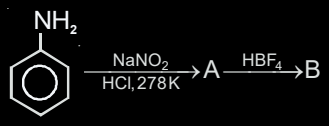
Chapter 27

Amines

1. In the chemical reactions,



the compounds 'A' and 'B' respectively are **[AIEEE-2010]**

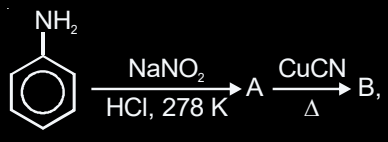
(1) Nitrobenzene and chlorobenzene

(2) Nitrobenzene and fluorobenzene

(3) Phenol and benzene

(4) Benzene diazonium chloride and fluorobenzene

2. In the chemical reactions



The compounds A and B respectively are **[AIEEE-2011]**

(1) Phenol and bromobenzene

(2) Fluorobenzene and phenol

(3) Benzene diazonium chloride and benzonitrile

(4) Nitrobenzene and chlorobenzene

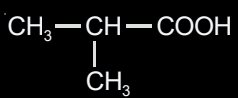
3. A compound with molecular mass 180 is acylated with CH_3COCl to get a compound with molecular mass 390. The number of amino groups present per molecule of the former compound is **[JEE (Main)-2013]**

(1) 2 (2) 5

(3) 4 (4) 6

4. An organic compound A upon reacting with NH_3 gives B. On heating, B gives C. C in presence of KOH reacts with Br_2 to give $CH_3CH_2NH_2$. A is **[JEE (Main)-2013]**

(1) CH_3COOH (2) $CH_3CH_2CH_2COOH$

(3)  (4) CH_3CH_2COOH

5. On heating an aliphatic primary amine with chloroform and ethanolic potassium hydroxide, the organic compound formed is **[JEE (Main)-2014]**

(1) An alkanol

(2) An alkanediol

(3) An alkyl cyanide

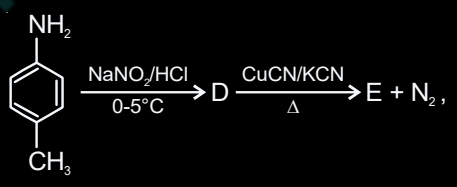
(4) An alkyl isocyanide

6. Considering the basic strength of amines in aqueous solution, which one has the smallest pK_b value? **[JEE (Main)-2014]**

(1) $(CH_3)_2NH$ (2) CH_3NH_2

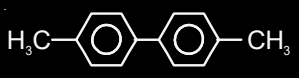
(3) $(CH_3)_3N$ (4) $C_6H_5NH_2$

7. In the reaction

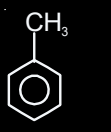


the product E is **[JEE (Main)-2015]**

(1) 

(2) 

(3) 

(4) 

8. In the Hofmann bromamide degradation reaction, the number of moles of NaOH and Br_2 used per mole of amine produced are **[JEE (Main)-2016]**

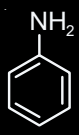
(1) Four moles of NaOH and two moles of Br_2

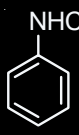
(2) Two moles of NaOH and two moles of Br_2

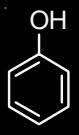
(3) Four moles of NaOH and one mole of Br_2

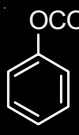
(4) One mole of NaOH and one mole of Br_2

9. Which of the following compounds will form significant amount of *meta* product during mono-nitration reaction? **[JEE (Main)-2017]**

(1) 

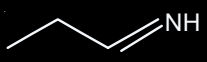
(2) 

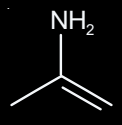
(3) 

(4) 

10. The increasing order of basicity of the following compound is **[JEE (Main)-2018]**

(a) 

(b) 

(c) 

(d) 

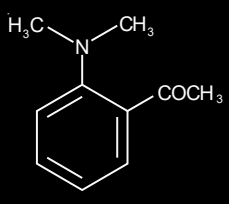
(1) (a) < (b) < (c) < (d) (2) (b) < (a) < (c) < (d)

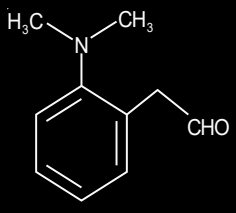
(3) (b) < (a) < (d) < (c) (4) (d) < (b) < (a) < (c)

