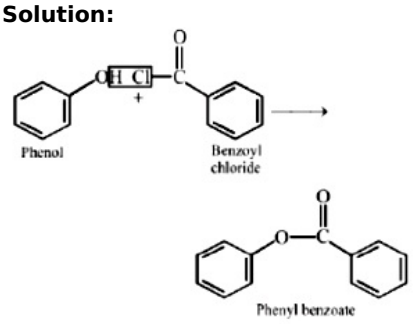
C. Reimer-Tiemann reaction

D. Gatterman-Koch reaction

Answer: B

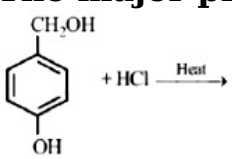
Solution:

Solution:



Question132

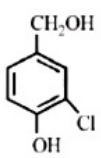
The major product in the following reaction is :



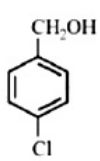
[Online April 25,2013]

Options:

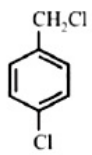
A.



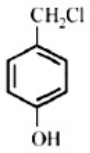
B.



C.



D.



Answer: C

Solution:

Solution:

Question133

Phenol on heating with $CHCl_3$ and NaOH gives salicylaldehyde. The reaction is called:
[Online April 25 ,2013]

Options:

A. Reimer - Tiemann reaction

B. Claisen reaction

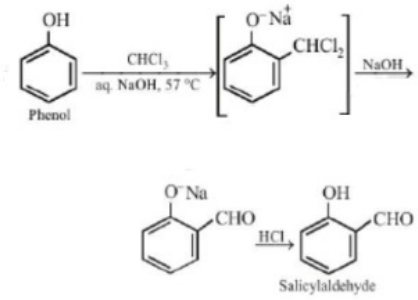
C. Cannizzaro's reaction

D. Hell - Volhard - Zelinsky reaction

Answer: A

Solution:

Solution:



Question134

An ether (A), $C_5H_{12}O$, when heated with excess of hot concentrated HI produced two alkyl halides which when treated with NaOH yielded compounds (B) and (C) Oxidation of (B) and (C) gave a propanone and an ethanoic acid respectively. The IUPAC name of the ether (A) is :
[Online April 9,2013]

Options:

A. 2 -ethoxypropane

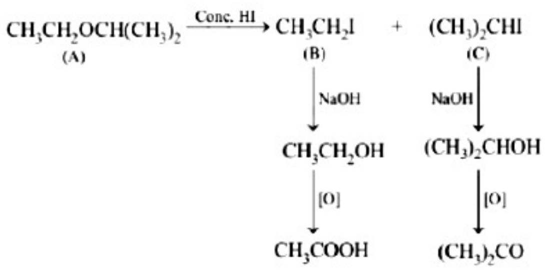
B. ethoxypropane

C. methoxybutane

D. 2 -methoxybutane

Answer: A

Solution:



Hence the IUPAC name of compound (A) is

$$\underset{2-\text{ethoxy propane}}{CH_3-CH_2-O-\overset{2}{C}H(\overset{3}{C}H_3)-\overset{1}{C}H_3}$$

Question135

In Williamson synthesis of mixed ether having a primary and a tertiary alkyl group if tertiary halide is used, then:
[Online April 22,2013]

Options:

A. Rate of reaction will be slow due to slow cleavage of carbon-halogen bond.

B. Alkene will be the main product.

C. Simple ether will form instead of mixed ether.

D. Expected mixed ether will be formed.

Answer: B

Solution:

The tertiary alkyl halide undergo elimination reaction to give alkenes.

$$CH_3-\underset{CH_3}{\overset{CH_3}{C}}-X+NaOC_2H_5\longrightarrow CH_3\longrightarrow\underset{2-\text{Methyl propene}}{\overset{CH_3}{C}=CH_2}$$

Question136

Reagent used to convert allyl alcohol to acrolein is
[Online May 19, 2012]

Options:

A. MnO_2

B. H_2O_2

C. OsO_4

D. $KMnO_4$

Answer: A

Solution:

MnO_2 being a mild oxidising agent stops the oxidation of $-CH_2OH$ group at aldehyde stage.

