Exercise-1

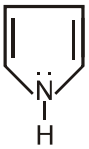
ONLY ONE OPTION CORRECT TYPE

Section (A) : Aromaticity

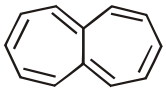
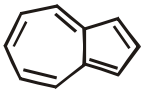
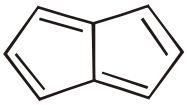
1. Which of the following statements is not correct ?
(1) An aromatic molecule must be cyclic
(2) An aromatic ring must be planar
(3) An aromatic ring must involve cyclic delocalization of (4n + 2) π-electrons
(4) An aromatic ring must involve cyclic delocalization of 4n π-electrons.

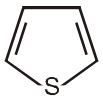
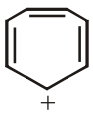
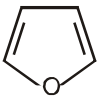
2. Aromatic compounds burn with sooty flame because :
(1) They have a ring structure of carbon atoms.
(2) They have a relatively high percentage of hydrogen.
(3) They resist reaction with oxygen of air.
(4) They have a relatively high percentage of carbon.

3. The general formula of arenes is :
(1) C_nH_{2n} (2) C_nH_{2n-4} (3) C_nH_{2n+2} (4) C_nH_{2n-6}

4. Number of π electrons in  are :
(1) 2 (2) 4 (3) 5 (4) 6

5. Number of π electrons present in naphthalene is:
(1) 2 (2) 4 (3)10 (4) 14

6. Identify the aromatic compound ?
(1)  (2)  (3)  (4) 

7. Which of the following is not an aromatic compound:
(1)  (2)  (3)  (4) 

8. Among the following the anti aromatic speceis is :
(1)  (2)  (3)  (4) 

Section (B) : Electrophilic substitution

1. The characteristic reaction of benzene is :
(1) Electrophilic addition (2) Nucleophilic substitution
(3) Electrophilic substitution (4) Nucleophilic addition

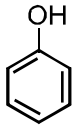
2. Benzene cannot undergo usually.
(1) Substitution (2) Addition (3) Elimination (4) Oxidation

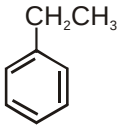
3. Which of the following compounds reacts slower than benzene in electrophilic bromination ?
(1) $C_6H_5CH_3$ (2) C_6H_5OH (3) $C_6H_5NO_2$ (4) $C_6H_5NH_2$

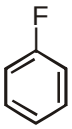
4. The fastest ArS_E2 reaction is given by ?
(1) Phenoxide ion (2) Phenyl ethanoate (3) Ethylbenzene (4) Aniline

5. The decreasing order of reactivity towards electrophilic substitution reaction of the following compounds is :
(i) benzene, (ii) chlorobenzene, (iii) nitrobenzene, (iv) toluene
(1) i > iii > iv > ii (2) iv > i > iii > ii (3) iv > i > ii > iii (4) iv > ii > i > iii

6. Arrange the following compounds in the order of decreasing reactivity towards electrophilic substitution reaction.


(I)


(II)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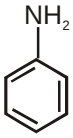
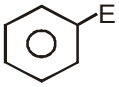

(IV)

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

7. In a compound  electrophilic substitution has occurred. The substituent – E are methyl,– CH_2Cl,–CCl_3 and –$CHCl_2$. The correct increasing order towards electrophilic substitution is
(1) $-CH_3 < -CH_2Cl < -CHCl_2 < -CCl_3$ (2) $-CH_3 < -CHCl_2 < -CH_2Cl < -CCl_3$
(3) $-CCl_3 < -CH_2Cl < -CHCl_2 < -CH_3$ (4) $-CCl_3 < -CHCl_2 < -CH_2Cl < -CH_3$

8. Select the correct statement.
(I) Ortho-and para-directing groups increase electron density at ortho-and para-positions mainly
(II) Meta-directing groups increase electron density at meta-position mainly
(III) Meta-directing groups decrease electron density at ortho pera position mainly
(IV) Ortho-and para-directing groups decrease electron density at meta-position
(1) I & II (2) I & III (3) III & IV (4) II & IV

9. A deactivating group
(1) deactivates only o-and p-positions. (2) deactivates only m-position
(3) deactivates o-and p-more than m-position (4) deactivates m-more than o-and p-positions

10. -NH_2 group in aniline is :
(1) m-directing and deactivating (2) o, p-directing and deactivating
(3) o, p-directing and activating (4) m-directing and activating

11. Amongst the following, weakest activating group is :
(1) –NHR (2) $-NHCOCH_3$ (3) $-NR_2$ (4) $-CH_3$.

12. Among the following groups, the group that deactivates the benzene ring for further electrophilic substitution is:
(1) methyl (2) amino (3) hydroxyl (4) nitro

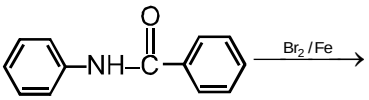
13. o,p-directing group are mostly :

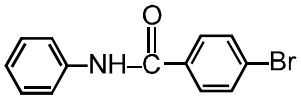
(1) activating group (2) deactivating groups (3) neutral groups (4) none of these

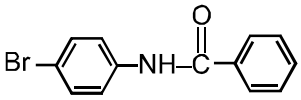
14. Chlorobenzene is o,p-directing in electrophilic substitution reaction. The directing influence is explaned by

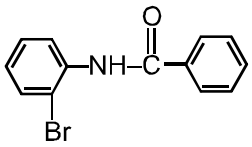
(1) +M of Ph (2) +I of Cl (3) +M of Cl (4) +I of Ph

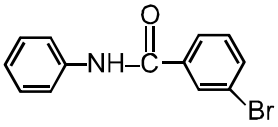
15. The major product obtained in the following is :

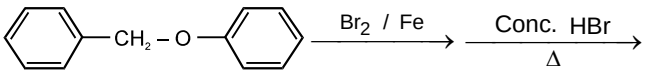


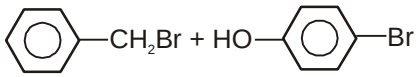
(1) 

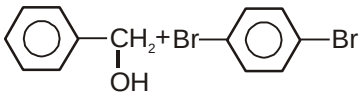
(2) 

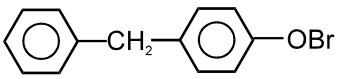
(3) 

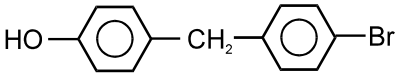
(4) 

16. 

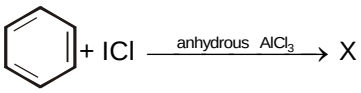
(1) 

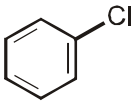
(2) 

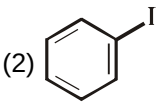
(3) 

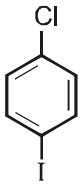
(4) 

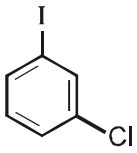
17. The compound X in the reaction,



(1) 

(2) 

(3) 

(4) 

18. The direct iodination of benzene is not possible because :

(1) iodine is an oxidising agent (2) resulting C_6H_5I is reduced to C_6H_6 by HI

(3) HI is unstable (4) the ring gets deactivated.

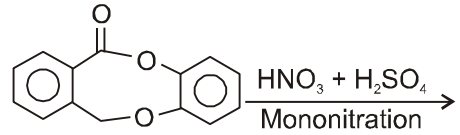
19. In the nitration of benzene with a mixture of conc. HNO_3 and conc. H_2SO_4, the electrophile involved is :

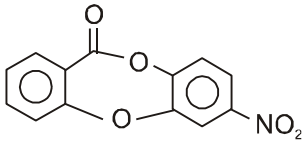
(1) NO_3^- (2) NO_2 (3) NO_2^- (4) NO_2^+

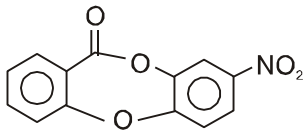
20. Nitrobenzene can be prepared from benzene by using a mixture of conc. HNO_3 and conc. H_2SO_4. In the nitrating mixture HNO_3 acts as a :

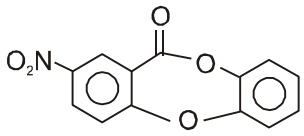
(1) base (2) acid (3) reducing agent (4) catalyst

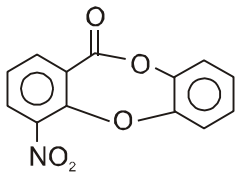
21. The end product of following reaction is



(1) 

(2) 

(3) 

(4) 

22. For the electrophilic substitution reaction involving nitration, which of the following sequence regarding the rate of reaction is true?

(1) $k_{C_6H_6} > k_{C_6D_6} > k_{C_6T_6}$ (2) $k_{C_6H_6} < k_{C_6D_6} < k_{C_6T_6}$

(3) $k_{C_6H_6} = k_{C_6D_6} = k_{C_6T_6}$ (4) $k_{C_6H_6} > k_{C_6D_6} < k_{C_6T_6}$

23. Benzene when heated with conc. H_2SO_4 forms:

(1) benzene sulphate (2) benzene sulphite

(3) benzene hydrogen sulphate (4) benzene sulphonic acid

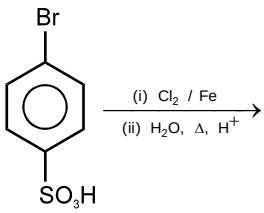
24. The attacking electrophilic species in sulfonation of benzene is

(1) SO_2 (2) SO_3 (3) $\overset{+}{S}O_3H$ (4) Both (2) and (3)

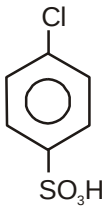
25. For the electrophilic substitution reaction involving sulphonation, which of the following sequence regarding the rate of reaction is true?

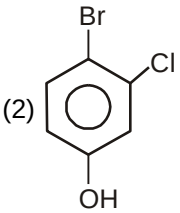
(1) $k_{C_6H_6} > k_{C_6D_6} > k_{C_6T_6}$ (2) $k_{C_6H_6} < k_{C_6D_6} < k_{C_6T_6}$

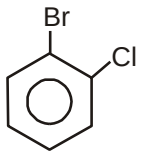
(3) $k_{C_6H_6} = k_{C_6D_6} = k_{C_6T_6}$ (4) $k_{C_6H_6} > k_{C_6D_6} < k_{C_6T_6}$

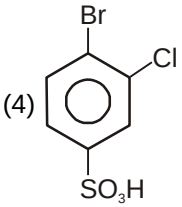
26. 

Identify the product

(1) 

(2) 

(3) 

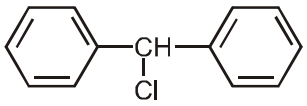
(4) 

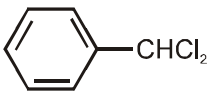
27. Benzene reacts with n-propyl chloride in the presence of anhydrous $AlCl_3$ to give predominantly:

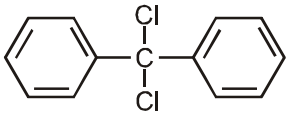
(1) n-propylbenzene (2) isopropylbenzene

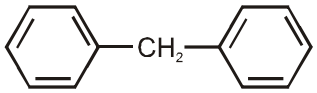
(3) 3-propyl-1-chlorobenzene (4) no reaction

28. Which of the following structures correspond to the product expected, when excess of C_6H_6 reacts with CH_2Cl_2 in presence of anhydrous $AlCl_3$:

(1) 

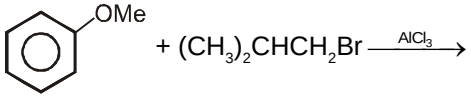
(2) 

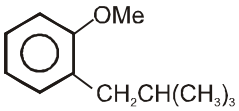
(3) 

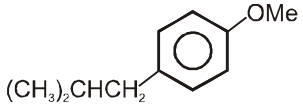
(4) 

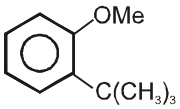
29. For preparing monoalkyl benzene, acylation process is preferred than direct alkylation because
(1) In alkylation, a poisonous gas is evolved
(2) In alkylation, large amount of heat is evolved
(3) In alkylation, polyalkylated product is formed
(4) Alkylation is very costly

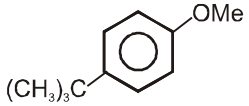
30. The major product formed in the reaction



(1) 

(2) 

(3) 

(4) 

31. Benzene reacts with acetyl chloride in presence of anhydrous aluminium chloride to form:
(1) acetophenone (2) phenyl acetate (3) chlorobenzene (4) benzoic acid

32. Nitrobenzene does not undergo Friedel-Crafts alkylation and acylation reactions because :
(1) it is a highly polar compound
(2) it is steam volatile
(3) its ring is deactivated by the electron withdrawing effect of the nitro substituent
(4) None of these is correct

Section (C) : Other Important Reactions of Benzene

1. Ethylbenzene + $Cl_2 \xrightarrow{Light}$ major product is :
(1) o- & p-Chloroethylbenzene (2) 1-Chloro-1-phenyl ethane
(3) 2-Chloroethylbenzene (4) m-Chloroethylbenzene

2. Chlorinaton of toluene in the presence of light and heat followed by treatment with aqueous NaOH gives:
(1) o-Cresol (2) p-Cresol
(3) 2,4- Dihydroxytoluene (4) Benzyl alcohol

3. Lindane can be obtained by reaction of benzene with
(1) CH_3Cl/anhy $AlCl_3$ (2) Cl_2/sunlight (3) C_2H_5I/anhy. $AlCl_3$ (4) $CH_3COCl/AlCl_3$

4. Toluene and chromyl chloride reacts to produce :
(1) Benzoic acid (2) Benzaldehyde (3) Chlorotoluene (4) Benzyl chloride

5. Reductive ozonolysis of benzene gives :
(1) one mole of glyoxal (2) two moles of glyoxal
(3) three moles of glyoxal (4) three moles of oxalic acid

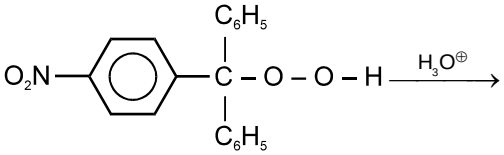
Section (D) : Phenol

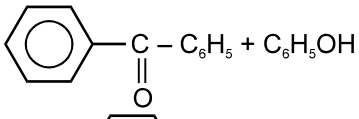
1. Following equation illustrates

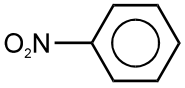
$C_6H_5Cl + 2NaOH \xrightarrow[300\ atm]{300-350^oC} C_6H_5ONa + NaCl + H_2O$

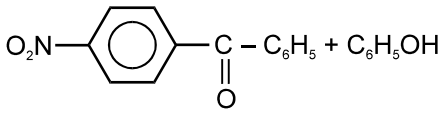
(1) Dow' process (2) Kolbe's process (3) Carbylamine test (4) Haloform reaction

2. Identify the product in the following reaction.



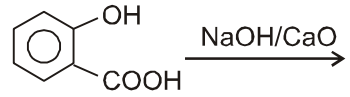
(1) 

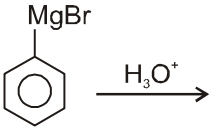
(2) 

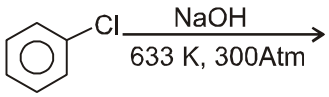
(3) 

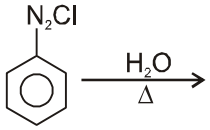
(4) 

3. In which of the following reactions phenol is not obtained :

(1) 

(2) 

(3) 

(4) 

4. The conversion of allyl phenyl ether into a mixture of ortho and para allylphenol by the action of heat is an example of :

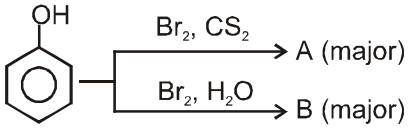
(1) Claisen rearrangement (2) Fries rearrangement
(3) Kolbe schmidt reaction (4) Cope rearrangement

5. Which of the following not gives effervescence with $NaHCO_3$?

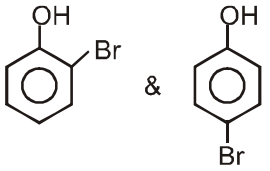
(1) Phenol (2) Benzoic acid (3) 2, 4-Dinitrophenol (4) 2, 4,6-Trinitrophenol

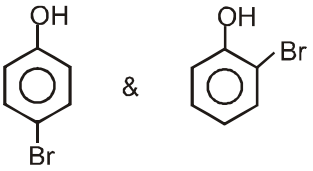
6. Which of the following pair of compounds can be seperated by aq. $NaHCO_3$?