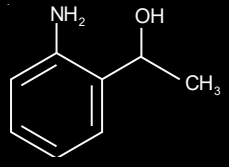
11. The tests performed on compound X and their inferences are :

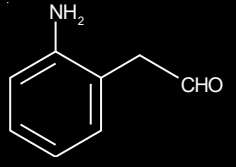
Test	Inference
(a) 2,4-DNP test	Coloured precipitate
(b) Iodoform test	Yellow precipitate
(c) Azo-dye test	No dye formation

Compound 'X' is **[JEE (Main)-2019]**

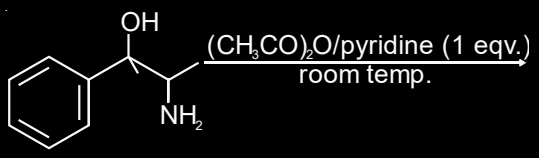
(1) 

(2) 

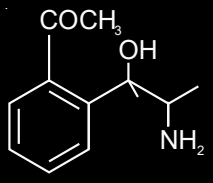
(3) 

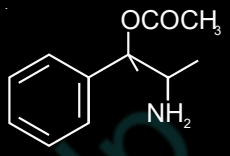
(4) 

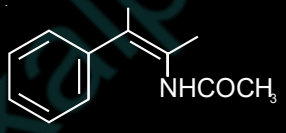
12. The major product obtained in the following reaction is

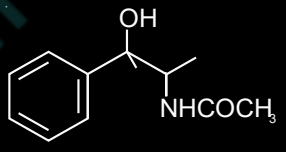


[JEE (Main)-2019]

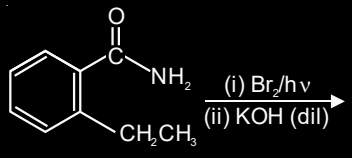
(1) 

(2) 

(3) 

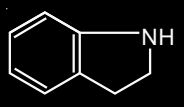
(4) 

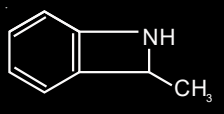
13. The major product of the following reaction

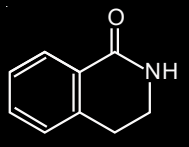


[JEE (Main)-2019]

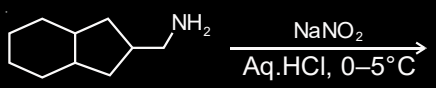
(1) 

(2) 

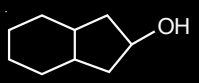
(3) 

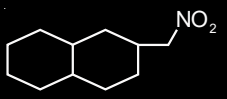
(4) 

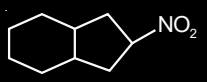
14. The major product formed in the reaction given below will be

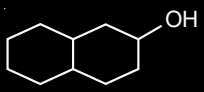


[JEE (Main)-2019]

(1) 

(2) 

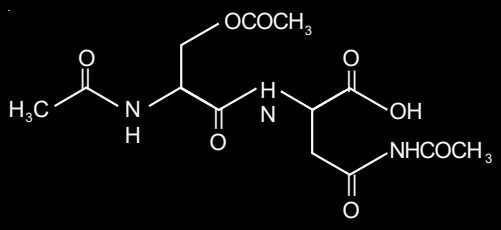
(3) 

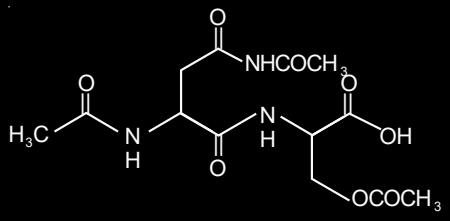
(4) 

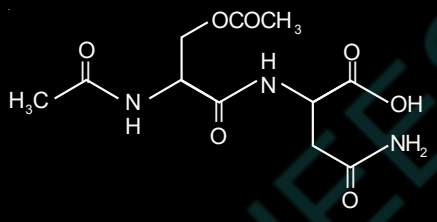
15. The correct structure of product 'P' in the following reaction is

