CHEMISTRY

BOOKS - IIT-JEE PREVIOUS YEAR (CHEMISTRY)

ARYL HALIDE AND PHENOLS

Jee Main And Advanced

1. For the identification of beta-naphtho1 using dye test it is necessary to _____ of beta-

naphtho1 .

A. dichloromethane solution of β-naphthol

B. acidic solution of β-naphthol

C. neutral solution of β-naphthol

D. alkaline solution of β-naphthol

Answer: D

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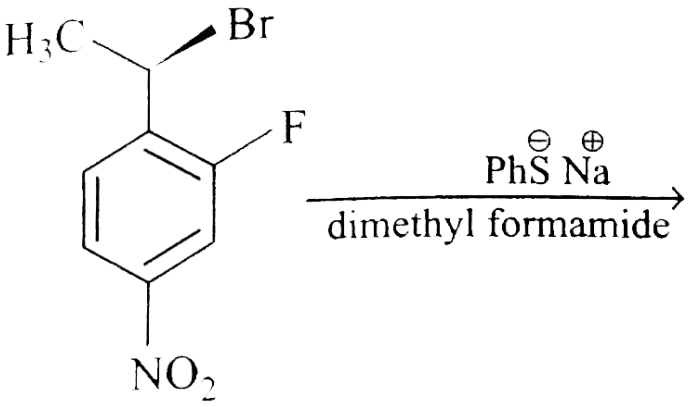
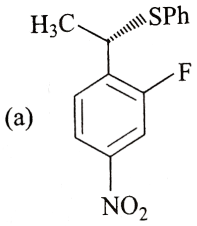
2. The major product of the following reaciton

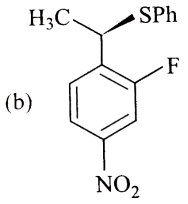


is

A.



B.



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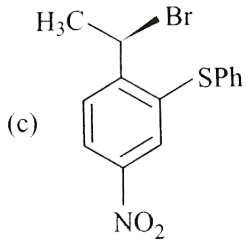
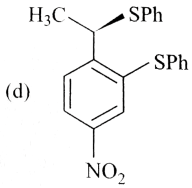


D.



Answer: A

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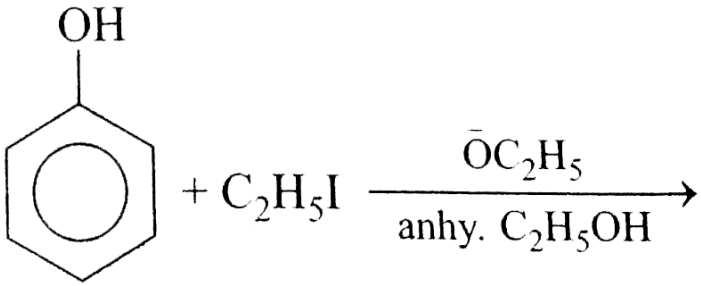
3. Complete the following reaction



A. $C_6H_5OC_2H_5$

B. $C_2H_5OC_2H_5$

C. $C_6H_5OC_6H_5$

D. C_6H_5I

Answer: A

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4. In the reaction of p-chlorotoluene with KNH_2 is liguid NH_3 the major product is .

A. o-toluidine

B. m-toludine

C. p-touidine

D. p-chlorooaniline

Answer: B

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5. Phenol reacts with bromine in carbon disulphide at low temperature to give

A. m-bromophenol

B. o-and p-bromophenol

C. p-bromophenol

D. 2,4, 6-tribromophenol

Answer: C

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6. When phenol is treated with excess of bromine water, it gives