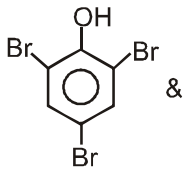
(1) Phenol & benzyl alcohol (2) Benzoic acid & Picric acid
(3) p-Nitrophenol & p-Methoxyphenol (4) Resorcinol & o-Cresol

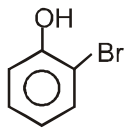
7. 

A and B are respectively

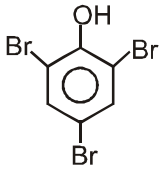
(1) 

(2) 

(3)  &



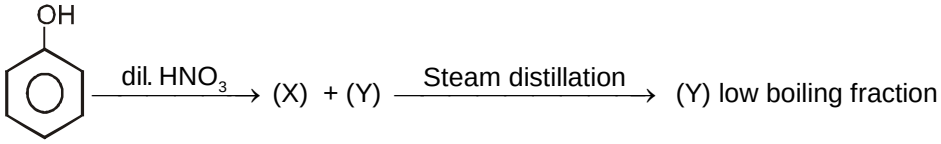
(4)  &



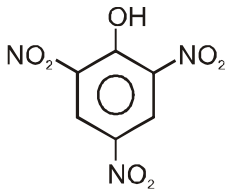
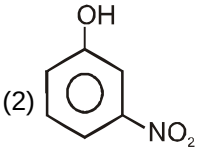
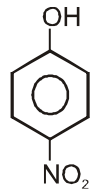
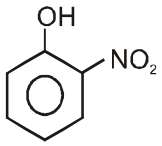
8. Anisole can be prepared by the action of methyl iodide on sodium phenoxide. The reaction is called

(1) Fittig reaction (2) Etard reaction (3) Wurtz reaction (4) Williamson reaction

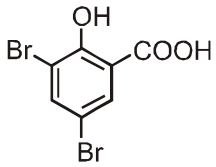
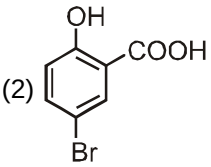
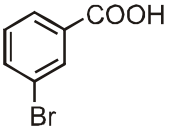
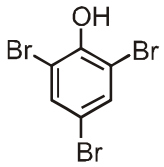
9. Observe the following reaction, and select the correct option



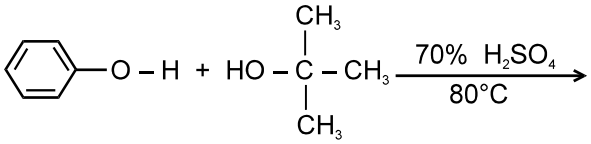
'Y' is :

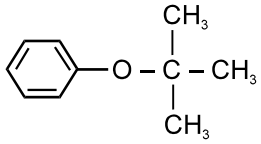
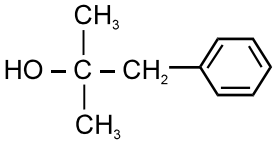
(1)  (2)  (3)  (4) 

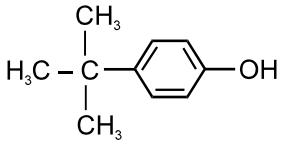
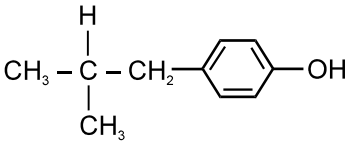
10. When 2-hydroxybenzoic acid (salicylic acid) is treated with bromine water, the product formed is

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

11. The major product of the following reaction is



(1)  (2) 

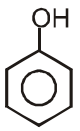
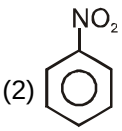
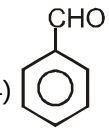
(3)  (4) 

12. Phenol + $CHCl_3$ + KOH ⟶ product is :

(1) benzoic acid (2) p-chlorophenol (3) salicylaldehyde (4) salicylic acid

13. A + CCl_4 + KOH → Salicylic acid

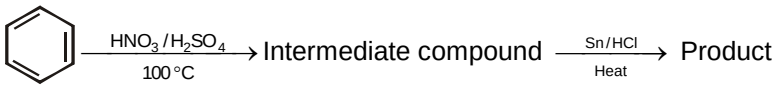
'A' in above reaction is

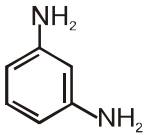
(1)  (2)  (3)  (4) 

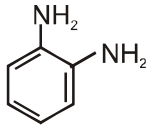
Section (E) : Aniline

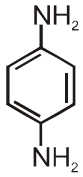
1. Nitrobenzene combines with hydrogen in the presence of platinum to produce
(1) Toluene (2) Benzene (3) Aniline (4) Azobenzene

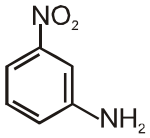
2. Aniline can be obtained by reduction of nitrobenzene with
(1) Fe / HCl
(2) Sn / HCl
(3) Electrolytic reduction under weakly acidic conditions
(4) All.

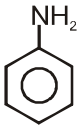
3. 

(1) 

(2) 

(3) 

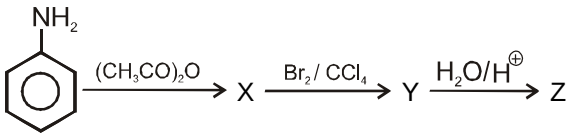
(4) 

4. Electrophilic substitution of 

with bromine water gives :
(1) 2,3,4-Tribromo aniline (2) 2, 4, 6-Tribromo aniline
(3) 4-Bromo aniline (4) 3-Bromo aniline

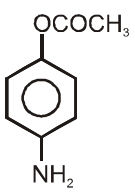
5. Which of the following sequence is best suited to convert benzene to 3-chloro aniline ?
(1) nitration, reduction, chlorination
(2) chlorination, nitration, reduction
(3) nitration, chlorination, reduction
(4) nitration, reduction, acetylation, chlorination, hydrolysis

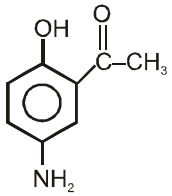
6. Activation of benzene ring in aniline can be decreased by treating with
(1) acetone (2) ethyl alcohol (3) acetic acid (4) acetyl chloride

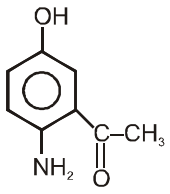
7. 

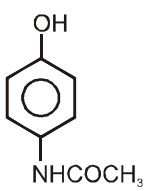
Identify 'Z'
(1) p-Bromo aniline (2) p-Bromo acetophenone
(3) p-Bromo acetanilide (4) o-Bromo acetophenone

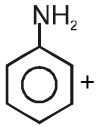
8. p-Aminophenol reacts with one equivalent of acetyl chloride in the presence of pyridine to give mainly :

(1) 

(2) 

(3) 

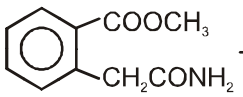
(4) 

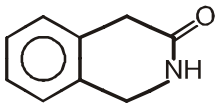
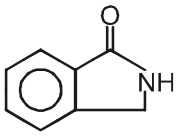
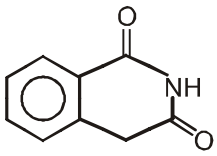
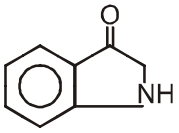
9.  + $CHCl_3$ + KOH $\rightarrow$ product is :

(1) phenyl isocyanide (2) benzyl amine (3) benzyl chloride (4) none of these

10. Aniline reacts with which of these to form schiff base ?

(1) Acetic acid (2) Benzaldehyde (3) Acetone (4) NH_3

11.  Product. The major product obtained is

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

12. A mixture of 1º, 2º and 3º amines can be separated by Hinsberg's reagent which is

(1) benzoyl chloride (2) acetyl chloride

(3) benzensulphonyl chloride (4) benzyl chloride

13. An amine (X) reacts with benzenesulphonyl chloride and the product thus obtained is soluble in KOH. The amine (X) is

(1) 1º Amine (2) 2º Amine (3) 3º Amine (4) Any of the three.

14. Which of the following undergoes mustard oil reaction ?

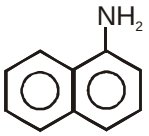
(1) Primary amines (2) Secondary amines (3) Tertiary amines (4) All the above

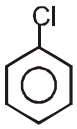
Section (F) : Benzene diazonium salt :

1. Aniline on treatement with nitrous acid ($NaNO_2$ + HCl) at 0ºC forms :

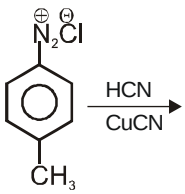
(1) phenol (2) nitrobenzene (3) nitrosobenzene (4) benzene diazonium chloride

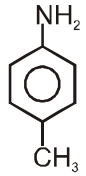
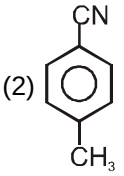
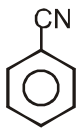
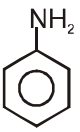
2. Which will not go for diazotisation ?

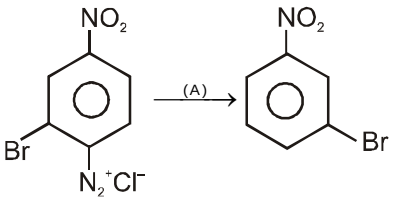
(1) $C_6H_5NH_2$ (2) $C_6H_5CH_2NH_2$ (3)  (4) 

3. Diazonium salts + Cu_2Cl_2 + HCl $\rightarrow$  , the reaction is known as

(1) Chlorination (2) Sandmeyer's reaction (3) Perkin reaction (4) Carbyl amine reaction

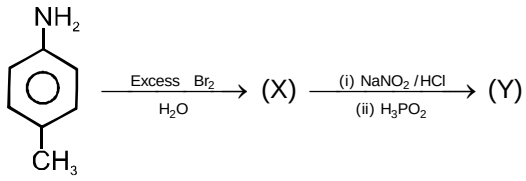
4.  product is

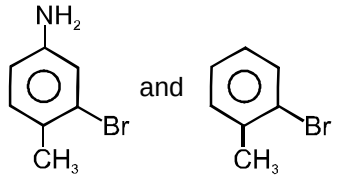
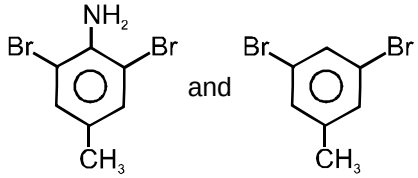
(1)  (2)  (3)  (4) 

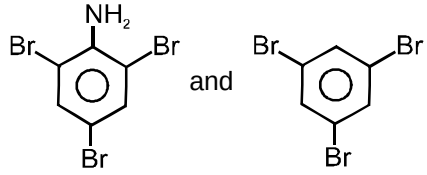
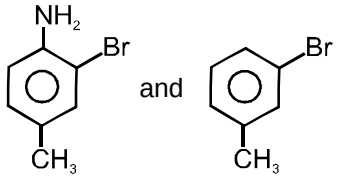
5. In the reaction,  (A) is :

(1) H_3PO_2 (2) Cu_2Cl_2 (3) $HgSO_4 / H_2SO_4$ (4) H^+ / H_2O

6. In the following reaction sequence, the compounds (X) and (Y) respectively are :



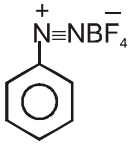
(1)  (2) 

(3)  (4) 

7. $C_6H_5NH_2 \xrightarrow[0-5°C]{NaNO_2+HCl} X \xrightarrow[\Delta]{H_2O} Y$, the product Y is :

(1) Benzenediazonium chloride (2) Nitrobenzene

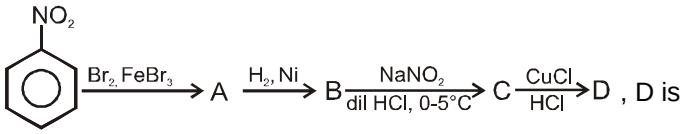
(3) Phenol (4) Cresol

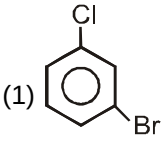
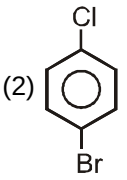
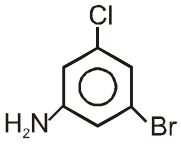
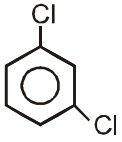
8.  $\xrightarrow{\Delta}$ A is

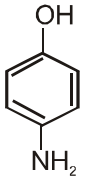
In the above process product A is

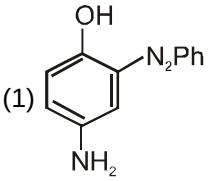
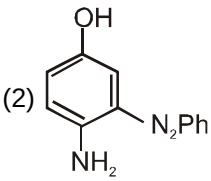
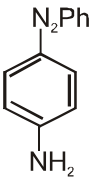
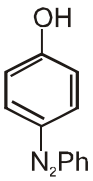
(1) Fluorobenzene (2) Benzene (3) 1, 4-Difiluorobenzene (4) 1, 3–Difluorobenzene

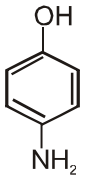
9. Consider the following sequence of reactions.