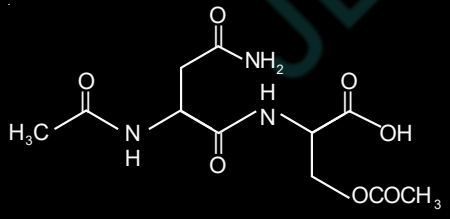
$$\text{Asn} - \text{Ser} + \underset{\text{(excess)}}{(CH_3CO)_2O} \xrightarrow{NEt_3} P$$

[JEE (Main)-2019]

(1) 

(2) 

(3) 

(4) 

16. The correct match between Item I and Item II is

Item I	Item II
(A) Ester test	(P) Tyr
(B) Carbylamine test	(Q) AsP
(C) Phthalein dye test	(R) Ser
	(S) Lys

[JEE (Main)-2019]

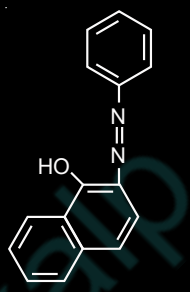
(1) (A) → (Q); (B) → (S); (C) → (P)
(2) (A) → (R); (B) → (Q); (C) → (P)
(3) (A) → (Q); (B) → (S); (C) → (R)
(4) (A) → (R); (B) → (S); (C) → (Q)

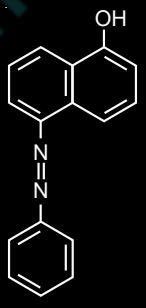
17. A compound 'X' on treatment with Br_2/NaOH, provided C_3H_9N, which gives positive carbylamine test. Compound 'X' is **[JEE (Main)-2019]**

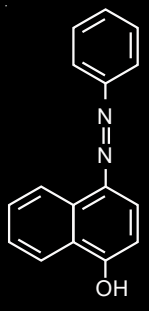
(1) $CH_3CH_2CH_2CONH_2$
(2) $CH_3COCH_2NHCH_3$
(3) $CH_3CH_2COCH_2NH_2$
(4) $CH_3CON(CH_3)_2$

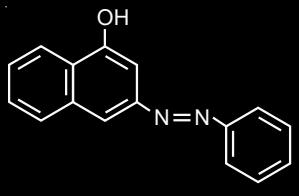
18. Coupling of benzene diazonium chloride with 1-naphthol in alkaline medium will give

[JEE (Main)-2019]

(1) 

(2) 

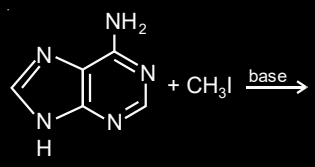
(3) 

(4) 

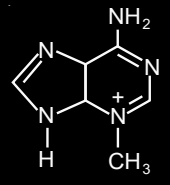
19. Which of the following amines can be prepared by Gabriel phthalimide reaction? **[JEE (Main)-2019]**
(1) Neo-pentylamine
(2) n-butylamine
(3) t-butylamine
(4) Triethylamine

20. In the following compounds, the decreasing order of basic strength will be **[JEE (Main)-2019]**
(1) $NH_3 > C_2H_5NH_2 > (C_2H_5)_2NH$
(2) $C_2H_5NH_2 > NH_3 > (C_2H_5)_2NH$
(3) $(C_2H_5)_2NH > NH_3 > C_2H_5NH_2$
(4) $(C_2H_5)_2NH > C_2H_5NH_2 > NH_3$

21. The major product in the following reaction is



[JEE (Main)-2019]

(1) 

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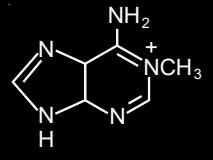
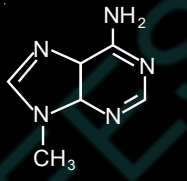
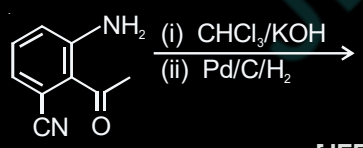
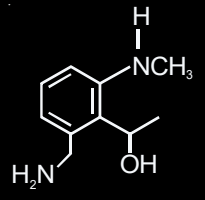
(3) 

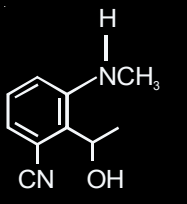
(4) 

22. The major product obtained in the following reaction is:



[JEE (Main)-2019]