A. m-bromophenol

B. o-and p-bromophenol

C. 2,4-tribromophenol

D. 2,4, 6-tribromophenol

Answer: D

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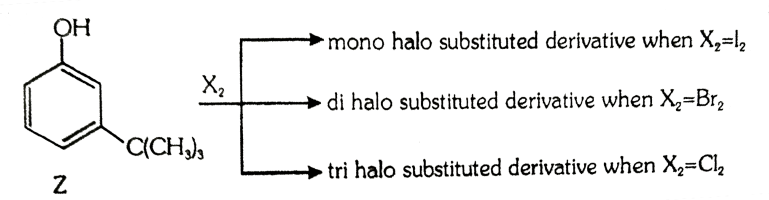
7. The reactivity of compound Z with different halogens under appropriate conditions is gives below-



The observed pattern of electrophilic substitution can be explained by-

A. the steric effect on the halogen

B. the steric effect of the tert-butyl group

C. the electronic effect of the phenolic group

D. the electronic effect of the tert-butyl group

Answer: A::B::C

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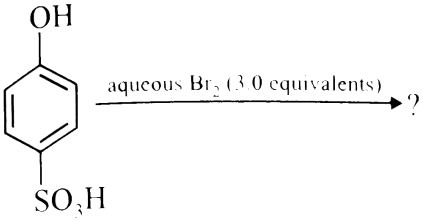
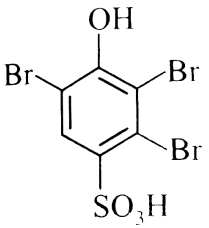
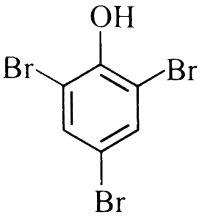
8. The major product (s) of the following reaction is (are)

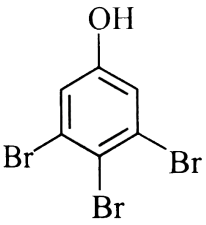




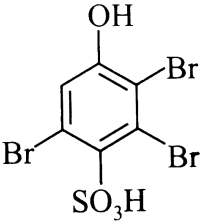
P



Q



R



S

P Q

R S

A. P

B. Q

C. R

D. S

Answer: B

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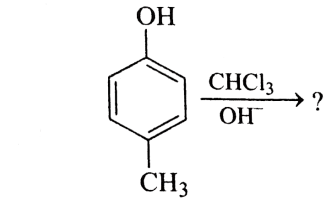
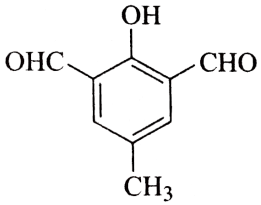
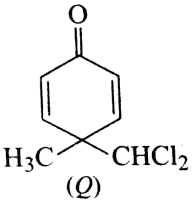
9. In the following reacation. The product(s) formed is/are

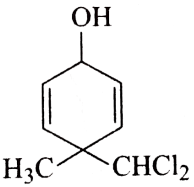




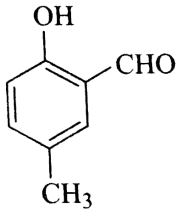
(P)



(Q)



(R)



(S)

A. P(major)

B. Q(minor)

C. R(minor)

D. S(major)

Answer: B::D

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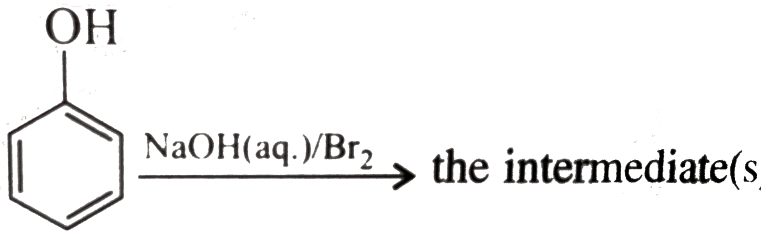
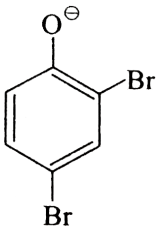
10. In the reaction

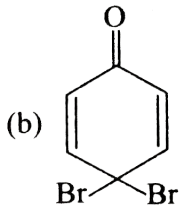


the intermediate(s) is/are:

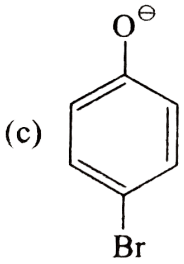
A. (a)



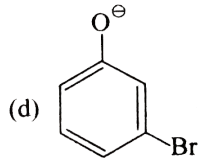
B.