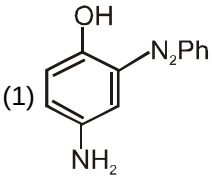
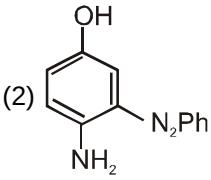
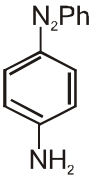
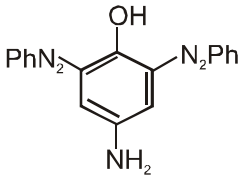


(1)  (2)  (3)  (4) 

10.  + Ph–$\overset{+}{N}_2$ $\xrightarrow{\text{(pH 9–11)}}$ X, (major product) X will be

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

11.  + Ph–$\overset{+}{N}_2$ $\xrightarrow{\text{pH 4~6}}$ X (major product) X will be -

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

Section (G) : Nitrobenzene

1. The well known explosive TNT stands for
(1) 2, 3, 6-Trinitrotoluene (2) 3, 4, 5-Trinitrotoluene
(3) 2, 3, 5-Trinitrotoluene (4) 2, 4, 6-Trinitrotoluene

2. Nitration of benzene with a mixture of conc. HNO_3 and conc. H_2SO_4 at 333 K (60ºC) gives :
(1) Nitrosobenzene (2) Nitrobenzene (3) 1, 3-Dinitrobenzene (4) 1, 3, 5-Trinitrobenzene

3. The rate determining step for the prepration of nitrobenzene from benzene is.
(1) Removal of $\overset{+}{N}O_2$ (2) Removal of H^+ (3) Attack of $\overset{+}{N}O_2$ (4) Formation of $\overset{+}{N}O_2$

4. Reduction of nitrobenzene with $LiAlH_4$ gives :
(1) Nitrosobenzene (2) Aniline (3) Azobenzene (4) Phenylhydroxylamine

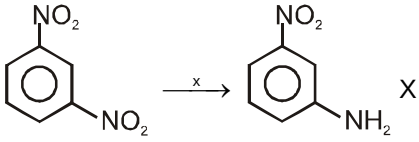
5. Nitrobenzene is reduced with Zn and alcoholic NaOH to get :
(1) $C_6H_5NH_2$ (2) $C_6H_5–\underset{\downarrow}{\underset{O}{N}}=N–C_6H_5$ (3) $C_6H_5N=NC_6H_5$ (4) $C_6H_5–NH–CO–C_6H_5$

6. Hydrazobenzene is formed when nitrobenzene is reduced with
(1) Zn / HCl (2) Zn / NaOH (3) Sn / HCl (4) Zn / NH_4Cl

7. $C_6H_6 \xrightarrow[\text{conc. } H_2SO_4,\ 363\ K]{\text{conc. } HNO_3} X \xrightarrow{(NH_4)_2S} Y$

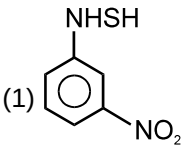
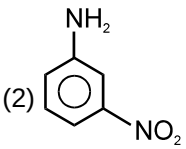
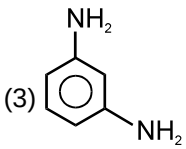
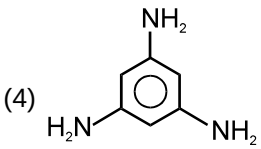
In the above reaction sequence, X and Y are respectively

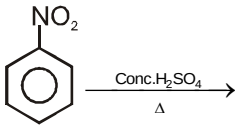
(1) nitrobenzene, aniline
(2) m-dinitrobenzene, m-phenylenediamine
(3) m-dinitrobenzene, m-nitroaniline
(4) m-dinitrobenzene, p-nitroaniline.

8.  X is

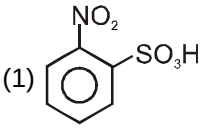
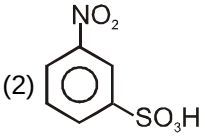
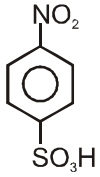
(1) Na_2S (2) NaSH (3) $(NH_4)_2S$ (4) All of these

9. The major product of the reaction between m-dinitrobenzene with NH_4SH is :

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

10. 

Product 'A' in above reaction is

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

11. Primary nitro compounds when react with HNO_2 forms crystalline solids which one treatment with NaOH gives

(1) Red solution (2) Blue solution (3) White precipitate (4) Yellow colouration.

12. Nitrobenzene is generally used for :

(1) preparation of shoe polish
(2) preparation cheap scented soap
(3) preparation of aniline
(4) all of the above

13. Nitrobenzene at room temperature is

(1) gas (2) liquid (3) solid (4) solution

Section (H) : RNH_2, RNO_2, RNC, RCN

1. Which of the following reactions does not yield an amine ?

(1) $R–X + NH_3 \longrightarrow$
(2) $R–CH=NOH + [H] \xrightarrow[C_2H_5OH]{Na}$
(3) $R–CN + H_2O \xrightarrow{H^+}$
(4) $R–CONH_2 + 4\,[H] \xrightarrow{LiAlH_4}$

2. Acetonoxime on reduction with Na/C_2H_5OH would give

(1) isopropylamine (2) n-propylamine (3) ethylmethylamine (4) diethylamine

3. Aniline, chloroform and alcoholic KOH reacts to produce a bad smelling substance which is :

(1) phenyl isocyanide (2) phenyl cyanide (3) chloro benzene (4) benzyl alcohol

4. A positive carbylamine test is given by :

(1) N,N–dimethylaniline
(2) 2, 4-dimethylaniline

(3) N-methyl-o-methylaniline (4) N-methylaniline

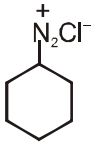
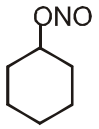
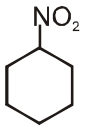
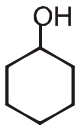
5. Ethyl amine on heating with CS_2 in presence of $HgCl_2$ forms
(1) C_2H_5NCS (2) $(C_2H_5)_2S$ (3) $(C_2H_5)_2CS$ (4) $C_2H_5(CS)_2$

6. The Hinsberg's method is used for :
(1) preparation of primary amines (2) preparation of secondary amines
(3) preparation of tertiary amines (4) separation of amine mixtures

7. Which of the following amine does not react with Hinsberg's reagent ?
(1) $CH_3CH_2NH_2$ (2) $(CH_3CH_2)_2NH$ (3) $(CH_3CH_2)_3N$ (4) All of these

8. Secondary amine forms yellow oily liquid with nitrous acid which on warming with phenol and conc. H_2SO_4 gives a brown or red colour and which at once changes into blue-green. This reaction is called as :
(1) Carbylamine reaction (2) Liebermann's nitroso reaction
(3) Gabriel phthalimide reaction (4) Hofmann's mustard oil reaction

9. Aromatic primary amines can be distinguished from aliphatic primary amines by
(1) tollen's test (2) action on red litmus paper
(3) azo dye test (4) action with dil. HCl

10. Action of $NaNO_2$ + dil HCl on $ArNH_2$ yield ArN_2Cl. A similar reaction with cyclohexylamine will yield.
(1) 
(2) 
(3) 
(4) 

11. Which of the following reagents can be used to prepare ethyl carbylamine from ethyl iodide ?
(1) HCN (2) KCN (3) AgCN (4) CuCN

12. Butanenitrile may be prepared by :
(1) propyl alcohol + KCN (2) butyl alcohol + KCN
(3) butyl chloride + KCN (4) propyl chloride + KCN

13. Dehydration of primary amides with P_2O_5 gives
(1) cyanides (2) isocyanides (3) amines (4) nitro compounds.

14. Which is not the property of acetonitrile (CH_3CN)
(1) Undergoes acidic hydrolysis to give carboxylic acid.
(2) Undergoes alkaline hydrolysis to give salt of carboxylic acid.
(3) It tautomerises to give methyl isocyanide.
(4) It gives ethyl amine with $LiAlH_4$

15. Which of the following statement is not correct
(1) Alkyl isocyanides have bad odours while alkyl cyanides have pleasant odours
(2) Alkyl cyanides are not as poisonous as KCN
(3) Alkyl cyanides have lower boiling points than the corresponding alkyl isocyanides
(4) Acetonitrile is soluble in water but methylcarbylamine is not.

16. Which one does not liberate NH_3 when undergoes hydrolysis ?

(1) Acetanilide (2) Acetonitrile (3) Acetamide (4) Phenyl isocyanide

17. Acid hydrolysis of methyl isocyanide gives
(1) $CH_3NH_2 + CH_3COOH$ (2) $CH_3NH_2 + CH_3CH_2COOH$
(3) $CH_3NH_2 + HCOOH$ (4) HCOOH

18. Identify the compound 'X' in the following reactions

$$CH_3NO_2 \xrightarrow[\text{Excess}]{Cl_2/NaOH} X \xleftarrow{HNO_3} CHCl_3$$

(1) $ClCH_2NO_2$ (2) Cl_2CHNO_2 (3) Cl_3CNO_2 (4) CH_3Cl

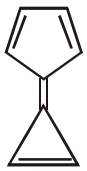
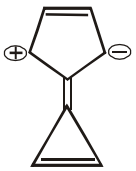
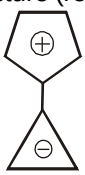
19. Nitroparaffins on reduction gives :
(1) amides (2) Alkylamines (3) Ammonium salts (4) acetanilides

20. Which of the following poisonous gas caused Bhopal tragedy in 1984 ?
(1) CH_3–N=C=O (2) CH_3–N=C=S (3) CH_3–CH=N=S (4) CH_3–O–NC

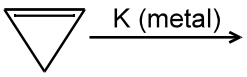
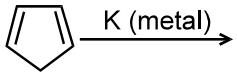
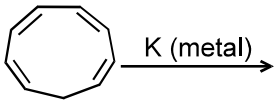
Exercise-2

ONLY ONE OPTION CORRECT TYPE

1. Calicene, C_8H_6, is expected to be fairly polar aromatic molecule. Which of the following resonance forms contributes to the greatest extent towards the real structure (resonance hybrid) of the molecule ?

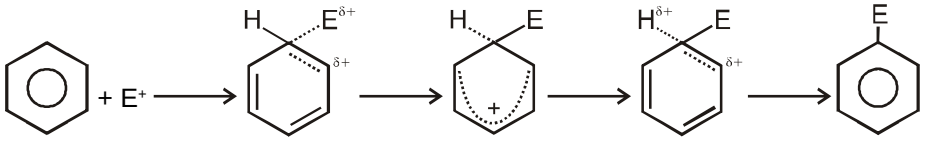
(1)  (2)  (3)  (4) 

2. In which of the following reactions hydrogen gas is not liberated

(I)  (II)  (III) 

(1) I, III (2) II, III (3) I only (4) III only

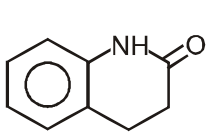
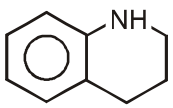
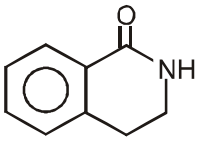
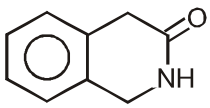
3. Which of the following species is expected to have maximum enthalpy in an electrophilic aromatic substitution reaction ?



(I) (II) (III) (IV) (V)

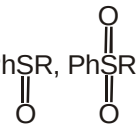
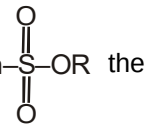
(1) Species (II) (2) Species (III) (3) Species (IV) (4) Species (V)

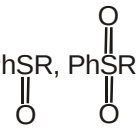
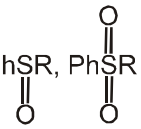
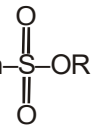
4. Order of rate of electrophilic substitution reaction is :

(P) (Q) (R) (S)

(1) Q > P > S > R (2) Q > P > R > S (3) P > Q > S > R (4) P > Q > R > S

5. Which of the species PhSH,  and  the ortho para-substituted product is obtained from :

(1) PhSH (2)  (3)  (4) 

6. Which of the following is ortho-para directing group ?

(1) $-CF_3$ (2) $-CCl_3$ (3) –CH=CH–COOH (4) $-NO_2$

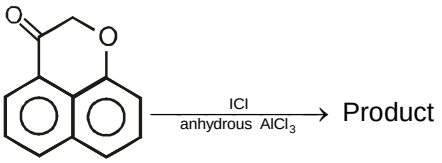
7. Benzene on reaction with conc. HNO_3 in presence of conc. H_2SO_4 followed by the treatment of Cl_2 in presence of $FeCl_3$, it gives:

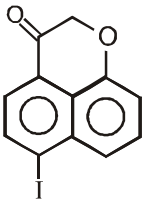
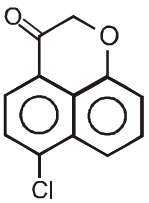
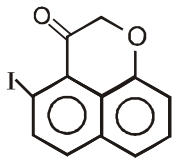
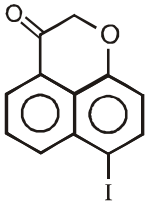
(1) 2-Chloro-1-nitrobenzene (2) 1-Chloro-3-nitrobenzene
(3) 4-Chloro-1-nitrobenzene (4) A mixture of 2-Chloro and 4-Chloro-1-nitrobenzene

8. When nitrobenzene is treated with Br_2 in presence of $FeBr_3$ the major product formed is m-bromonitrobenzene. Statement which is related to obtain the m-isomer is :

(1) The electron density on meta carbon is more than that on ortho and para positions
(2) Loss of aromaticity when Br^+ attacks at the ortho and para positions and not at meta position
(3) Easier loss of H^+ to regain aromaticity from the meta position than from ortho and para positions
(4) None of the above

9. Benzene ring can be halogenated by using interhalogens. Identify the product of the following halogenation reaction :

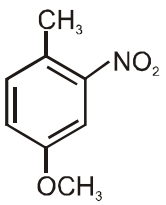
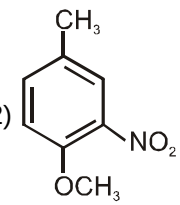
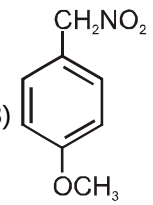


(1)  (2)  (3)  (4) 

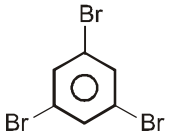
10. Among following statements on the nitration of aromatic compounds, the false one is

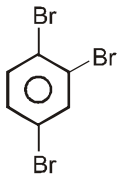
(1) The rate of nitration of benzene is almost the same as that of hexadeuterobenzene
(2) The rate of nitration of toluene is greater than that of benzene
(3) The rate of nitration of benzene is greater than that of hexadeuterobenzene
(4) Nitration is an electrophilic substitution reaction.

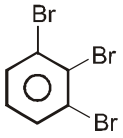
11. If p-methoxy toluene is nitrated, the major product is :

(1)  (2)  (3)  (4) No reaction

12. A particular form of tribromobenzene forms three possible mononitrotribromo-benzene. The structure of the compound is :

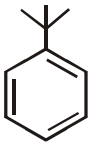
(1) 

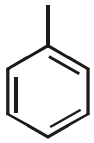
(2) 

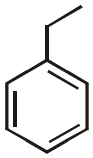
(3) 

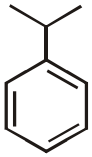
(4) Both 2 and 3

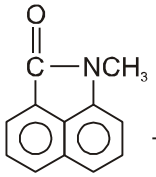
13. Which of the following will undergo sulphonation at fastest rate ?

(1) 

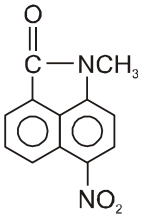
(2) 

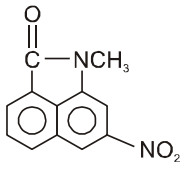
(3) 

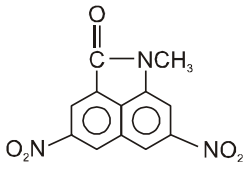
(4) 

14. 