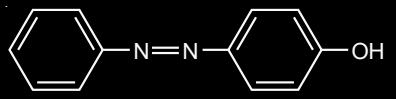
(1) 

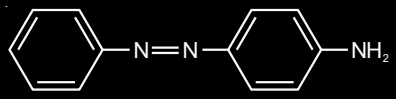
(2) 

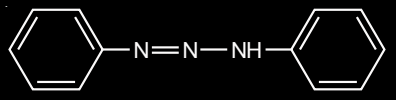
(3) 

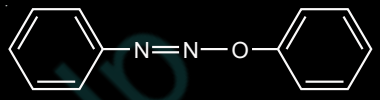
(4) 

23. Aniline dissolved in dilute HCl is reacted with sodium nitrite at 0°C. This solution was added dropwise to a solution containing equimolar mixture of aniline and phenol in dil. HCl. The structure of the major product is **[JEE (Main)-2019]**

(1) 

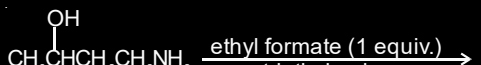
(2) 

(3) 

(4) 

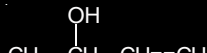
24. Hinsberg's reagent is **[JEE (Main)-2019]**
(1) $C_6H_5SO_2Cl$
(2) $(COCl)_2$
(3) C_6H_5COCl
(4) $SOCl_2$

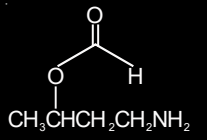
25. The major product of the following reaction is :

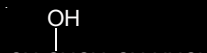


[JEE (Main)-2019]

(1) $CH_3CH{=}CH{-}CH_2NH_2$

(2) 

(3) 

(4) 

26. Ethylamine ($C_2H_5NH_2$) can be obtained from N-ethylphthalimide on treatment with : **[JEE (Main)-2019]**
(1) NH_2NH_2
(2) $NaBH_4$
(3) H_2O
(4) CaH_2

27. Which of the following is NOT a correct method of the preparation of benzylamine from cyanobenzene? **[JEE (Main)-2019]**

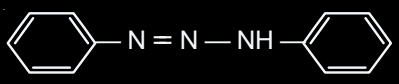
(1) (i) $SnCl_2$ + HCl(gas)
(ii) $NaBH_4$

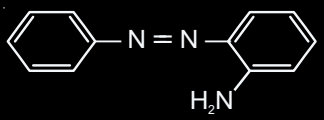
(2) H_2/Ni

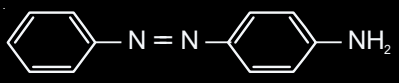
(3) (i) $LiAlH_4$
(ii) H_3O^+

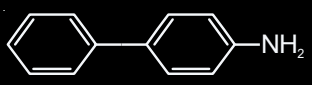
(4) (i) HCl/H_2O
(ii) $NaBH_4$

28. Benzene diazonium chloride on reaction with aniline in the presence of dilute hydrochloric acid gives : **[JEE (Main)-2019]**

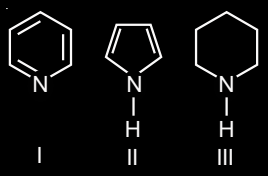
(1) 

(2) 

(3) 

(4) 

29. Arrange the following amines in the decreasing order of basicity **[JEE (Main)-2019]**

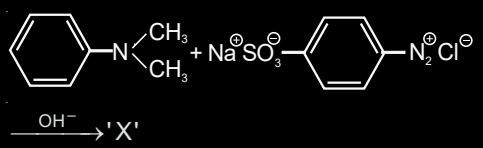


I II III

(1) III > II > I (2) I > III > II

(3) III > I > II (4) I > II > III

30. Consider the following reaction:



The product 'X' is used **[JEE (Main)-2020]**

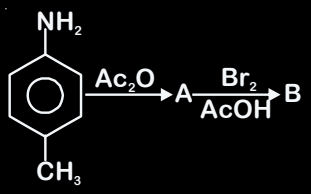
(1) In acid base titration as an indicator