C.



D.



Answer: A::B::C

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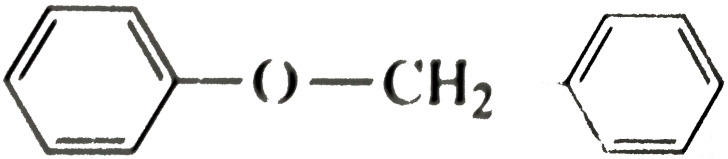
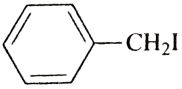
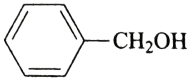
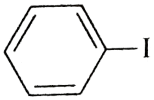
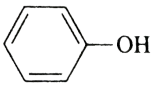
11. The ether  when treated with HI produces:

A. (a) 

B. (b) 

C. (c) 

D. (d) 

Answer: A::D

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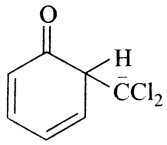
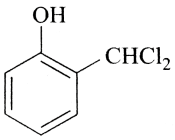
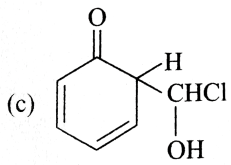
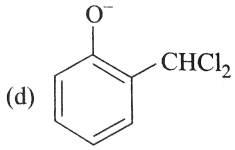
12. When phenol reactes with $CHCl_3$ and NaOH followed by acidification, salicyladehyde is obtained. Which of the following species are involed in the above-mentioned reaction as intermediates ?

A. (a) 

B. (b) 

C. 

D. 

Answer: A::D

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13. Aryl halides are less reactive towards nucleophilic substitution reaction as compared to alyl halides due to

A. the forrmation of less stable carbonium ion

B. resonance stablisation

C. longer carbon halogen bond

D. sp^2-hybridised carbon bonded to halogen

Answer: B::D

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14. Assertion: Bromobenzene upon reaction with Br_2/Fe gives 1,4-dibromobenzene as the major product

Reason In bromobenzene the inductive effect of the bromo group is more dominant than the mesomeric effect in directing the incoming electrophile .

A. Statement I is correct, Statement II is

correct Statement II is

the correct explanation of Statement I

B. Statement I is correct, Statement II is correct Statement II is not the correct explantion of Statement I

C. Statement I is correct, Statement II is incorrect

D. Statement I is incorrect, Statement II is correct

Answer: C

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15. Phenol is more reactive than benzene towards electrophilic substitution reaction.

In case of Phenol, the intermediate carbocation is more resonance stabilised.

A. Statement I is correct, Statement II is correct Statement II is the correct explanation of Statement

B. Statement I is correct, Statement II is correct Statement II is

not the correct explantion of Statement I

C. Statement I is correct, Statement II is incorrect

D. Statement I is incorrect, Statement II is correct

Answer: A

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16. Statement I Benzonitrile is prepared by the reaction of

chlorobenzene with potassium cyanide.

Statement II Cyanide $\left(CN^{-}\right)$ is a strong nucleoohile.

A. Statement I is correct, Statement II is correct Statement II is the correct explanation of Statement

B. Statement I is correct, Statement II is correct Statement II is

not the correct explantion of Statement I

C. Statement I is correct, Statement II is incorrect

D. Statement I is incorrect, Statement II is correct

Answer: D

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17. Assertion: Aryl halides undergoes nucleophilic substitution with ease

Reason The carbon halogen bond in aryl halides has partial double bond character .