$\xrightarrow{\text{conc. } HNO_3 / H_2SO_4}$ Product is :

(1) 

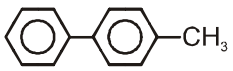
(2) 

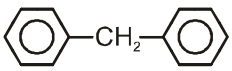
(3) 

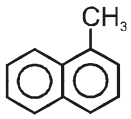
(4) None of these

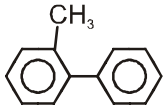
15. The organic products (X) formed in the following reaction is

$C_6H_5CH_2Cl + C_6H_6 \xrightarrow{AlCl_3} X$

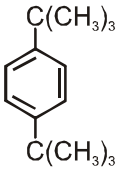
(1) 

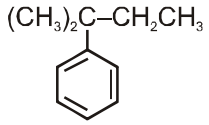
(2) 

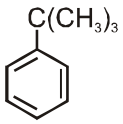
(3) 

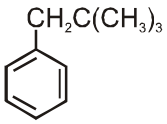
(4) 

16. Neopentyl bromide reacts with benzene under Friedel-Crafts conditions to give mainly

(1) 

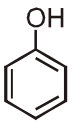
(2) 

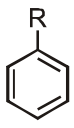
(3) 

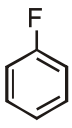
(4) 

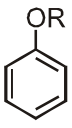
17.  + R–OH $\xrightarrow{BF_3}$ P

The product P in the above reaction is

(1) 

(2) 

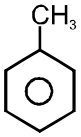
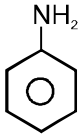
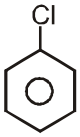
(3) 

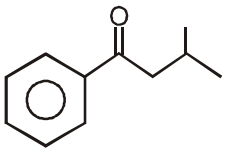
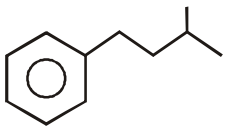
(4) 

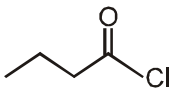
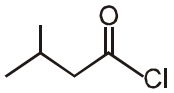
18. Which of the following organic chlorides will not give a Friedel-Craft alkylation product when heated with benzene and $AlCl_3$

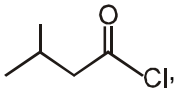
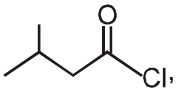
(1) $(CH_3)_3\ CCl$ (2) $CH_2 = CHCH_2Cl$ (3) CH_3CH_2Cl (4) $CH_2 = CHCl$

19. Friedel craft acylation is not observed in

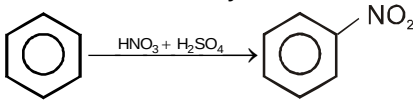
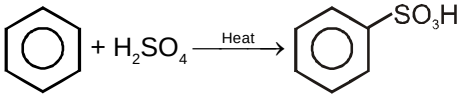
(1)  (2)  (3)  (4) 

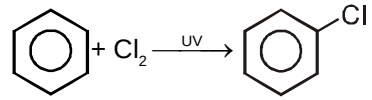
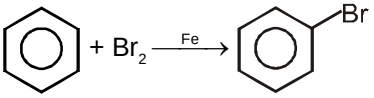
20. Benzene on reaction with 'A' forms  which on reaction with 'B' forms  'A' and 'B' are :

(1) Zn-Hg + conc. HCl,  (2)  , $LiAlH_4$

(3)  , $NaBH_4$ (4)  Zn-Hg + conc. HCl

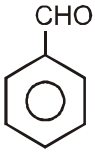
21. The reaction least likely to occur is:

(1)  (2) 

(3)  (4) 

22. Which of the following reactions is not an example of electrophilic substitution:

(1) $C_6H_6 + NO_2^{\oplus} \longrightarrow C_6H_5NO_2$ (2) $C_6H_6 + CH_3Cl \xrightarrow{AlCl_3} C_6H_5 - CH_3 + HCl$

(3) $C_6H_6 + Cl_2 \xrightarrow{UV\ light} C_6H_6Cl_6$ (4) $C_6H_6 + CO + HCl \xrightarrow[AlCl_3]{anhydrous}$ 

23. The number of benzene derivatives of the formula C_7H_7Cl is :

(1) 2 (2) 4 (3) 5 (4) 6

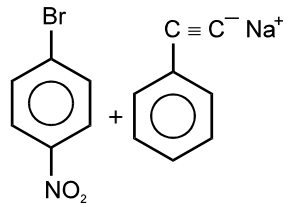
24. The number of benzene derivatives of the formula C_7H_8O is :

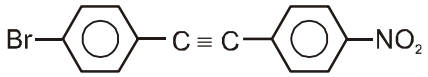
(1) 2 (2) 3 (3) 4 (4) 5

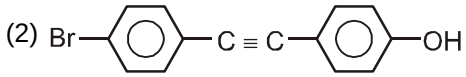
25. 1-Chloro-2, 4-dinitrobenzene undergoes hydrolysis on heating with aqueous NaOH to form 2,4-dinitrophenol. The reaction proceeds by :

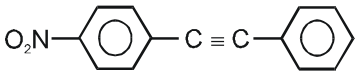
(1) S_N1 mechanism (2) S_N2 mechanism

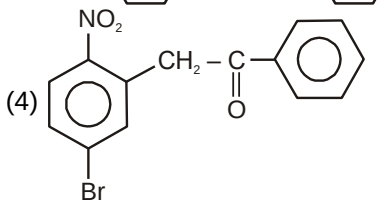
(3) Addition-elimination mechanism (4) Eliminatiomn-addition mechanism

26.  $\xrightarrow{\Delta}$ Product is

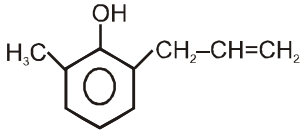
(1) 

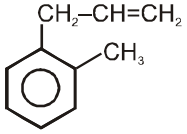
(2) 

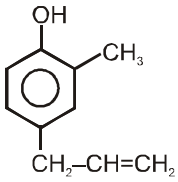
(3) 

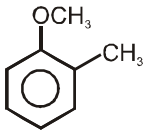
(4) 

27. o-Cresol is treated with allyl chloride in presence of NaOH and product obtained is heated. What would be the major product ?

(1) 

(2) 

(3) 

(4) 

28.  + $CH_3-CH=CH_2$ $\xrightarrow[\Delta]{H_3PO_4}$ A $\xrightarrow[(2).\ H_3O^+]{(1)\ .O_2,\Delta}$ B + C

The products B & C are respectively

(1) Phenol & acetic acid (2) Phenol & acetaldehyde

(3) Benzoic acid & acetone (4) Phenol & acetone

29. An organic compound having the molecular formulaf C_7H_8O is insoluble in $NaHCO_3$ solution but dissolves in aqueous NaOH. When treated with bromine water the compound rapidly forms a precipitate having the molecular formula $C_7H_5OBr_3$. The organic compound is

(1) o-cresol (2) m-cresol (3) p-cresol (4) anisole

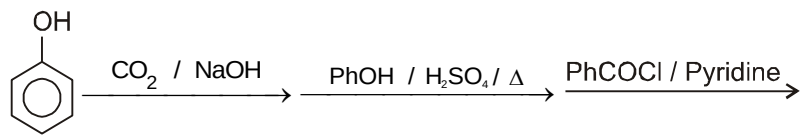
30. Phenol reacts with dilute HNO_3 at 40°C to give a mixture of ortho and para nitro phenols. They are readily separated by

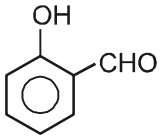
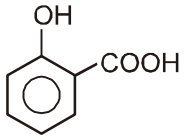
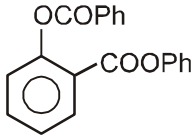
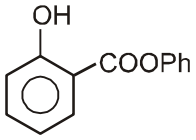
(1) filtration (2) solvent extraction (3) steam distillation (4) fractional crystallization

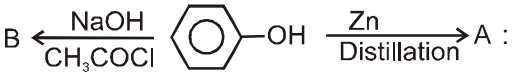
31. The product(s) formed when phenol is heated above 150°C with CH_3COCl and anhydrous aluminium chloride is /are

(1) a mixture of o-and p-cresol (2) acetophenone

(3) a mixture of o-and p-hydroxy acetophenone (4) o-hydroxy benzoyl chloride

32.  (P), Product is :

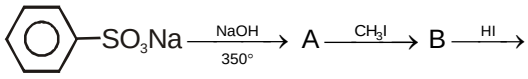
(1)  (2)  (3)  (4) 

33. 

The compounds A and B in the above reaction sequence are :

(1) Benzene, Methyl benzoate (2) Phenyl acetate, Benzene

(3) Benzene, Phenyl acetate (4) Benzene, Phenylacetyl chloride

34. In the reaction sequence 

A, B, C and D are given by the set :

(1) Sodium phenate, anisole, C_6H_5I, CH_3OH (2) Sodium phenate, phenitole, C_2H_5I, C_6H_5OH

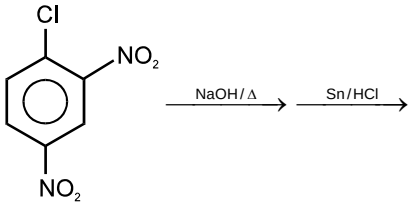
(3) Sodium phenate, anisole, C_6H_5OH, CH_3I (4) Sodium phenate, phenitole, C_6H_5I, C_2H_5OH

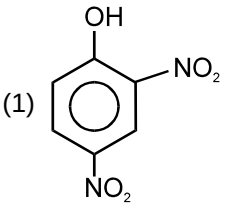
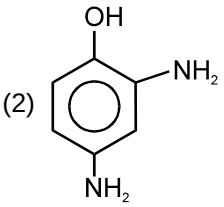
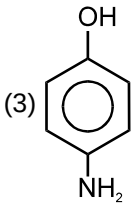
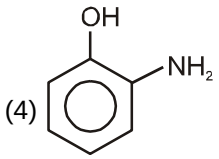
35. Phenol $\xrightarrow[\text{distillation}]{\text{Zinc}}$ (A) $\xrightarrow[\text{Conc.}H_2SO_4\text{ at }60^oC]{\text{Conc.}HNO_3}$ (B) $\xrightarrow[\text{NaOH}]{\text{Zn}}$ (C)

In the above reaction products (A), (B) and (C) are :

(1) benzene, nitrobenzene and aniline (2) benzene, dinitrobenzene and m-nitroaniline

(3) toluene, m-nitrobenzene and m-toluidine (4) benzene, nitrobenzene and hydrazobenzene

36.  'X', The product 'X' is

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

37. Nitration of aniline also give m-nitro aniline, in strong acidic medium because

(1) Amino group is meta directive.

(2) Inspite of substituents nitro group always goes to m-position.

(3) In strong acidic medium, nitration of aniline is a nucleophilic substitution reaction.

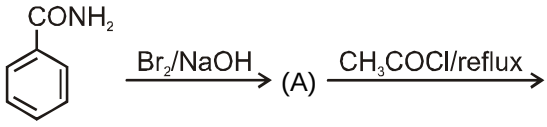
(4) In strong acidic medium aniline converts into anilinium ion.

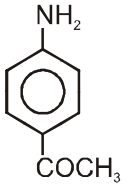
38. Aniline when treated with acetyl chloride in presence of alkali, the product formed is :

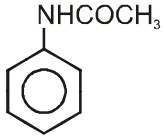
(1) acetanilide (2) benzoyl chloride (3) acetophenone (4) aniline hydrochloride

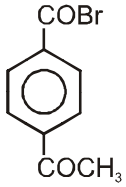
39. Aniline when acetylated, the product on nitration followed by alkaline hydrolysis gives :

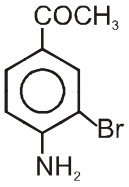
(1) acetanilide (2) o-nitroacetanilide (3) p-nitroaniline (4) m-nitroaniline

40.  (B), Identify the major product (B).

(1) 

(2) 

(3) 

(4) 

41. An aromatic amine (X) was treated with alcoholic potash and another compound (Y) then foul smelling gas C_6H_5NC is formed . The compound (Y) was formed by reacting compound (Z) with Cl_2 in the presence of slaked lime. The compound (Z) is :

(1) $CHCl_3$ (2) CH_3COCH_3 (3) CH_3OH (4) $C_6H_5NH_2$

42. p-Chloro aniline and anilinium hydrogen chloride can be distinguished by

(1) Sandmayer reaction (2) Carbyl amine reaction

(3) Hinsberg's reaction (4) $AgNO_3$

43. Chlorobenzene can be prepared by treating aniline with

(1) HCl (2) Cu_2Cl_2

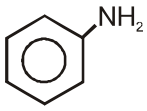
(3) Chlorine in presence of anhydrous $AlCl_3$ (4) nitrous acid followed by heating with Cu_2Cl_2+HCl

44. In the reaction, the product (C) is

$C_6H_5NH_2 \xrightarrow[0-5°C]{NaNO_2 + HCl} (A) \xrightarrow[KCN]{CuCN} (B) \xrightarrow{H^+/H_2O} (C)$

(1) $C_6H_5CH_2NH_2$ (2) C_6H_5COOH (3) C_6H_5OH (4) none of these

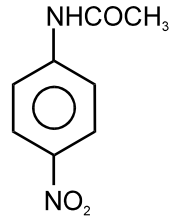
45. Aniline in a set of reaction yield a product D. The structure of product C would be :



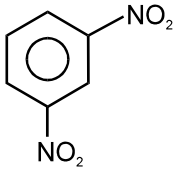
$\xrightarrow[HCl]{NaNO_2}$ A $\xrightarrow{CuCN}$ B $\xrightarrow{H_2,\ Ni}$ C $\xrightarrow{HNO_2}$ D

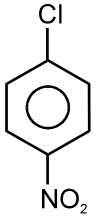
(1) $C_6H_5CH_2NH_2$ (2) $C_6H_5NHCH_2CH_3$ (3) C_6H_5NHOH (4) $C_6H_5CH_2OH$

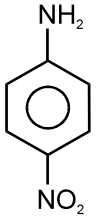
46. The major product of the following reaction is :

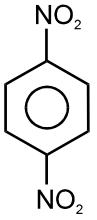


$\xrightarrow{H_3O^+,\ \Delta}$ $\xrightarrow{NaNO_2\ /\ HCl}$ $\xrightarrow{KNO_2\ /\ Cu^+}$

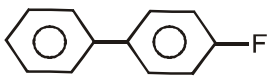
(1) 

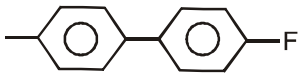
(2) 

(3) 

(4) 

47. $Ph–NH_2 \xrightarrow[0^0C]{HNO_2} A \xrightarrow[BF_3]{HF} B \xrightarrow{\Delta} C$,C is .