(2) In protein estimation as an alternative to ninhydrin

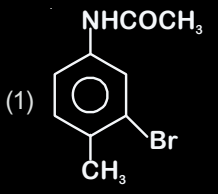
(3) In laboratory test for phenols

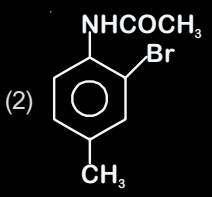
(4) As food grade colourant

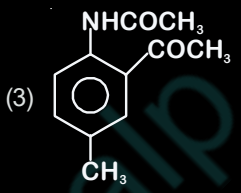
31. In the following reaction sequence:

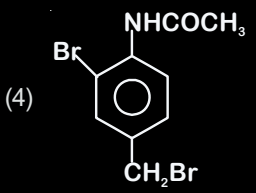


the major product B is: **[JEE (Main)-2020]**

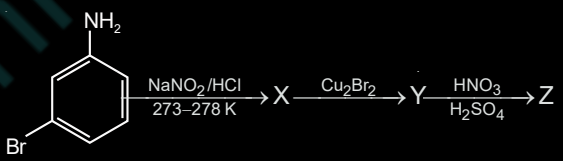
(1) 

(2) 

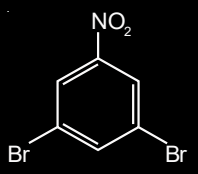
(3) 

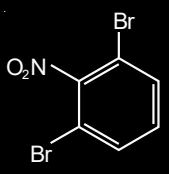
(4) 

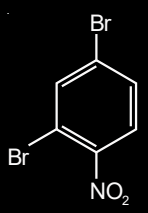
32. The major product Z obtained in the following reaction scheme is

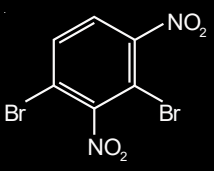


[JEE (Main)-2020]

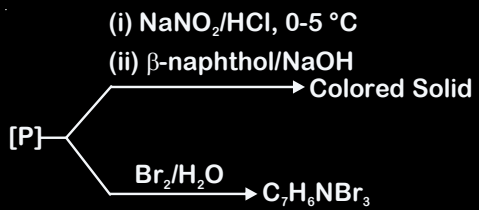
(1) 

(2) 

(3) 

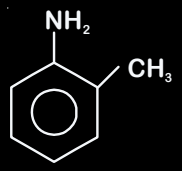
(4) 

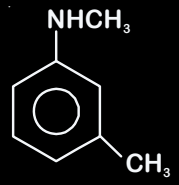
33. Consider the following reactions,

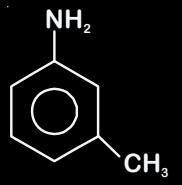


The compound [P] is **[JEE (Main)-2020]**

(1) 

(2) 

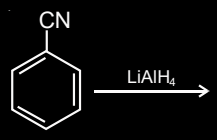
(3) 

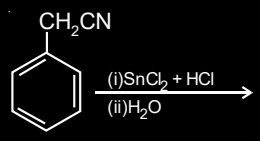
(4) 

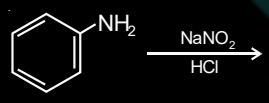
34. The Kjeldahl method of Nitrogen estimation fails for which of the following reaction products?

[JEE (Main)-2020]

(a) 

(b) 

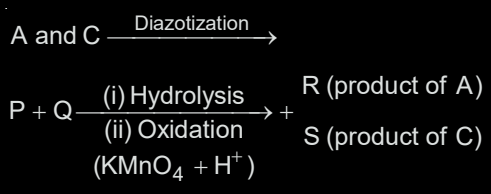
(c) 

(d) 

(1) (a), (c) and (d) (2) (a) and (d)

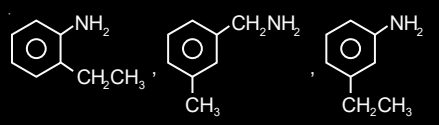
(3) (c) and (d) (4) (b) and (c)

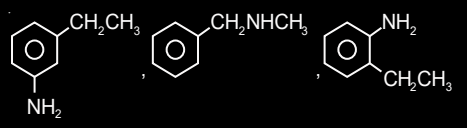
35. Three isomers A, B and C (mol. formula $C_8H_{11}N$) give the following results