A. Statement I is correct, Statement II is correct Statement II is the correct explanation of Statement

B. Statement I is correct, Statement II is correct Statement II is

not the correct explantion of Statement I

C. Statement I is correct, Statement II is incorrect

D. Statement I is incorrect, Statement II is correct

Answer: D

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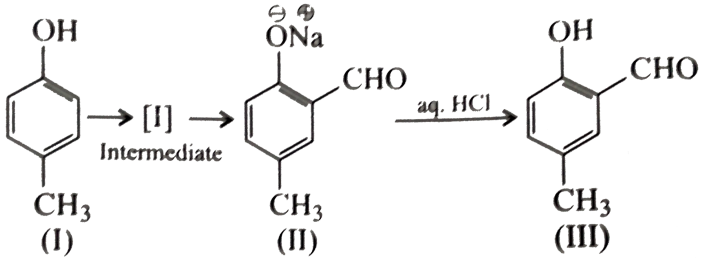
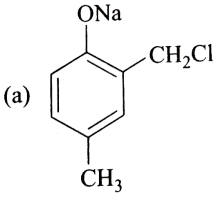
18. Reimer-Tiemann reaction introduces an aldehyde group on to the aromatic ring of phenol, ortho to the hydroxyl group. This reacrtion involves electrophilic aromatic subsititution. It is a general method for the synthesis of subsituted salicyladehydes as depiced below:

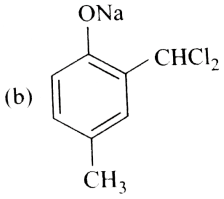


The structure of the intremediate (I) is:

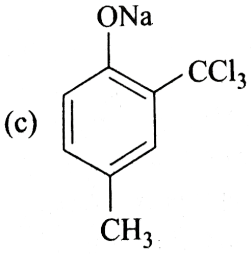
A.



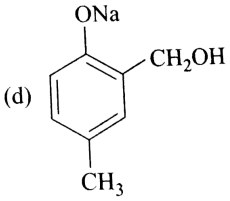
B.



C.



D.



Answer: B

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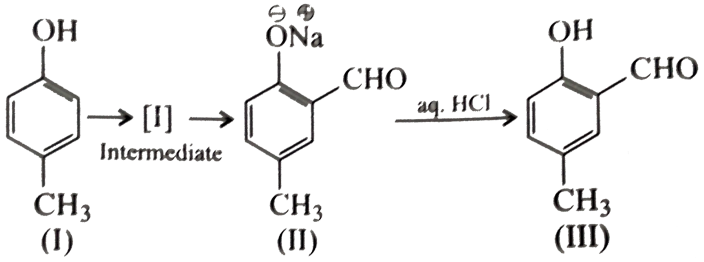
19. Reimer-Tiemann reaction introduces an aldehyde group on to the aromatic ring of phenol, ortho to the hydroxyl group. This reacrtion involves electrophilic aromatic subsititution. It is a general method for the synthesis of subsituted salicyladehydes as depiced below:



The electrophile in this reaction is:

A. $\_(*)^{*}CHCl$

B. $\hat{}(+)CHCl_2$

C. $\_(*)^{*}CCl_2$

D. $\hat{}(*)CHCl_2$

Answer: C

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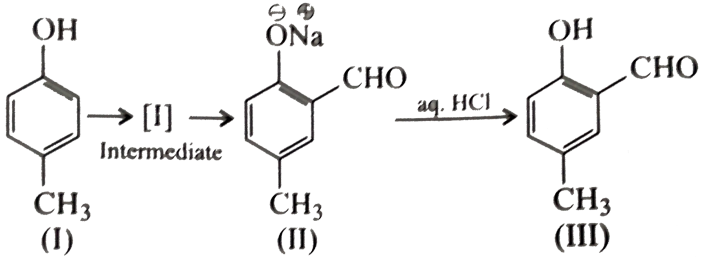
20. Reimer-Tiemann reaction introduces an aldehyde group on to the aromatic ring of phenol, ortho to the hydroxyl group. This

reacrtion involves electrophilic aromatic subsititution. It is a general method for the synthesis of subsituted salicyladehydes as depiced below:



Which one of the following reagents is used in the above reaction ?