(1) $Ph - N \equiv \overset{\oplus}{N}\ \overset{\ominus}{BF_4}$ (2) 

(3) 

(4) Ph – F

48. In the reaction sequence identify the functional group present in A, B, C :

$A \xrightarrow{Sn/HCl} B \xrightarrow[0-5°C]{HNO_2} C \xrightarrow{C_2H_5OH} C_6H_6$

(1) $-NO_2$, $-NH_2$, $-N=N-$ (2) $-NO_2$, $-NH_2$, $-OH$

(3) $-OH$, $-NH_2$, $-NO$ (4) $-NH_2$, $-NO_2$, $-N=N-$

49. Aniline when diazotized in cold and then treated with dimethyl aniline gives a coloured product. Its structure would be

(1) $(CH_3)_2N-C_6H_4-N=N-C_6H_5$ (2) $(CH_3)_2N-C_6H_4-NH-C_6H_5$

(3) $CH_3NH-C_6H_4-N=N-C_6H_4-NHCH_3$ (4) $CH_3-C_6H_4-N=N-C_6H_4-NH_2$

50. In the diazotisation of aniline with sodium nitrite and hydrochloric acid, an excess of hydrochloric acid is used primarily to

(1) suppress the concentration of free aniline available for coupling

(2) suppress hydrolysis of phenol

(3) in sure a stoichiometric amount of nitrous acid

(4) neutralize the base liberated

51. An organic compound with M.F C_3H_5N on hydrolysis forms an acid which reduces Fehling's solution. The compound can be

(1) Ethanenitrile (2) Ethyl carbylamine (3) Ethoxyethane (4) Propanenitrile

52. Which of the following gives primary amine on reduction

(1) $CH_3CH_2N(=O)-O$ (2) CH_3CH_2ONO (3) CH_3CH_2NC (4) None of these

53. $C_2H_5Br \xrightarrow{AgCN} A \xrightarrow{H_3O^+} HCOOH + B$;

$B \xrightarrow[KOH]{CHCl_3} A \xrightarrow{Reduction} C$

A,B,C respectively in the above sequence are :

(1) Ethane amine, methane nitrile and diethyl amine

(2) Ethane isocyanide, ethane amine and secondary amine

(3) Ethyl isocyanide, ethyl amine and methyl isocyanate

(4) Ethyl isocyanide, ethane amine and ethyl methyl amine

Exercise-3

PART - I : NEET / AIPMT QUESTION (PREVIOUS YEARS)

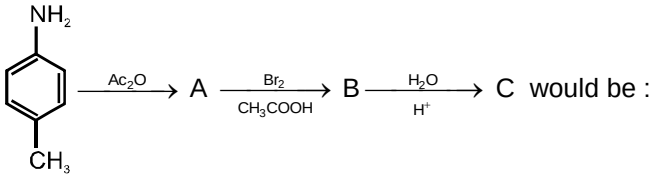
1. In the reaction, **[AIPMT 2002]**

$C_6H_5NH_2 \xrightarrow[273\ K]{NaNO_2/HBF_4} (A) \xrightarrow{\Delta} C_6H_5F$: The compound (A) is known as :

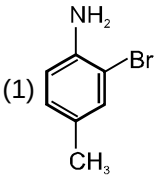
(1) m-nitro fluorobenzene (2) a mixture of fluoroanilines

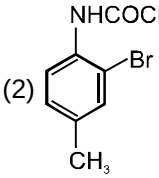
(3) benzene diazonium fluoride (4) benzene diazonium tetrafluoroborate

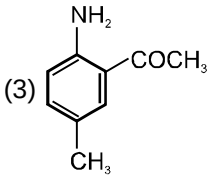
2. The final product C, obtained in this reaction **[AIPMT 2003]**

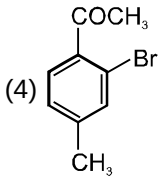


would be :

(1) 

(2) 

(3) 

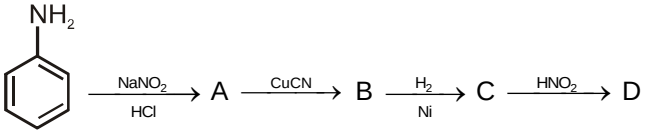
(4) 

3. Using anhydrous $AlCl_3$ as catalyst, which one of the following reaction produce ethylbenzene (PhEt)? **[AIPMT 2004]**

(1) $H_3C - CH_2OH + C_6H_6$ (2) $CH_3 - CH == CH_2 + C_6H_6$

(3) $C_2H_5Cl + C_6H_6$ (4) $H_3C - CH_3 + C_6H_6$

4. Aniline in a set of reactions yield a product D. The structure of the product D would be **[AIPMT 2005]**



(1) $C_6H_5CH_2NH_2$ (2) $C_6H_5NHCH_2CH_3$ (3) C_6H_5NHOH (4) $C_6H_5CH_2OH$

5. Electrolytic reduction of nitrobenzene in weakly acidic medium gives. **[AIPMT 2005]**

(1) aniline (2) nitrosobenzene

(3) N-phenyl hydroxylamine (4) p-hydroxyaniline

6. Which of the following is more basic than aniline? **[AIPMT 2006]**

(1) Diphenylamine (2) Triphenylamine (3) p-nitroaniline (4) Benzylamine

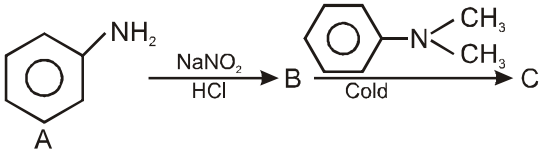
7. Which one of the following on reduction with $LiAlH_4$ yields a secondary amine? **[AIPMT 2007]**

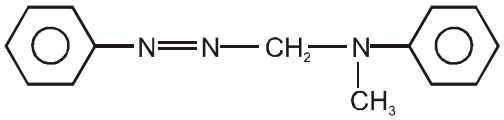
(1) Methyl isocyanide (2) Acetamide (3) Methyl cyanide (4) Nitroethane

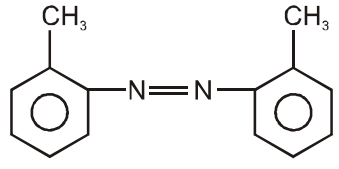
8. Aniline is prepared in presence of Fe/HCl from : **[AIPMT 2007]**

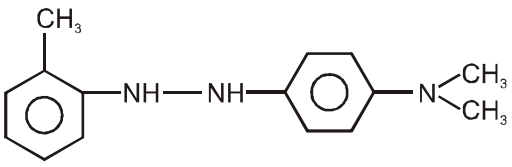
(1) benzene (2) nitrobenzene (3) dinitrobenzene (4) none of these

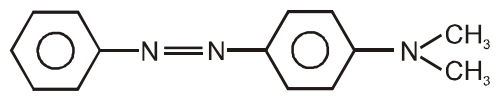
9. In a reaction of aniline a coloured products C was obtained. The structure of C would be : **[AIPMT 2008]**



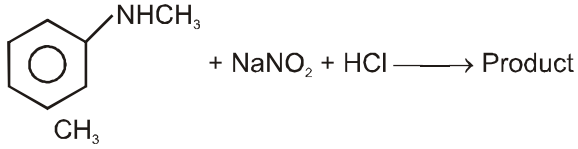
(1) 

(2) 

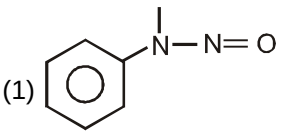
(3) 

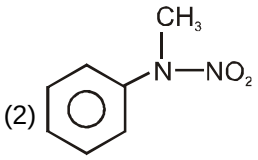
(4) 

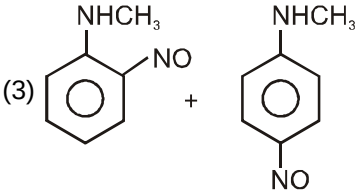
10. Predict the product,

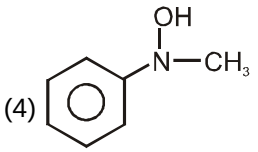


[AIPMT 2009]

(1) 

(2) 

(3) 

(4) 

11. Benzene reacts with CH_3Cl in the presence of anhydrous $AlCl_3$ to form : **[AIPMT 2009]**

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

12. Among the following four compounds the acidity order is : **[AIPMT 2010]**

(i) Phenol (ii) Methyl phenol (iii) Meta-nitrophenol (iv) Para-nitrophenol

(1) (iv) > (iii) > (i) > (ii) (2) (iii) > (iv) > (i) > (ii) (3) (i) > (iv) > (iii) > (ii) (4) (ii) > (i) > (iii) > (iv)

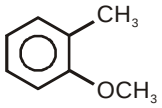
13. Which of the following species is not electrophilic in nature? **[AIPMT 2010]**

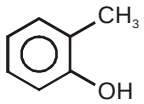
(1) $\overset{\oplus}{Cl}$ (2) BH_3 (3) $H_3\overset{\oplus}{O}$ (4) $\overset{\oplus}{NO}_2$

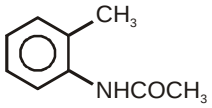
14. Given are cyclohexanol (I), acetic acid (II), 2, 4, 6-trinitrophenol (III) and phenol (IV). In these the order of decreasing acidic character will be: **[AIPMT 2010]**

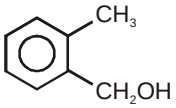
(1) III > II > IV> I (2) II > III > I > IV (3) II > III > IV > I (4) III > IV > II > I

15. Which one of the following is most reactive towards electrophilic reagent ? **[AIPMT 2011 Scr.]**

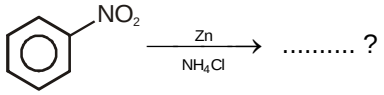
(1) 

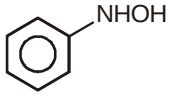
(2) 

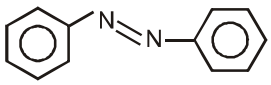
(3) 

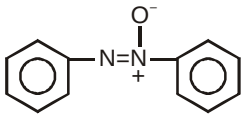
(4) 

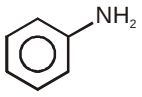
16. What is the product obtained in the following reaction : **[AIPMT 2011 Scr.]**



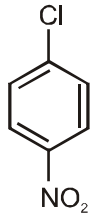
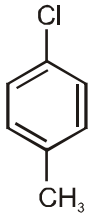
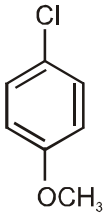
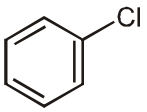
(1) 

(2) 

(3) 

(4) 

17. Which of the following compounds undergoes nucleophilic substitution reaction most easily ? **[AIPMT 2011]**

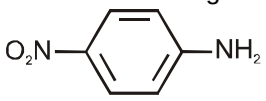
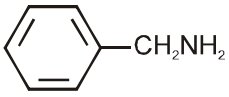
(1)  (2)  (3)  (4) 

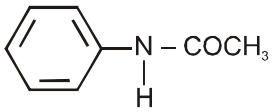
18. Match the compounds given in List-I with List-II and select the suitable option using the code given below : **[AIPMT 2011]**

List-I			List-II
(a)	Benzaldehyde	(i)	Phenolphthalein
(b)	Phthalic anhydride	(ii)	Benzoin condensation
(c)	Phenyl benzoate	(iii)	Oil of wintergreen
(d)	Methyl salicylate	(iv)	Fries rearrangement

Code	(a)	(b)	(c)	(d)
(1)	(iv)	(i)	(iii)	(ii)
(2)	(iv)	(ii)	(iii)	(i)
(3)	(ii)	(iii)	(iv)	(i)
(4)	(ii)	(i)	(iv)	(iii)

19. Which of the following compounds is most basic ? **[AIPMT 2011]**

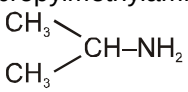
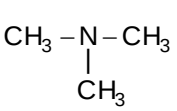
(1)  (2) 

(3)  (4) None of these

20. Among the following compounds the one that is most reactive towards electrophilic nitration is : **[AIPMT 2012]**

(1) Benzoic Acid (2) Nitrobenzene (3) Toluene (4) Benzene

21. An organic compound (C_3H_9N) (A), when treated with nitrous acid, gave an alcohol and N_2 gas was evolved. (A) on warming with $CHCl_3$ and caustic potash gave (C) which on reduction gave isopropylmethylamine. Predict the structure of (A). **[AIPMT 2012]**

(1)  (2) CH_3CH_2—NH—CH_3 (3)  (4) $CH_3CH_2CH_2$—NH_2

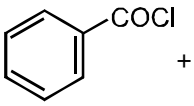
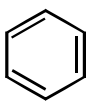
22. Some meta - directing substituents in aromatic substitution are given. Which one is most deactivating ? **[NEET 2013]**

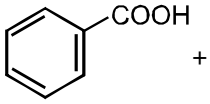
(1) $-SO_3H$ (2) –COOH (3) $-NO_2$ (4) –C≡N

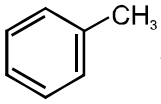
23. Which of the following compounds will not undergo Friedal-Craft's reaction easily : **[NEET 2013]**

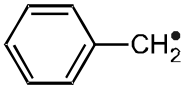
(1) Xylene (2) Nitrobenzene (3) Toluene (4) Cumene

24. Reaction by which Benzaldehyde canot be prepared : **[NEET 2013]**

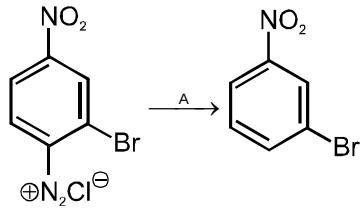
(1)  + H_2 in presence of Pd-$BaSO_4$ (2)  + CO + HCl in presence of anhydrous $AlCl_3$

(3)  + Zn/Hg and conc. HCl

(4)  + CrO_2Cl_2 in CS_2 followed by H_3O^+

25. The radical,  is aromatic because it has : **[NEET 2013]**

(1) 7 p-orbitals and 6 unpaired electrons
(2) 7 p-orbitals and 7 unpaired electrons
(3) 6 p-orbitals and 7 unpaired electrons
(4) 6 p-orbitals and 6 unpaired electrons

26. In the reaction  **[NEET 2013]**

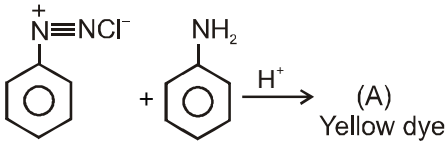
A is :

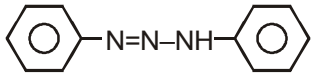
(1) Cu_2Cl_2 (2) H_3PO_2 and H_2O (3) H^+ / H_2O (4) $HgSO_4 / H_2SO_4$

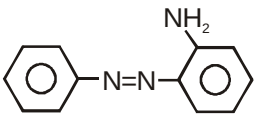
27. Nitrobenzene on reaction with conc. HNO_3 / H_2SO_4 at 80 – 100ºC forms which one of the following products ? **[NEET 2013]**

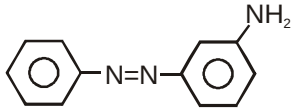
(1) 1, 3– Dinitrobenzene
(2) 1, 4– Dinitrobenzene
(3) 1, 2, 4– Trinitobenzene
(4) 1, 2– Dinitrobenzene

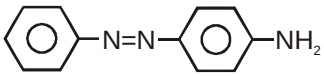
28. In the following reaction, the product (A) **[AIPMT 2014]**



(1) 

(2) 

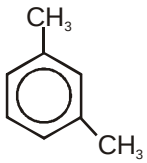
(3) 

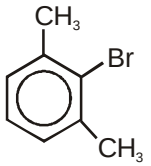
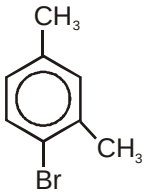
(4) 

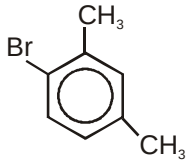
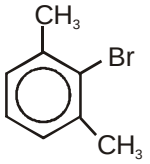
29. Which of the following will be most stable diazonium salt $RN_2^+X^-$? **[AIPMT 2014]**

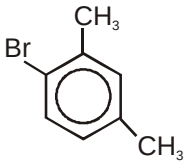
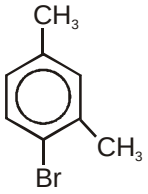
(1) $CH_3N_2^+X^-$ (2) $C_6H_5N_2^+X^-$ (3) $CH_3CH_2N_2^+X^-$ (4) $C_6H_5CH_2N_2^+X^-$

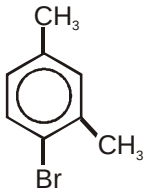
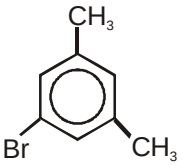
30. What product are formed when the following compound is treated with Br_2 in the presence of $FeBr_3$? **[AIPMT 2014]**



(1)  and 

(2)  and 

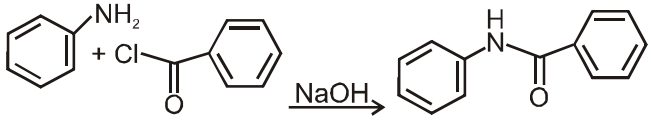
(3)  and 

(4)  and 

31. The electrolytic reduction of nitrobenzene in strongly acidic medium produces : **[AIPMT 2015]**
(1) Anoxybenzene (2) Azobenzene (3) Aniline (4) p-Aminophenol

32. Reaction of phenol with chloroform in presence of dilute sodium hydroxide finally introduces which one of the following functional group ? **[Re-AIPMT 2015]**
(1) $-CH_2Cl$ (2) –COOH (3) $-CHCl_2$ (4) –CHO

33. The following reaction **[Re-AIPMT 2015]**



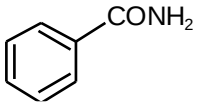
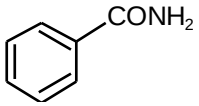
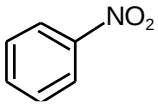
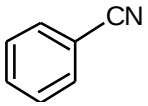
is known by the name :
(1) Friedel-Craft's reaction (2) Perkin's reaction
(3) Acetylation reaction (4) Schotten-Baumen reaction

34. The oxidation of benzene by V_2O_5 in presence of air produces : **[Re-AIPMT 2015]**
(1) benzoic anhydride (2) maleic anhydride (3) benzoic acid (4) benzaldehyde

35. Method by which Aniline cannot be prepared is : **[Re-AIPMT 2015]**
(1) hydrolysis of phenylisocyanide with acidic solution
(2) degradation of benzamide with bromine in alkaline solution
(3) reduction of nitrobenzene with H_2/Pd in ethanol
(4) potassium salt of phthalimide treated with chlorobenzene followed by hydrolysis with aqueous NaOH solution.