Question137

Consider thiol anion ($RS^{\oplus}$) and alkoxy anion ($RS^{\ominus}$). Which of the following statements is correct?
[2011RS]

Options:

A. $RS^{\ominus}$ is less basic but more nucleophilic than RO°

B. $RS^{\ominus}$ is more basic and more nucleophilic than $RO^{\ominus}$

C. RS° is more basic but less nucleophilic than RO°

D. RS^{θ} is less basic and less nucleophilic than RO°

Answer: A

Solution:

Solution:
On moving down a group, the basicity \& nucleophilicity are inversely related, i.e. nucleophilicity increases while basicity decreases. i.e $RS^{\ominus}$ is more nucleophilic but less basic than $RO^{\ominus}$. This opposite behaviour is because of the fact that basicity and nucleophilicity depends upon different factors. Basicity is directly related to the strength of the H -element bond, while nucleophilicity is indirectly related to the electronegativity of the atom to which proton is attached.

Question138

The correct order of acid strength of the following compounds:
(A) Phenol
(B) p -Cresol
(C) m - Nitrophenol
(D) p -Nitrophenol
[2011 RS]

Options:

A. D > C > A > B

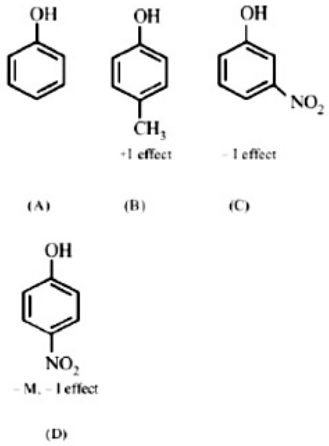
B. B > D > A > C

C. A > B > D > C

D. C > B > A > D

Answer: A

Solution:



Electron withdrawing substituents increase the acidity of phenols; while electron releasing substituents decrease acidity. Thus the correct order is D > C > A > B

Question139

Consider the following reaction :
$C_2H_5OH + H_2SO_4 \longrightarrow$ Product
Among the following, which one cannot be formed as a product under any conditions?
[2011RS]

Options:

A. Ethylene

B. Acetylene

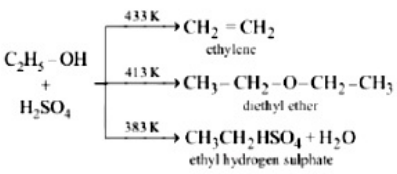
C. Diethyl ether

D. Ethylhydrogen sulphate

Answer: B

Solution:

Solution:



Acetylene is not formed under any condition.

Question140

From amongst the following alcohols, the one that would react fastest with conc. HCl and anhydrous $ZnCl_2$, is
[2010]

Options:

A. 2 -Butanol

B. 2 - Methylpropan-2-ol

C. 2-Methylpropanol

D. 1 - Butanol

Answer: B

Solution:

Solution:
Tertiary alcohols react fastest with conc. HCl and anhydrous $ZnCl_2$ (Lucas reagent) as its mechanism proceeds through the formation of stable tertiary carbocation.
Mechanism :

Step 1: $\underset{\text{2 Methylpropane} - 2 - \text{ol}}{CH_3 - \underset{CH_3}{\overset{CH_3}{\overset{|}{\underset{|}{C}}}} - OH} \xrightarrow{HCl} \rightleftharpoons (CH_3)_3C - \overset{+}{O}H_2 + Cl^-$

Step 2: $(CH_3)_3C - OH_2 \rightleftharpoons \underset{3^\circ \text{ Carbocation}}{(CH_3)_3C^+} + H_2O$

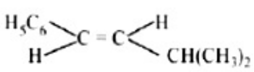
Step 3: $(CH_3)_3C^+ + Cl^- \rightleftharpoons \underset{\text{t} - \text{Butylchloride}}{(CH_3)_3C - Cl}$

Question141

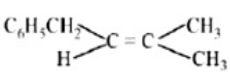
The main product of the following reaction is $C_6H_5CH_2CH(OH)CH(CH_3)_2 \xrightarrow{\text{conc. } H_2SO_4}$?
[2010]

Options:

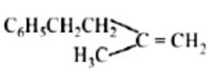
A.



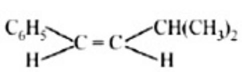
B.



C.



D.