A. $aqNaOH + CH_3Cl$

B. $aqNaOH + CH_2Cl_2$

C. $aqNaOH + CCl_4$

D.

Answer: C

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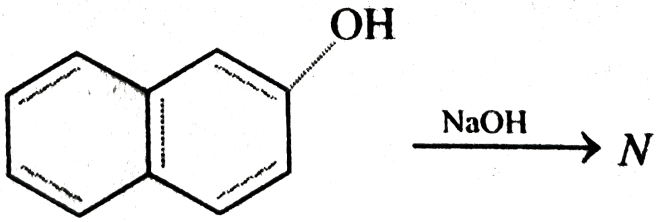
21. The number of resonannce structure for N



is

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22. Amongst the three isomers of the nitrophenol, the one that is least soluble in water is .....

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23. Phenol is acidic because of the resonance stabilisation of its conjugate base, namely .....

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24. Formation of phenol from chlorobenzene is an example of

.... Aromatic substitution.

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25. The acidity of phenol is due to the ..... Of its anion.

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26. Carry out the following conversation.

Phenol to aspirin

Benzoic acid to meta- fluorobenzoic acid in not more than

three steps.

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27. How would you synthesise 4-methoxyphenol from

bromobenzene in not more than five steps?

State clearly the

reagents used in each step and show the structure of the intermediate compounds in your synthetic scheme.

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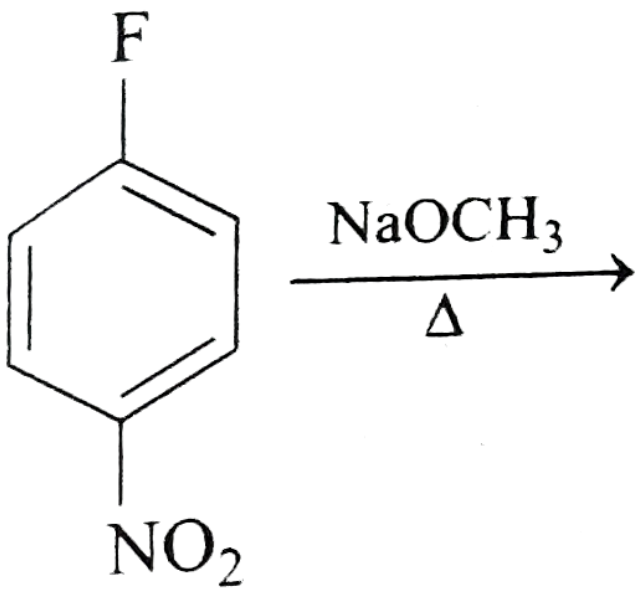
28. What would be the major product in the following reaction?



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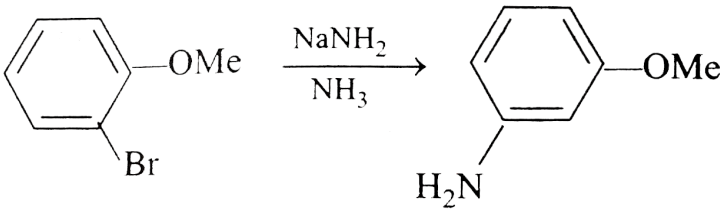
29. Explain briefly the formation of the products giving the

structures of the intermediates.



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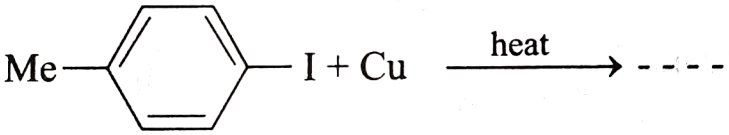
30. Complete the following, giving the structures of the principal organic products



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31. How will you prepare m-bromoiodobenzene from benzene (in not more than 5-7 steps)?