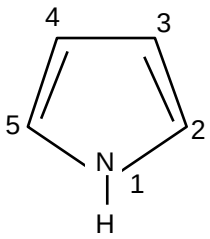
36. Consider the nitration of benzene using mixed conc. H_2SO_4 and HNO_3. If a larger amount of $KHSO_4$ is added to the mixture the rate of nitration will be : **[NEET-1 2016]**
(1) doubled (2) faster (3) slower (4) unchanged

37. A given nitrogen-containing aromatic compound A reacts with Sn/HCl, followed by HNO_2 to give an unstable compound B. B, on treatment with phenol, forms a beautiful coloured compound C with the molecular formula $C_{12}H_{10}N_2O$. The structure of compound A is : **[NEET-2 2016]**

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

38. Which of the following can be used as the halide component for Freidel –Crafts reaction? **[NEET-2 2016]**
(1) Isopropyl chloride (2) Chlorobenzene (3) Bromobenzene (4) Chloroethene

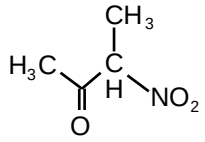
39. In pyrrole **[NEET-2 2016]**

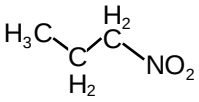


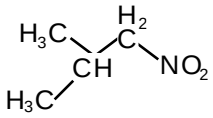
the electron density is maximum on

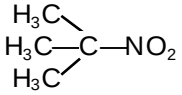
(1) 2 and 5 (2) 2 and 3 (3) 3 and 4 (4) 2 and 4

40. Which one of the following nitro-compounds does not react with nitrous acid **[NEET-2 2016]**

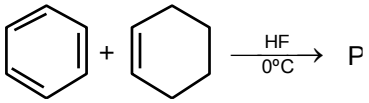
(1) 

(2) 

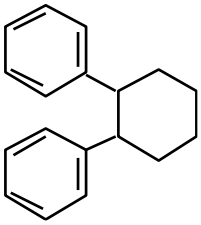
(3) 

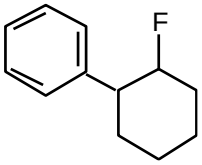
(4) 

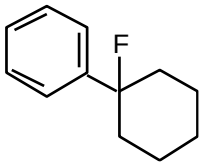
41. In the given reaction **[NEET-2 2016]**

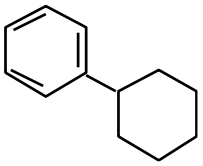


the product P is

(1) 

(2) 

(3) 

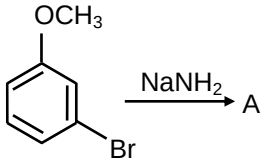
(4) 

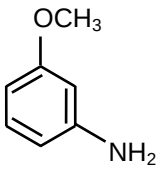
42. Which of the following reactions is appropriate for converting acetamide to methanamine ? **[AIPMT 2017]**

(1) Carbylamine reaction (2) Hoffmann hypobromamide reaction

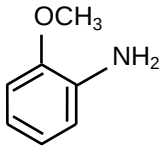
(3) Stephens reaction (4) Gabriels phthalimide synthesis

43. Identify A and predict the type of reaction : **[AIPMT 2017]**

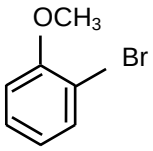


(1) 

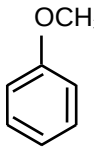
and substitution reaction

(2) 

and elimination addition reaction

(3) 

and cine substitution reaction

(4) 

and cine substitution reaction

44. The compound C_7H_8 undergoes the following reaction **[AIPMT 2018]**

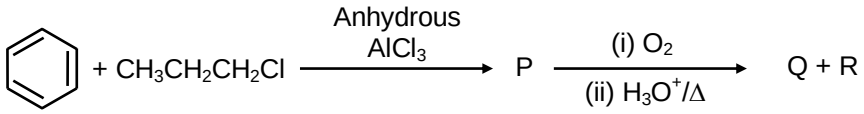
$C_7H_8 \xrightarrow{3Cl_2/\Delta} A \xrightarrow{Br_2/Fe} B \xrightarrow{Zn/HCl} C$

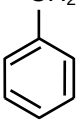
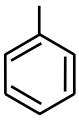
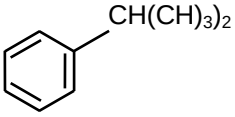
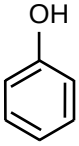
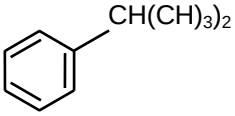
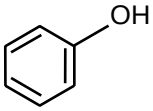
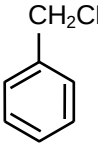
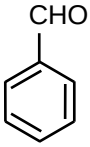
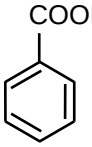
The product 'C' is

(1) m-bromotoluene (2) p-bromotoluene

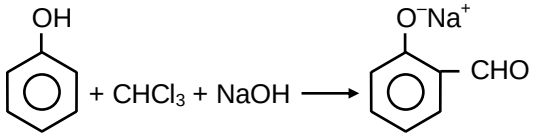
(3) 3-bromo-2,4,6-trichlorotoluene (4) o-bromotoluene

45. Identify the major products P, Q and R in the following sequence of reactions : **[AIPMT 2018]**



	P	Q	R
(1)			CH_3CH_2–OH
(2)			CH_3–CO–CH_3
(3)			$CH_3CH(OH)CH_3$
(4)			

46. In the reaction : **[AIPMT 2018]**



the electrophile involved is :

(1) dichloromethyl cation : $(\overset{\oplus}{C}HCl_2)$ (2) dichlorocarbene $(:CCl_2)$

(3) dichloromethyl anion $(\overset{\ominus}{C}HCl_2)$ (4) formly cation $(\overset{\oplus}{C}HO)$

47. Nitration of aniline in strong acidic medium also given m-nitroaniline because **[AIPMT 2018]**

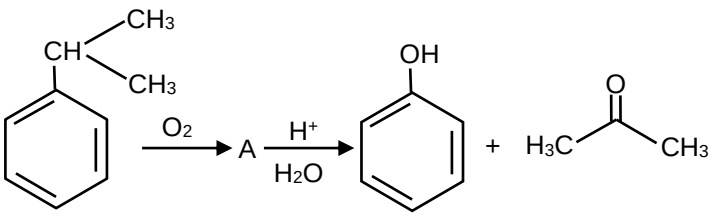
(1) In spite of substituents nitro group always goes to only m-position.

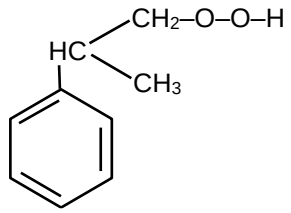
(2) In acidic (strong) medium aniline is present as anilinium ion.

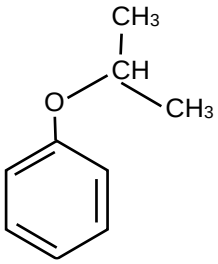
(3) In absence of substituents nitro group always goes to m-position.

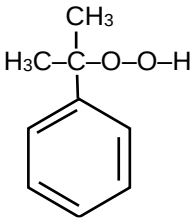
(4) In electrophilic substitution reactions amino group is meta directive.

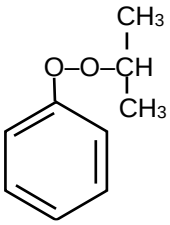
48. The structure of intermediate A in the following reaction is : **[NEET-1 2019]**



(1) 

(2) 

(3) 

(4) 

PART - II : AIIMS QUESTION (PREVIOUS YEARS)

1. In Sandmeyer's reaction the salt involved is : **[AIIMS 2002]**
(1) Diazonium salt (2) Cupramonium salt (3) Ferrous salt (4) Ammonium salt

2. In the reaction the compound (A) is known as : **[AIIMS 2002]**

$$C_6H_5CHO + C_6H_5NH_2 \longrightarrow \underset{(A)}{C_6H_5N = CHC_6H_5} + H_2O$$

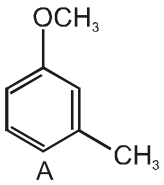
(1) Aldol (2) Schiff base (3) Schiff reagent (4) Benedict's reagent

3. Nitrobenzene given N-phenylhydroxylamine by : **[AIIMS 2003]**
(1) Sn/HCl (2) H_2/Pd-C (3) Zn/NaOH (4) Zn/NH_4Cl

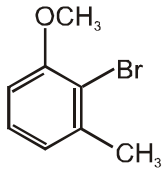
4. The treatment of benzene with isobutene in the presence of sulphuric acid gives : **[AIIMS 2003]**
(1) isobutyl benzene (2) tert-butyl benzene (3) n-butyl benzene (4) no reaction

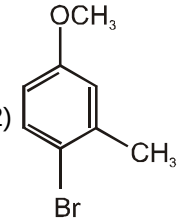
5. Which of the following chemicals are used to manufacture methyl isocyanate that caused "Bhopal Tragedy"? **[AIIMS 2005]**
(i) Methylamine (ii) Phosgene (iii) Phosphine (iv) Dimethylamine
(1) (i) and (ii) (2) (iii) and (iv) (3) (i) and (iii) (4) (ii) and (iv)

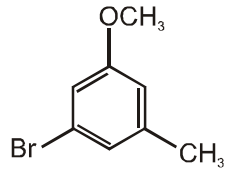
6. The major product obtained on the monobromination (with Br_2 / $FeBr_3$) of the following compound A is : **[AIIMS 2006]**

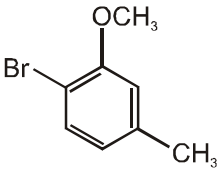


A

(1) 

(2) 

(3) 

(4) 

7. Nitrobenzene on treatment with zinc dust and aqueous ammonium chloride gives : **[AIIMS 2006]**

(1) $C_6H_5N == N - C_6H_5$ (2) $C_6H_5NH_2$ (3) C_6H_5NO (4) C_6H_5NHOH

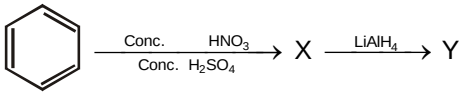
8. The type of isomerism observed in urea molecule is : **[AIIMS 2007]**

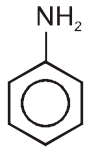
(1) chain (2) position (3) geometrical (4) tautomerism

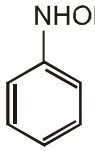
9. The compound which gives an oily nitrosoamine on reaction with nitrous acid at low temperature, is : **[AIIMS 2008]**

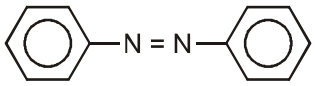
(1) CH_3NH_2 (2) $(CH_3)_2CHNH_2$ (3) $CH_3 - NH - CH_3$ (4) $(CH_3)_3N$

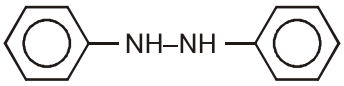
10. The product 'Y' in the following reaction sequence is : **[AIIMS 2009]**



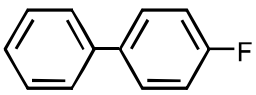
(1) 

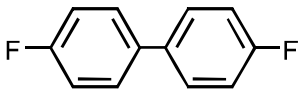
(2) 

(3) 

(4) 

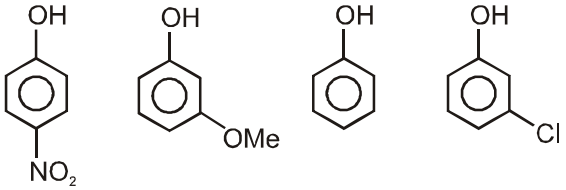
11. $Ph - NH_2 \xrightarrow[0^oC]{HNO_2} A \xrightarrow[BF_3]{HF} B \xrightarrow{\Delta} C$, C is : **[AIIMS 2010]**

(1) $Ph - N^+ \equiv NBF_4$ (2) 

(3) 

(4) Ph – F

12. The correct increasing order of reactivity for the following molecules towards electrophilic aromatic substitution is : **[AIIMS 2011]**



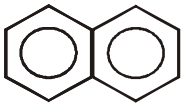
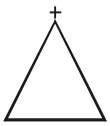
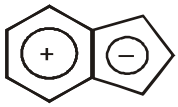
(I) (II) (III) (IV)

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

13. Best method to form aromatic iodide is : **[AIIMS 2011]**

(1) $ArN^+_2 + HI \longrightarrow$ (2) $RNH_2 + I_2 \longrightarrow$ (3) $ArN^+_2 + KI \longrightarrow$ (4) $ArN^+_2 + PI_3 \longrightarrow$

14. The chemical system that is non-aromatic is **[AIIMS 2012]**

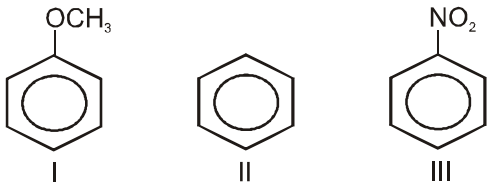
(1)  (2)  (3)  (4) 

15. Consider the following reaction What is Y? **[AIIMS 2012]**

$$C_6H_5NO_2 \xrightarrow{Sn/HCl} X \xrightarrow{C_6H_5COCl} Y + HCl$$

(1) Acetanilide (2) Benzanilide (3) Azobenzene (4) Hydrazobenzene

16. Among the following compounds (I-III), the correct order of reactivity towards electrophilic substitution reaction is **[AIIMS 2012]**



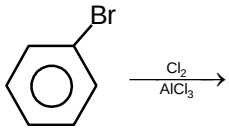
(1) II > III > I (2) III < I < II (3) I > II > III (4) I = II > III

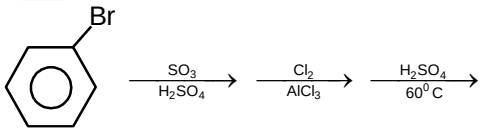
17. **Assertion :** Phenol undergo Kolbe reaction, ethanol does not. **[AIIMS 2014]**
Reason : Phenoxide ion is more basic than ethoxide ion.
(1) If both assertion and reason are true and reason is the correct explanation of assertion.
(2) If both assertion and reason are true but reason is not the correct explanation of assertion.
(3) If Assertion is true but reason is false.
(4) If both assertion and reason are false.