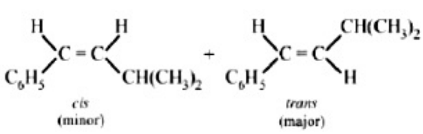


Answer: A

Solution:

Solution:
Whenever dehydration can produce two different alkenes, major product is formed according to Saytzeff rule i.e. more substituted alkene (alkene having lesser number of hydrogen atoms on the two doubly bonded carbon atoms) is the major product. Such reactions which can produce two or more structural isomers but one of them in greater amounts than the other are called regioselective ; in case a reaction is 100% regioselective, it is termed as regiospecific. In addition to being regioselective, alcohol dehydrations are stereoselective (a reaction in which a single starting material can yield two or more stereoisomeric products, but gives one of them in greater amount than any other).

$C_6H_5 - CH_2 - \underset{OH}{\underset{|}{CH}} - \underset{CH_3}{\underset{|}{CH}} - CH_3 \xrightarrow{\text{Conc. } H_2SO_4}$



Question142

The major product obtained on interaction of phenol with sodium hydroxide and carbon dioxide is
[2009]

Options:

A. salicylaldehyde

B. salicylic acid

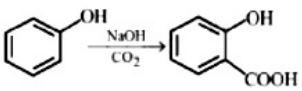
C. phthalic acid

D. benzoic acid

Answer: B

Solution:

Solution:



Question143

Phenol, when it reacts first with concentrated sulphuric acid and then with concentrated nitric acid, gives
[2008]

Options:

A. 2,4,6 -trinitrobenzene

B. o -nitrophenol

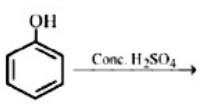
C. p -nitrophenol

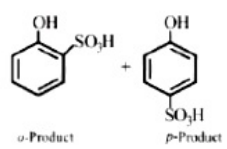
D. nitrobenzene

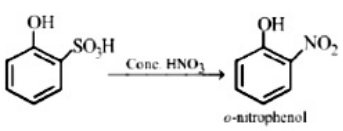
Answer: B

Solution:

Solution:
Phenol on reaction with conc. H_2SO_4 gives a mixture of o - and p - products (i.e., $-SO_3H$ group occupies $o-$, p^- position). At room temperature, o -product is more stable, which on treatment with conc. HNO_3 will yield onitrophenol.







Question144

In the following sequence of reactions,

$CH_3CH_2OH \xrightarrow{P+I_2} A \xrightarrow[ether]{Mg} B \xrightarrow{HCHO} C \xrightarrow{H_2O} D$ the compound D is

[2007]

Options:

A. propanal

B. butanal

C. n -butyl alcohol

D. n -propyl alcohol.

Answer: D

Solution:

Solution:

$$CH_3CH_2OH \xrightarrow{P+I_2} \underset{(A)}{CH_3CH_2I} \xrightarrow[Ether]{Mg} \underset{(B)}{CH_3CH_2MgI} \xrightarrow{HCHO} H-\underset{\substack{|\\H\\(C)}}{\overset{\overset{|}{CH_2CH_3}}{\overset{|}{C}}}-OMgI \xrightarrow{H_2O} H-\underset{\substack{|\\H\\(D)\\n-Propylalcohol}}{\overset{\overset{|}{CH_2CH_3}}{\overset{|}{C}}}-OH$$

Question145

Among the following the one that gives positive iodoform test upon reaction with I_2 and NaOH is

[2006]

Options:

A. $CH_3-\overset{\overset{|}{CH_3}}{\overset{|}{C}}HCH_2OH$

B. $PhCHOHCH_3$

C. $CH_3CH_2CH(OH)CH_2CH_3$

D. $C_6H_5CH_2CH_2OH$

Answer: B

Solution:

Solution:
Ethanol and only those 2° alcohols which contain $CHOHCH_3$ group undergo haloform reaction.

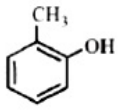
Question146

The structure of the compound that gives a tribromo derivative on treatment with bromine water is

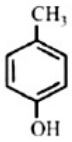
[2006]

Options:

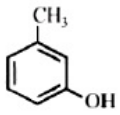
A.



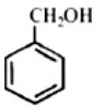
B.



C.



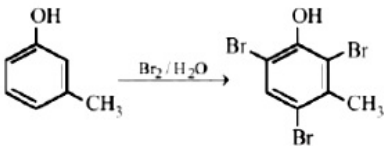
D.



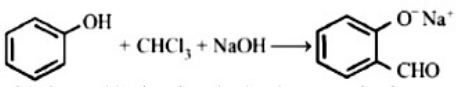
Answer: C

Solution:

Solution:
In (c) both groups are activativating and undergo electrophilic substitution in the same positions.