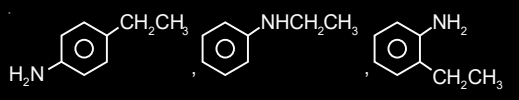


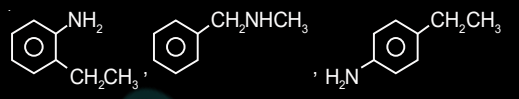
R has lower boiling point than S

A, B and C, respectively are **[JEE (Main)-2020]**

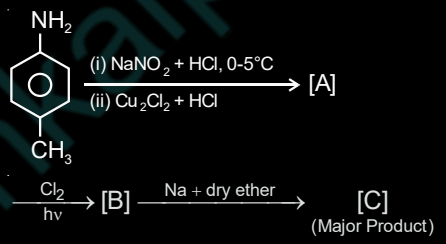
(1) 

(2) 

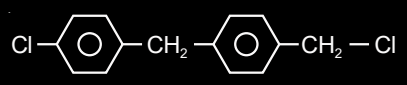
(3) 

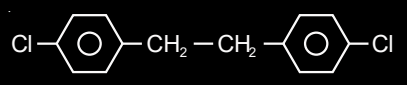
(4) 

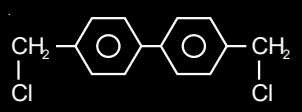
36. In the following reaction sequence, [C] is



[JEE (Main)-2020]

(1) 

(2) 

(3) 

(4) 

37. The most appropriate reagent for conversion of C_2H_5CN into $CH_3CH_2CH_2NH_2$ is **[JEE (Main)-2020]**

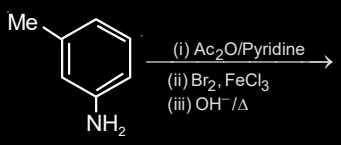
(1) $NaBH_4$

(2) CaH_2

(3) $Na(CN)BH_3$

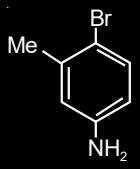
(4) $LiAlH_4$

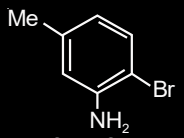
38. The final major product of the following reaction is

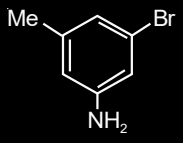


[JEE (Main)-2020]

(1) 

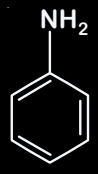
(2) 

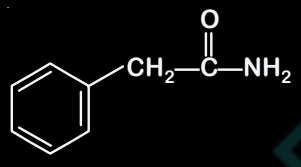
(3) 

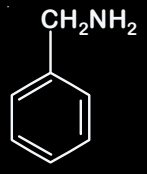
(4) 

39. Which of the following compounds can be prepared in good yield by Gabriel phthalimide synthesis?

[JEE (Main)-2020]

(1) 

(2) 

(3) 

(4) $CH_3—CH_2—NHCH_3$

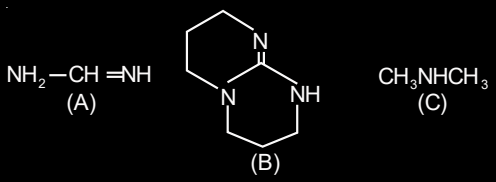
40. Match the following :

Test/Method	Reagent
(i) Lucas Test	(a) $C_6H_5SO_2Cl$/ aq. KOH
(ii) Dumas method	(b) HNO_3/ $AgNO_3$
(iii) Kjeldahl's method	(c) CuO/CO_2
(iv) Hinsberg test	(d) Conc. HCl and $ZnCl_2$
	(e) H_2SO_4

[JEE (Main)-2020]

(1) (i)-(b), (ii)-(d), (iii)-(e), (iv)-(a)
(2) (i)-(d), (ii)-(c), (iii)-(e), (iv)-(a)
(3) (i)-(b), (ii)-(a), (iii)-(c), (iv)-(d)
(4) (i)-(d), (ii)-(c), (iii)-(b), (iv)-(e)