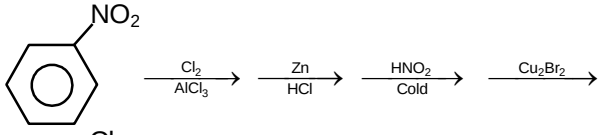
18. Aniline is reacted with bromine water and the resulting product is treated with an aqueous solution of sodium nitrite in the presence of dilute HCl.The compound so formed is converted into tetrafluoroborate which is subsequently heated dry. The final product is **[AIIMS 2015]**

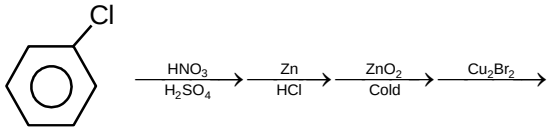
(1) 2, 4, 6-tribromofluorobenznene (2) 1, 3, 5-tribromobenzene
(3) p-bromoaniline (4) o-bromofluorobenzene

19. Which of the following is the best method for synthesis of 1-bromo-3-chlorobenzene ? **[AIIMS 2015]**

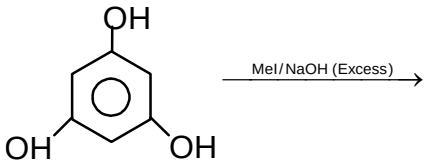
(1) 

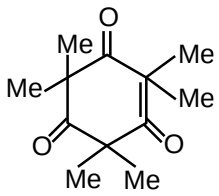
(2) 

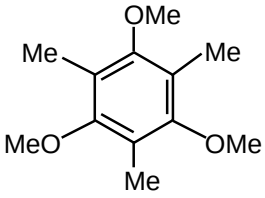
(3) 

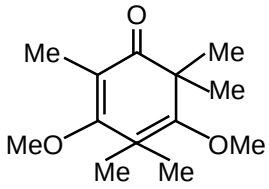
(4) 

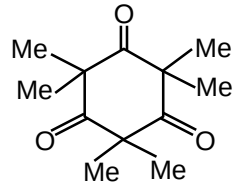
20. Identify the product A in the given reaction, **[AIIMS 2015]**



(1) 

(2) 

(3) 

(4) 

21. In the following reaction, B is **[AIIMS 2015]**

$$A \xrightarrow{\text{Bromination}} B \xrightarrow{NaNO_2/HCl} C \xrightarrow[C_2H_5OH]{\text{Boiling}} \text{Syn–tribromobenzene}$$

(1) salicyclic acid (2) benzoic acid (3) phenol (4) 2, 4, 6–tribromoaniline

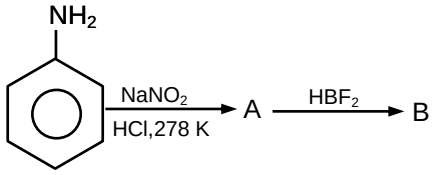
22. **Assertion :** Gabriel phthalimide reaction can be used to prepare aryl and alkyl amines. **[AIIMS 2015]**
Reason : Aryl halides have same reactivity as alkyl halides towards nucleophilic substitution reactions.
(1) If both assertion and reason are true and reason is the correct explanation of assertion.
(2) If both assertion and reason are true but reason is not the correct explanation of assertion.
(3) If Assertion is true but reason is false.
(4) If both assertion and reason are false.

23. **Assertion :** Friedel-Crafts reaction of benzene with n-propyl chloride on heating produce isopropyl benzene.
Reason : Benzene undergoes electrophilic substitution easily. **[AIIMS 2015]**
(1) If both assertion and reason are true and reason is the correct explanation of assertion.
(2) If both assertion and reason are true but reason is not the correct explanation of assertion.
(3) If Assertion is true but reason is false.
(4) If both assertion and reason are false.

24. **Assertion :** Nitration of salicyclic acid gives picric acid by elimination of CO_2H group **[AIIMS 2016]**
Reason : OH group is strongly activating group hence, S_E reaction takes place at o- and p-positives.
(1) If both assertion and reason are true and reason is the correct explanation of assertion.
(2) If both assertion and reason are true but reason is not the correct explanation of assertion.
(3) If Assertion is true but reason is false.
(4) If both assertion and reason are false.

25. Which of the following reagent is used to distinguish phenol and benzoic acid ? **[AIIMS 2017]**
(1) Aqueous NaOH (2) Tollen's reagent (3) Molisch reagent (4) Neutral $FeCl_3$

26. In the following reaction, **[AIIMS 2017]**



Compound (A) and (B) respectively are

(1) Nitrobenzene and fluorobenzen

(2) Phenol and benzene

(3) Benzene diazonium chloride and fluorobenzene

(4) Nitrobenzene and chlorobenzene

27. **Assertion** : Aniline on reaction with $NaNO_2$/HCl at 0º C followed by coupling with β-naphthol gives a dark blue coloured precipitate. **[AIIMS 2017]**

Reason : The colour of the compound formed in the reaction of aniline with $NaNO_2$/ HCl at 0º C followed by coupling with β-naphthol is due to the extended conjugation

(1) If both assertion and reason are true and reason is the correct explanation of assertion.

(2) If both assertion and reason are true but reason is not the correct explanation of assertion.

(3) If Assertion is true but reason is false.

(4) If both assertion and reason are false.

28. **Assertion (A)** : Presence of nitro group facilitates nucleophilic substitution reactions in aryl halides.
Reason (R) : The intermediate carbocation is stable due to presence of nitro group. **[AIIMS 2017]**

(1) If both assertion and reason are true and reason is the correct explanation of assertion.

(2) If both assertion and reason are true but reason is not the correct explanation of assertion.

(3) If Assertion is true but reason is false.

(4) If both assertion and reason are false.

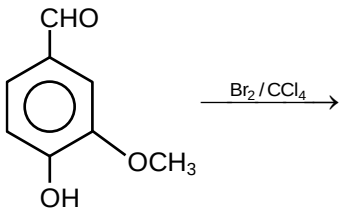
29. **Assertion (A)** : Aryl halides undergo nucleophilic substitution with ease. **[AIIMS 2017]**
Reason (R) : Hybridisation of C-atom attached to halide is sp^3-hybrid.

(1) If both assertion and reason are true and reason is the correct explanation of assertion.

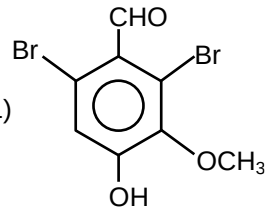
(2) If both assertion and reason are true but reason is not the correct explanation of assertion.

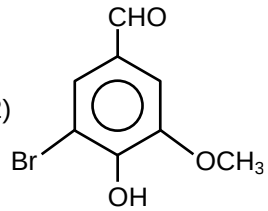
(3) If Assertion is true but reason is false.

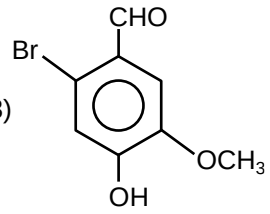
(4) If both assertion and reason are false.

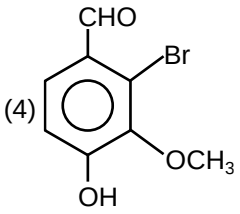
30. 

[AIIMS 2018]

(1) 

(2) 

(3) 

(4) 

31. **Assertion :**  + $CH_3–CH_2–CH_2–Cl \xrightarrow{AlCl_3}$ Product is isopropyl benzene **[AIIMS 2018]**

Reason : Due to rearrangement of primary carbocation into secondary carbocation

(1) If both assertion and reason are true and reason is the correct explanation of assertion.

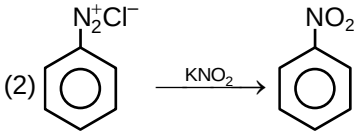
(2) If both assertion and reason are true but reason is not the correct explanation of assertion.

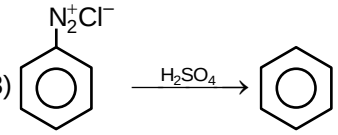
(3) If Assertion is true but reason is false.

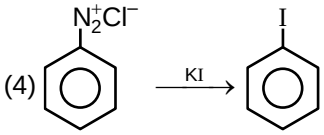
(4) If both assertion and reason are false.

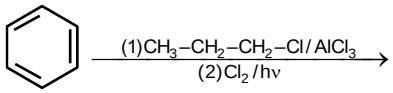
32. Which reaction give wrong product ? **[AIIMS 2018]**

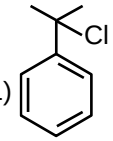
(1) 

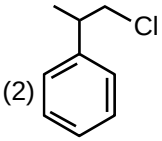
(2) 

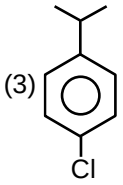
(3) 

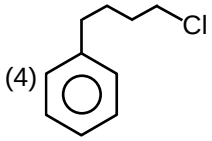
(4) 

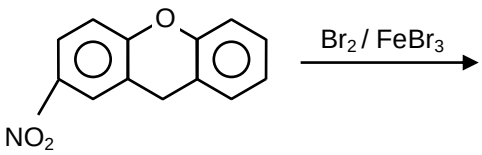
33.  **[AIIMS 2018]**

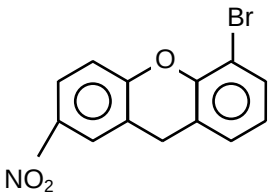
(1) 

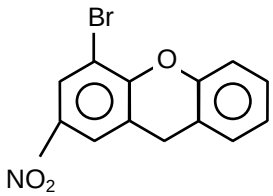
(2) 

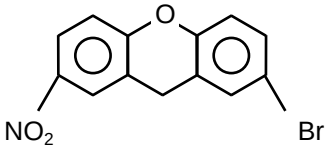
(3) 

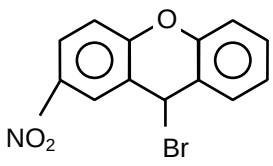
(4) 

34.  **[AIIMS 2018]**

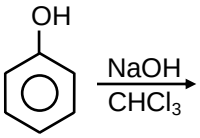
(1) 

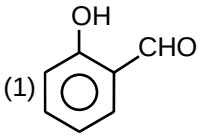
(2) 

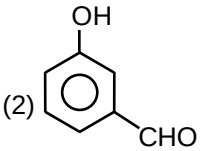
(3) 

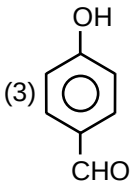
(4) 

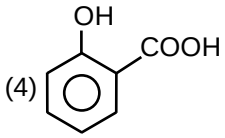
35. Final Product of given reaction : **[AIIMS 2018]**



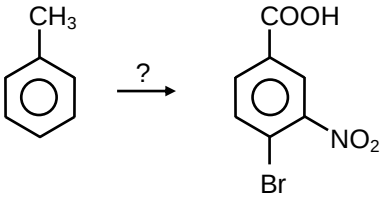
(1) 

(2) 

(3) 

(4) 

36. What are the suitable reagent for following conversion **[AIIMS 2018]**



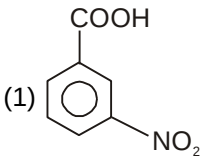
(1) $Br_2/FeBr_3$, $KMnO_4$, HNO_3 / H_2SO_4 (2) $KMnO_4$, $Br_2/FeBr_3$, HNO_3

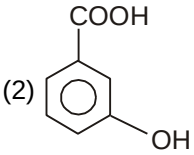
(3) HNO_3, $Br_2/FeBr_3$, $KMnO_4$ (4) HNO_3, $KMnO_4$, Br_2 / $FeBr_3$

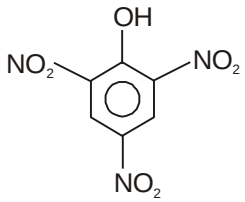
PART - III : JEE (MAIN) / AIEEE PROBLEMS (PREVIOUS YEARS)

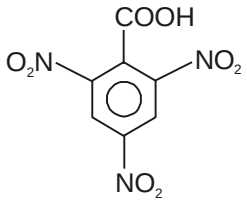
*** Marked Questions are having more than one correct option.**

1. Picric acid is **[AIEEE-2002]**

(1) 

(2) 

(3) 

(4) 

2. When primary amine reacts with chloroform in ethanolic KOH then the product is **[AIEEE 2002]**

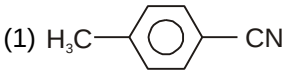
(1) an isocyanide (2) an aldehyde (3) a cyanide (4) an alcohol.

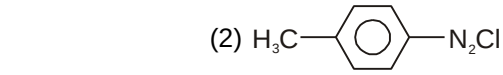
3. Ethyl isocyanide on hydrolysis in acidic medium generates **[AIEEE 2003]**

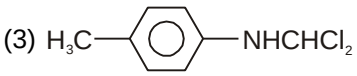
(1) ethylamine and methanoic acid (2) propanoic acid and ammonium salt

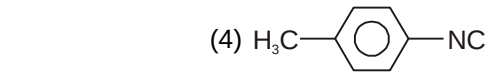
(3) ethanoic acid and ammonium salt (4) methylamine salt and ethanoic acid.

4. The reaction of chloroform with alcoholic KOH and p-toluidine forms : **[AIEEE-2003]**

(1) 

(2) 

(3) 

(4) 

5. Which one of the following methods is neither meant for the synthesis nor for separation of amines ? **[AIEEE 2005]**

(1) Hinsberg method (2) Hofmann method (3) Wurtz reaction (4) None of these

6. Reaction of cyclohexanone with dimethylamine in the presence of catalytic amount of an acid forms a compound is generally known as **[AIEEE 2005]**

(1) a Schiff's base (2) an enamine (3) an imine (4) an amine

7. Fluorobenzene (C_6H_5F) can be synthesized in the laboratory **[AIEEE-2006]**

(1) from aniline by diazotisation followed by heating the diazonium salt with HBF_4

(2) by direct fluorination of benzene with F_2 gas

(3) by reacting bromobenzene with NaF solution

(4) by heating phenol with HF and KF

8. In the chemical reaction, **[AIEEE-2007, 3/120]**

$CH_3CH_2NH_2 + CHCl_3 + 3\ KOH \longrightarrow (A) + (B) + 3H_2O$, the compounds (A) and (B) are respectively :

(1) C_2H_5CN and 3KCl (2) $CH_3CH_2CONH_2$ and 3KCl

(3) C_2H_5NC and K_2CO_3 (4) C_2H_5NC and 3KCl

9. Presence of a nitro group in a benzene ring **[AIEEE-2007, 3/120]**

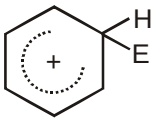
(1) activates the ring towards electrophilic substitution

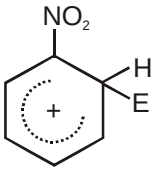
(2) renders the ring basic

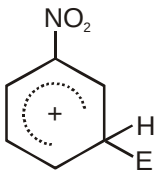
(3) deactivates the ring towards nucleophilic substitution.

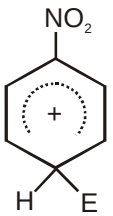
(4) deactivates the ring towards electrophilic substitution.