Question147



The electrophile involved in the above reaction is [2006]

Options:

A. trichloromethyl anion $\left(\overset{\ominus}{C}Cl_3\right)$.

B. formyl cation

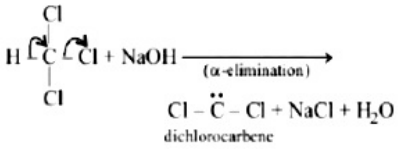
C. phenoxide ion

D. dichlorocarbene

Answer: D

Solution:

Solution:
This is Riemer-Tiemann reaction and the electrophile is dichlorocarbene.



Question148

HBr reacts with $CH_2 = CH - OCH_3$ under anhydrous conditions at room temperature to give [2006]

Options:

A. $BrCH_2 - CH_2 - OCH_3$

B. $H_3C - CHBr - OCH_3$

C. CH_3CHO and CH_3Br

D. $BrCH_2CHO$ and CH_3OH

Answer: B

Solution:

Solution:
Methyl vinyl ether under anhydrous condition at room temperature undergoes addition reaction.

$$CH_2 = CH - OCH_3 \xrightarrow{H\,Br} CH_3 - \underset{Br}{CH} - O - CH_3$$

Question149

The best reagent to convert pent- 3 − en − 2 − ol into pent- 3 -en2-one is [2005]

Options:

A. Pyridinium chlorochromate

B. Chromic anhydride in glacial acetic acid

C. acidic dichromate

D. Acidic permanganate

Answer: A

Solution:

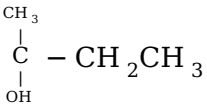
$$CH_3 - \underset{OH}{CH} - CH = CH - CH_3 \longrightarrow CH_3 - \overset{O}{C} - CH = CH - CH_3$$

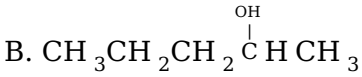
Pyridinium chlorochromate (PCC) oxidises 1° and 2° alcohols to aldehyde and ketones.

Question150

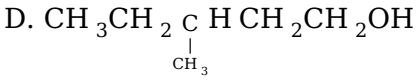
Among the following compounds which can be dehydrated very easily? [2004]

Options:

A. 

B. 

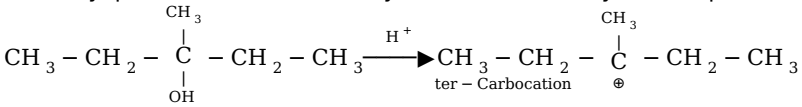
C. $CH_3CH_2CH_2CH_2CH_2CH_2OH$

D. 

Answer: A

Solution:

3 -Methyl pentan- 3 -ol will be dehydrated most readily since it produces a very stable, tertiary carbonium ion as intermediate.



Question151

During dehydration of alcohols to alkenes by heating with conc. H_2SO_4, the initiation step is
[2003]

Options:

A. formation of carbocation

B. elimination of water

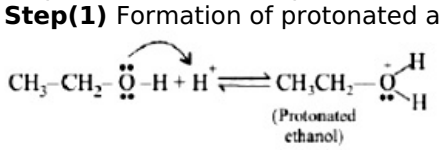
C. formation of an ester

D. protonation of alcohol molecule

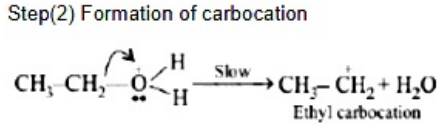
Answer: D

Solution:

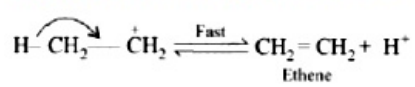
The dehydration of alcohol to form alkene occurs in following three steps.
Step (1) is initiation step.
Step(1) Formation of protonated alcohol.



Step(2) Formation of carbocation



Step(3) Elimination of a proton to form alkene



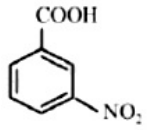
Question152

Picric acid is:

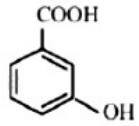
[2002]

Options:

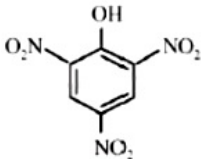
A.



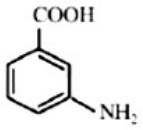
B.



C.



D.



Answer: C

Solution:

2,4,6 Trinitrophenol is also known as picric acid.