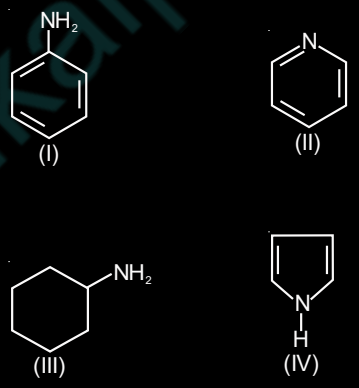
41. The increasing order of pK_b for the following compounds will be



[JEE (Main)-2020]

(1) (B) < (C) < (A) (2) (B) < (A) < (C)
(3) (C) < (A) < (B) (4) (A) < (B) < (C)

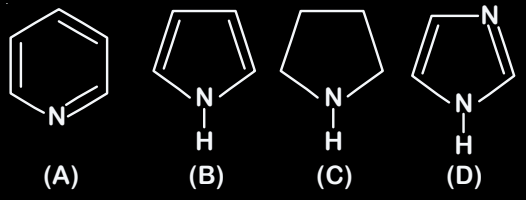
42. The decreasing order of basicity of the following amines is



[JEE (Main)-2020]

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

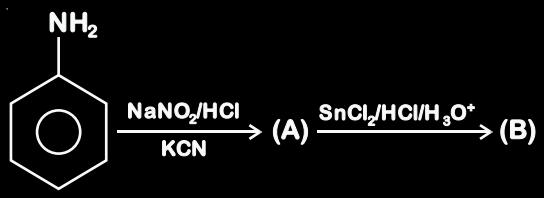
43. The increasing order of basicity of the following compounds is



[JEE (Main)-2020]

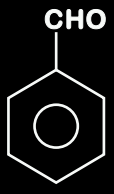
(1) (B) < (A) < (D) < (C)
(2) (D) < (A) < (B) < (C)
(3) (B) < (A) < (C) < (D)
(4) (A) < (B) < (C) < (D)

44. 'A' and 'B' in the following reactions are :

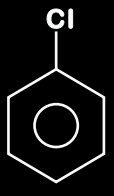


[JEE (Main)-2021]

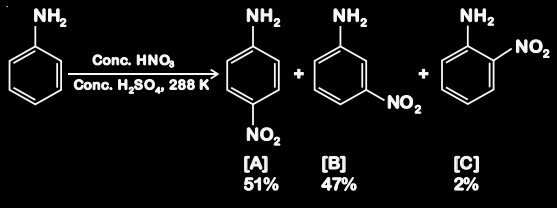
(1) (A) :  (B) : 

(2) (A) :  (B) : 

(3) (A) :  (B) : 

(4) (A) :  (B) : 

45. In the following reaction the reason why meta-nitro product also formed is :



[JEE (Main)-2021]

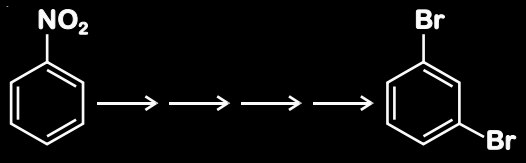
(1) Formation of anilinium ion

(2) Low temperature

(3) $-NO_2$ substitution always takes place at meta-position

(4) $-NH_2$ group is highly meta-directive

46. What is the correct sequence of reagents used for converting nitrobenzene into m-dibromobenzene?



[JEE (Main)-2021]

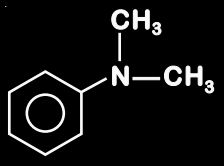
(1) $NaNO_2 / HCl / KBr / H^+$

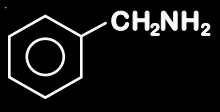
(2) $Sn/HCl / Br_2 / NaNO_2 / NaBr$

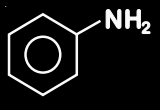
(3) $Sn/HCl / KBr / Br_2 / H^+$

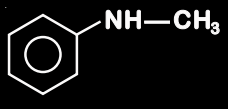
(4) $Br_2/Fe / Sn/HCl / NaNO_2/HCl / CuBr/HBr$

47. The diazonium salt of which of the following compounds will form a coloured dye on reaction with β-Naphthol in NaOH? [JEE (Main)-2021]

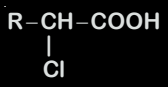
(1) 

(2) 

(3) 

(4) 