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32. Explain the following in one or two sentence only: 'Phenol is an acid, but it does not react with sodium bicarbonate'.

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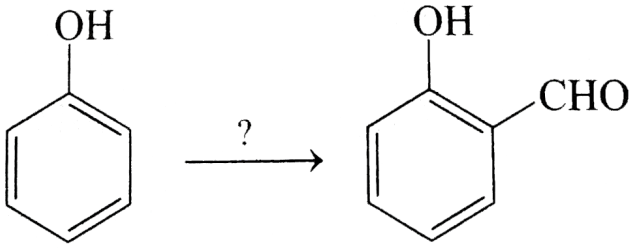
33. Complete the following with appropriate structures:



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34. Compound A, C_7H_8O, is insoluble in water, dilute HCl, and aquenous $NaHCO_3$, it dissolves in dilute $NaOH$. When A is treated

with bromine water is is converted rapidly into a compound of formula $C_7H_5Obr_3$. The structure of A is

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35. Give reason in one or two sentences form the following: 'o-nitrophenol is steam volatile, whereas p-nitrophenol is not'.

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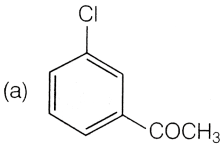
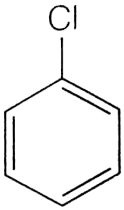
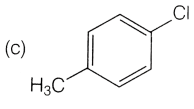
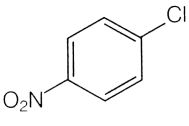
36. Which of the following compounds undergoes nucleophilic substitution most readly?

A. (a) 

B. (b) 

C. (c) 

D. (d) 

Answer: D

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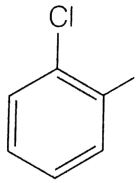
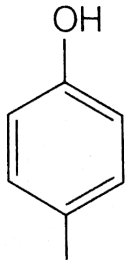
37. The reaction of toluence with chlorine In this presence of light gives

A. (a) 

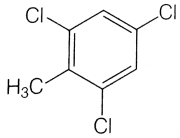
B.

(b)



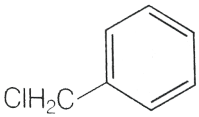
C.

(c)



D.

(d)



Answer: D

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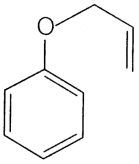
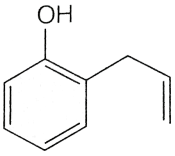
38. When phenol is refluxed with allyl bromide in acetone solution in the presence of anhydrous potassiym carbonate a product may be isolated which, on heating to $200^{\circ} C$ is converted mainly to

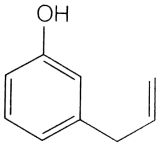
A. (a)

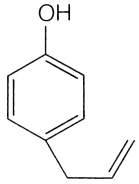


B. (b)



C. (c)



D. (d) 

Answer: D

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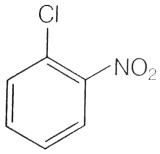
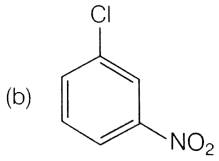
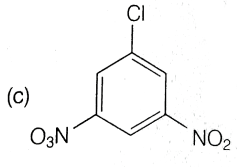
39. Which one of the following compounds will be most readily hydrolysed in aqueous alkali?

A. (a) 

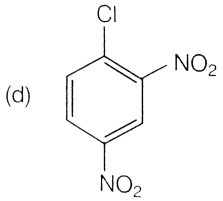
B.



C.



D.