10. The electrophile, $E^{\oplus}$ attacks the benzene ring to generate the intermediate σ-complex. Of the following, which σ-complex is of lowest energy ? **[AIEEE-2008, 3/105]**

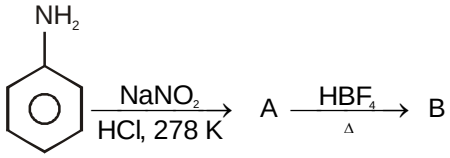
(1) 

(2) 

(3) 

(4) 

11. In the chemical reactions the compounds 'A' and 'B' respectively are : **[AIEEE-2010, 4/144]**



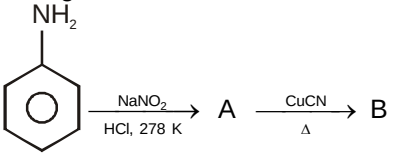
(1) nitrobenzene and fluorobenzene (2) phenol and benzene

(3) benzene diazonium chloride and fluorobenzene (4) nitrobenzene and chlorobenzene

12. Phenol is heated with a solution of mixture of KBr and $KBrO_3$. The major product obtained in the above reaction is : **[AIEEE-2011, 4/144]**

(1) 2-Bromophenol (2) 3-Bromophenol (3) 4-Bromophenol (4) 2, 4, 6 -Tribromophenol

13. In the following chemical reactions, the compounds A and B are respectively : **[AIEEE-2011, 4/144]**



(1) Benzene diazonium chloride and benzonitrile (2) Nitrobenzene and chlorobenzene

(3) Phenol and bromobenzene (4) Fluorobenzene and phenol

14. Aspirin is known as : **[AIEEE-2012, 4/144]**

(1) Acetyl salicylic acid (2) Phenyl salicylate

(3) Acetyl salicylate (4) Methyl salicylic acid

15. The gas leaked from a storage tank of the Union Carbide plant in Bhopal gas tragedy was : **[JEE Mains 2013]**

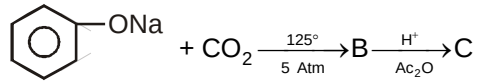
(1) Methylisocyanate (2) Methylamine (3) Ammonia (4) Phosgene

16. On heating an aliphatic primary amine with chloroform and ethanolic potassium hydroxide, the organic compound formed is : **[JEE Mains 2014]**

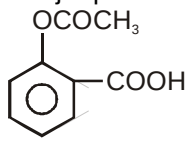
(1) an alkanol (2) an alkanediol

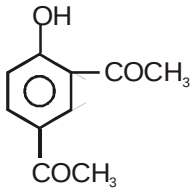
(3) an alkyl cyanide (4) an alkyl isocyanide

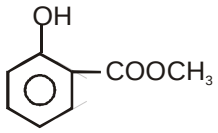
17. Sodium phenoxide when heated with CO_2 under pressure at 125°C yields a product which on acetylation produces C. **[JEE Mains 2014]**

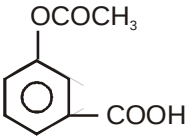


The major product C would be :

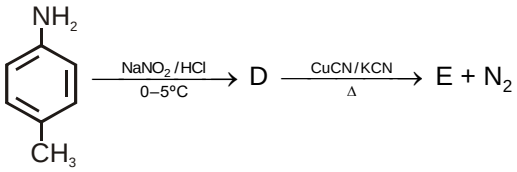
(1) 

(2) 

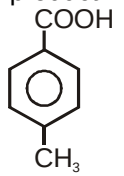
(3) 

(4) 

18. In the reaction **[JEE Mains 2015]**

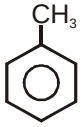


the product E is :

(1) 

(2) 

(3) 

(4) 

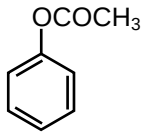
19. In the following sequence of reactions : **[JEE Mains 2015]**

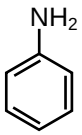
Toluene $\xrightarrow{KMnO_4}$ A $\xrightarrow{SOCl_2}$ B $\xrightarrow[BaSO_4]{H_2/Pd}$ C

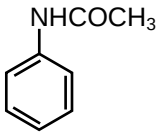
the product C is :

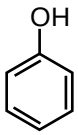
(1) C_6H_5COOH (2) $C_6H_5CH_3$ (3) $C_6H_5CH_2OH$ (4) C_6H_5CHO

20. Which of the following compounds will form significant amount of *meta* product during mono-nitration reaction ? **[JEE Mains 2017]**

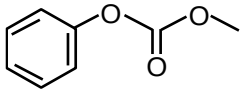
(1) 

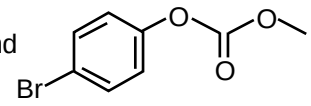
(2) 

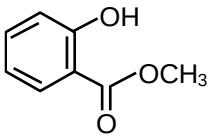
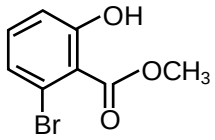
(3) 

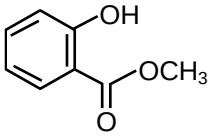
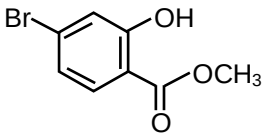
(4) 

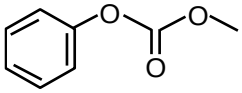
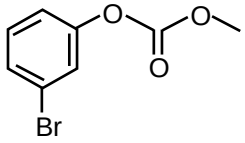
21. Phenol reacts with methyl chloroformate in the presence of NaOH to form product A. A react with Br_2 to form product B. A and B are respectively: **[JEE Mains 2018]**

(1) 

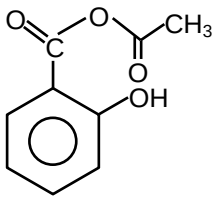
and 

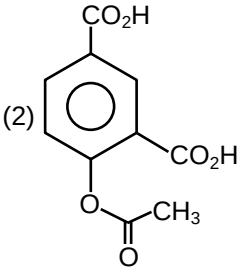
(2)  and 

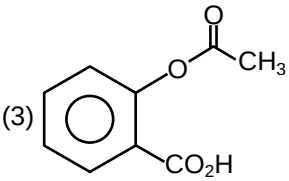
(3)  and 

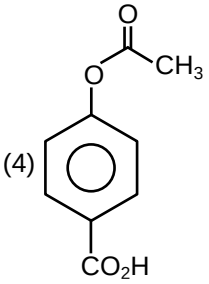
(4)  and 

22. 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 : **[JEE Mains 2018]**

(1) 

(2) 

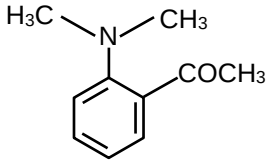
(3) 

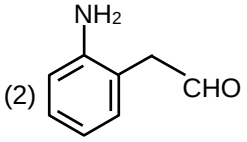
(4) 

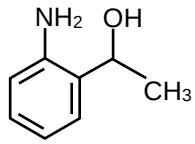
23. The tests performed on compound X and their inferences are : **[JEE Mains 2019]**

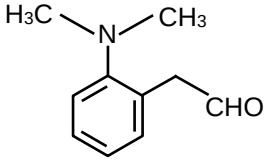
	Test	Inference
(a)	2, 4-DNP test	Coloured
(b)	Iodoform test	yellow precipitate
(c)	Azo-dry test	No dry formation

Compound 'X' is :

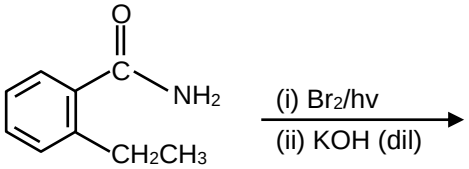
(1) 

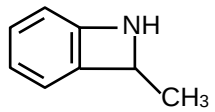
(2) 

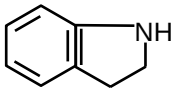
(3) 

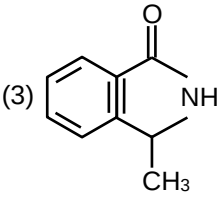
(4) 

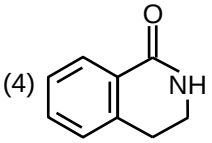
24. The major product of the following reaction is : **[JEE Mains 2019]**



(1) 

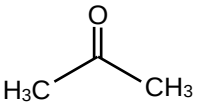
(2) 

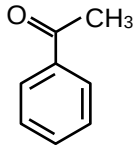
(3) 

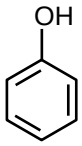
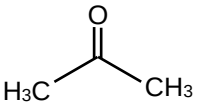
(4) 

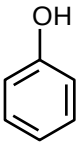
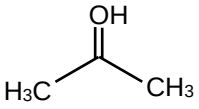
25. The products formed in the reaction of cumene with O_2 followed by treatment with dil. HCl are :

[JEE Mains 2019]

(1)  and 

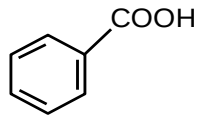
(2)  and CH_3–OH

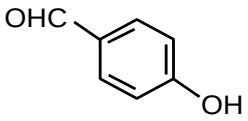
(3)  and 

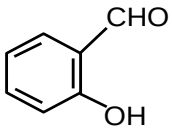
(4)  and 

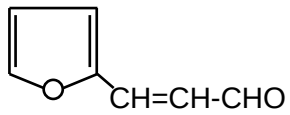
26. An aromatic compound 'A' having molecular formula $C_7H_6O_2$ on treating with aqueous ammonia and heating forms compounds 'B'. The compound B on reaction with molecular bromine and potassium hydroxide provides compound 'C' having molecular formula C_6H_7N. The structure of 'A' is:

[JEE Mains 2019]

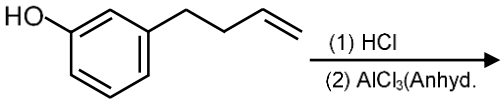
(1) 

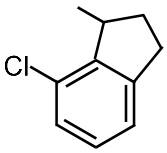
(2) 

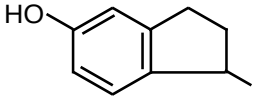
(3) 

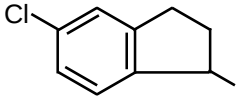
(4) 

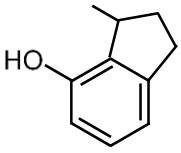
27. The major product of the following reaction is : **[JEE Mains 2019]**



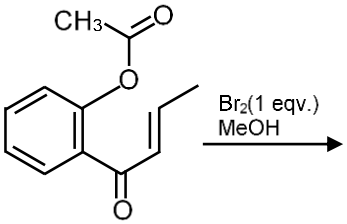
(1) 

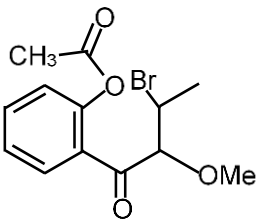
(2) 

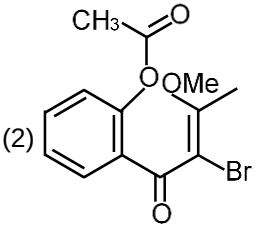
(3) 

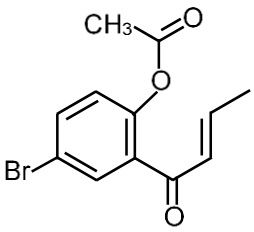
(4) 

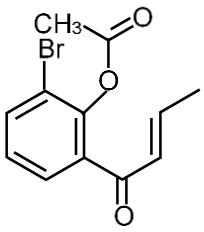
28. The major product obtained in the following conversion is : **[JEE Mains 2019]**



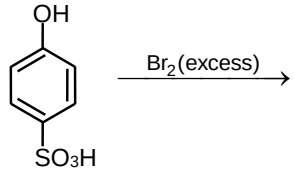
(1) 

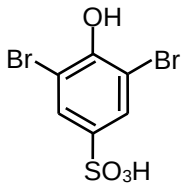
(2) 

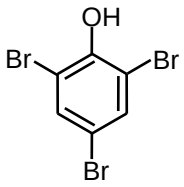
(3) 

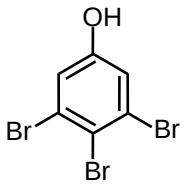
(4) 

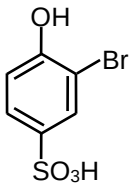
29. The major product of the following reaction is: **[JEE Mains 2019]**



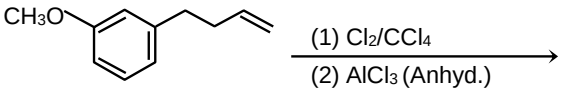
(1) 

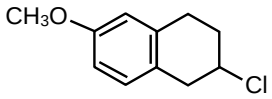
(2) 

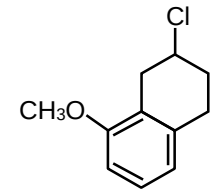
(3) 

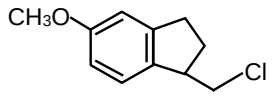
(4) 

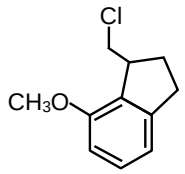
30. The major product of the following reactions is : **[JEE Mains 2019]**



(1) 

(2) 

(3) 

(4) 

Answers

EXERCISE - 1

SECTION (A)

1.	(4)	**2.**	(4)	**3.**	(4)	**4.**	(4)	**5.**	(3)	**6.**	(2)	**7.**	(2)
8.	(2)												

SECTION (B)

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

SECTION (C)

1.	(2)	**2.**	(4)	**3.**	(2)	**4.**	(2)	**5.**	(3)

SECTION (D)

1.	(1)	**2.**	(3)	**3.**	(2)	**4.**	(1)	**5.**	(1)	**6.**	(3)	**7.**	(4)
8.	(4)	**9.**	(4)	**10.**	(4)	**11.**	(3)	**12.**	(3)	**13.**	(1)		

SECTION (E)

1.	(3)	**2.**	(4)	**3.**	(1)	**4.**	(2)	**5.**	(3)	**6.**	(4)	**7.**	(1)
8.	(4)	**9.**	(1)	**10.**	(2)	**11.**	(2)	**12.**	(3)	**13.**	(1)	**14.**	(1)

SECTION (F)

1.	(4)	**2.**	(2)	**3.**	(2)	**4.**	(2)	**5.**	(1)	**6.**	(2)	**7.**	(3)
8.	(1)	**9.**	(1)	**10.**	(1)	**11.**	(2)						

SECTION (G)

1.	(4)	**2.**	(2)	**3.**	(3)	**4.**	(3)	**5.**	(3)	**6.**	(2)	**7.**	(3)
8.	(4)	**9.**	(2)	**10.**	(2)	**11.**	(1)	**12.**	(4)	**13.**	(2)		

SECTION (H)

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

EXERCISE - 2

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

EXERCISE - 3

PART-I

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

PART-II

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

PART-III

1.	(3)	**2.**	(1)	**3.**	(1)	**4.**	(4)	**5.**	(3)	**6.**	(2)	**7.**	(1)
8.	(4)	**9.**	(4)	**10.**	(1)	**11.**	(3)	**12.**	(4)	**13.**	(1)	**14.**	(1)
15.	(1)	**16.**	(4)	**17.**	(1)	**18.**	(3)	**19.**	(4)	**20.**	(2)	**21.**	(1)
22.	(3)	**23.**	(1)	**24.**	(3)	**25.**	(3)	**26.**	(1)	**27.**	(2)	**28.**	(2)
29.	(2)	**30.**	(3)										