Answer: D

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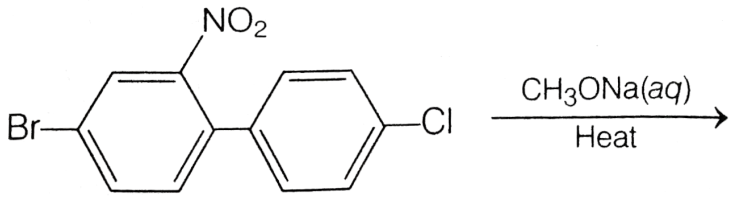
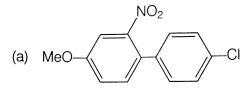
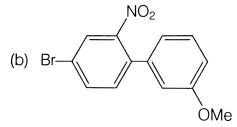
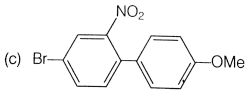
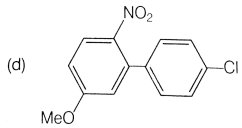
40. The major substitution product of the following reaction



A. 

B. 

C. 

D. 

Answer: C

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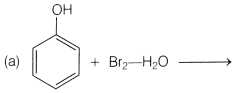
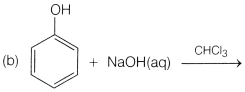
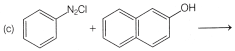
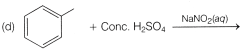
41. Which of the following reaction will give a visible change?

A. 

B. 

C. 

D. 

Answer: A::C::D

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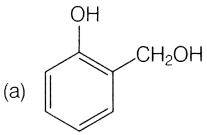
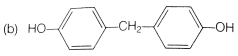
42. Consider the following reaction

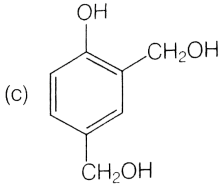
$$Phenol + CH_2(excess) + H_2SO_4) \rightarrow$$

The expected product(s) of the above reaction is/are

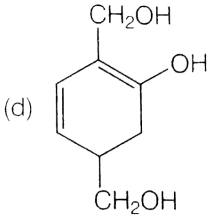
A. 

B. 

C.



D.



Answer: A::C

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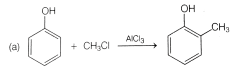
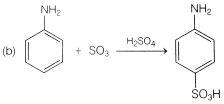
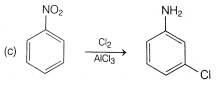
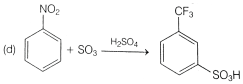
43. In which of the following reaction(s), the product shown will

not be formed?

A. 

B. 

C. 

D. 

Answer: A::B

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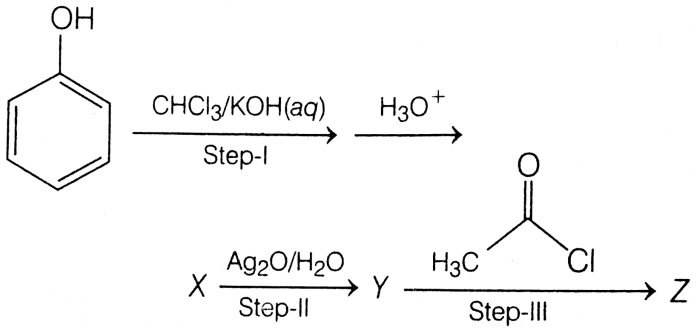
44. Consider the following reaction to answer the next three

questions:



In the above reaction. The reactive intermediate formed in the first step(step-i) is

A. CCl_3

B. $\_(*)^{*}CCl_2$

C. $\_(*)^{*}CCl_2^{-}$

D. $\overset{+}{C}HCl_2$

Answer: B

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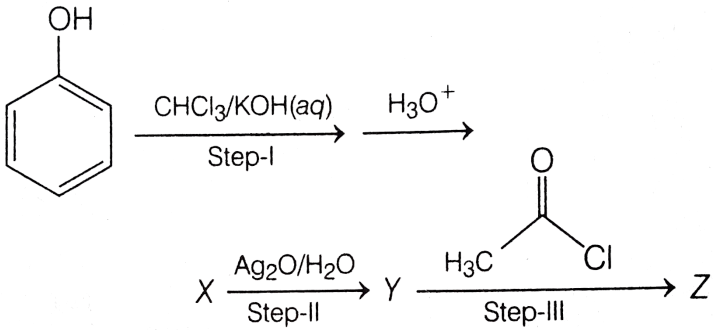
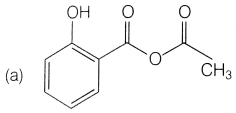
45. Consider the following reaction to answer the next three questions:

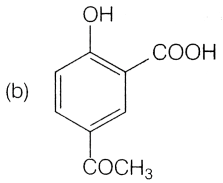


The product Z in the above reaction is

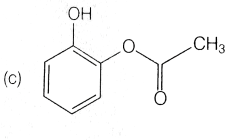
A.



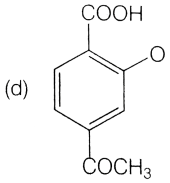
B.



C.



D.



Answer: C

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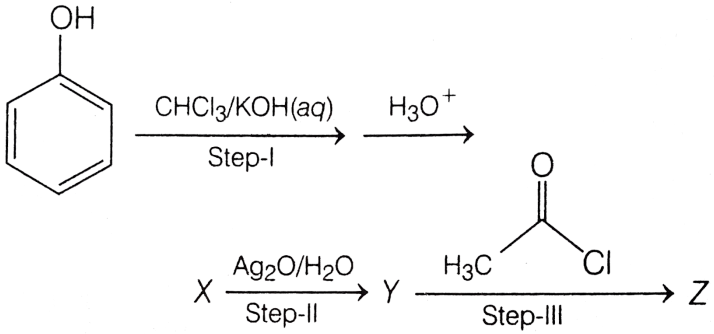
46. Consider the following reaction to answer the next three questions:



Y can also be obtained in the above reaction by reacting phenol with

A. $NaOH(aq)$ followed by passing $CO_2(g)$ and finally acid

hydrolysis

B. $CH_3Cl / AlCl_3$ followed by treatment with $KMnO_4$(OH^(-))` and finally acid hydrolysis

C.

D. Either b or C

Answer: A

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47. Asscertain Phenol on treatment with $Br_2 - H_2O$ gives

2,4,6-tribromo phenol. ltReasongt Due to strong activation by hydroxyl group

trisubstitution takes place.

A. Both assertion and reason are correct and reason is the correct explanation of assertion

B. Both assertion and reason are correct and reason is not the

correct explanation of assertion

C. Assertion is correct but reason is incorrect.

D. Assertion is incorrect but reason is correct.

Answer: c

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48. Assertion p-fluoro nitrobenzene is more reactive than

p-bromo nitrobenzene in the aromatic necleophilic

substitution reaction with acqueous $NaOH$

Reason Addition of nuceophilie on the a-carbon of aryl

halide is the rate determing step is $S_N Ar$ reaction.

A. Both assertion and reason are correct

and reason is the

correct explanation of assertion

B. Both assertion and reason are correct and reason is not the correct explanation of assertion

C. Assertion is correct but reason is incorrect.

D. Assertion is incorrect but reason is correct.

Answer: A

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49. An organic compound (X) has molecular formula $C_7H_6O_2$

and it does not effervesces with NaH A on treatment with

excess of $HBr(aq)$ gives $Y(C_6H_6O_2)$ and CH_2Br_2. Y forms a

violet coloured solution with $FeCl_3$. If X treated with Br_2Fe,

how many different monobrominaiton product would result?

A. 1

B. 2

C. 3

D. 4

Answer: B

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50. If toluene is monochlorinated, how many different

monochloro derivatives would be expected?

A. Both assertion and reason are correct and reason is the correct explanation of assertion

B. Both assertion and reason are correct and reason is not the correct explanation of assertion

C. Assertion is correct but reason is incorrect.

D. Assertion is incorrect but reason is correct.

Answer: 4

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