48. Match List - I and List - II. **[JEE (Main)-2021]**

List - I	List - II
(a) $R-\overset{\overset{O}{\|}}{C}-Cl \rightarrow R-CHO$	(i) $Br_2/NaOH$
(b) $R-CH_2-COOH \rightarrow$ 	(ii) $H_2/Pd-BaSO_4$
(c) $R-\overset{\overset{O}{\|}}{C}-NH_2 \rightarrow R-NH_2$	(iii) Zn(Hg)/Conc. HCl
(d) $R-\overset{\overset{O}{\|}}{C}-CH_3 \rightarrow R-CH_2-CH_3$	(iv) Cl_2/Red P, H_2O

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

(1) (a)-(iii), (b)-(i), (c)-(iv), (d)-(ii)

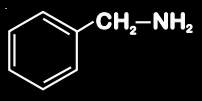
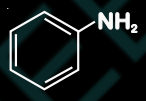
(2) (a)-(ii), (b)-(iv), (c)-(i), (d)-(iii)

(3) (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)

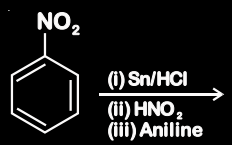
(4) (a)-(iii), (b)-(iv), (c)-(i), (d)-(ii)

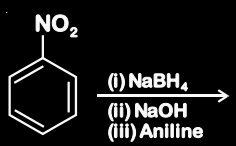
49. The total number of amines among the following which can be synthesized by Gabriel synthesis is _____. **[JEE (Main)-2021]**

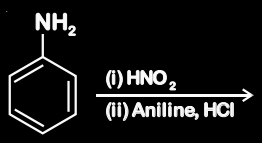
(A)  (B) $CH_3CH_2NH_2$

(C)  (D) 

50. Which of the following reaction/s will not give p-aminoazobenzene?

A. 

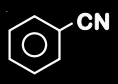
B. 

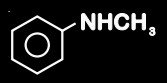
C. 

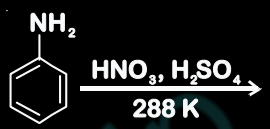
(1) C only (2) B only

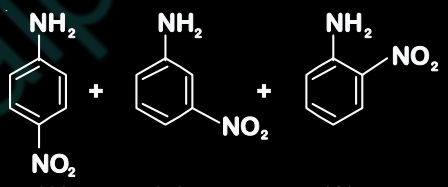
(3) A only (4) A and B

51. Carbylamine test is used to detect the presence of primary amino group in an organic compound. Which of the following compound is formed when this test is performed with aniline? **[JEE (Main)-2021]**

(1)  (2) 

(3)  (4) 

52. 



(A) (B) (C)

Correct statement about the given chemical reaction is : **[JEE (Main)-2021]**

(1) The reaction will form sulphonated product instead of nitration.

(2) Reaction is possible and compound (B) will be the major product.

(3) Reaction is possible and compound (A) will be major product.

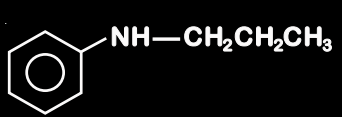
(4) $-\ddot{N}H_2$ group is ortho and para directive, so product (B) is not possible.

53. An amine on reaction with benzenesulphonyl chloride produces a compound insoluble in alkaline solution. This amine can be prepared by ammonolysis of ethyl chloride. The correct structure of amine is : **[JEE (Main)-2021]**

(1) $CH_3CH_2CH_2\overset{\overset{H}{|}}{N}-CH_2CH_3$

(2) $CH_3CH_2NH_2$

(3) $CH_3CH_2CH_2NHCH_3$

(4) 

54. A. Phenyl methanamine

B. N,N-Dimethylaniline

C. N-Methyl aniline

D. Benzenamine

Choose the correct order of basic nature of the above amines. **[JEE (Main)-2021]**

(1) A > C > B > D (2) D > B > C > A

(3) D > C > B > A (4) A > B > C > D

55. Ceric ammonium nitrate and $CHCl_3$/alc. KOH are used for the identification of functional groups present in _____ and _____ respectively.

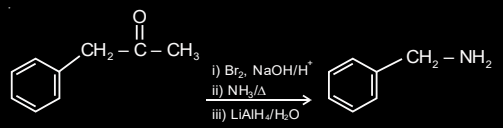
[JEE (Main)-2021]

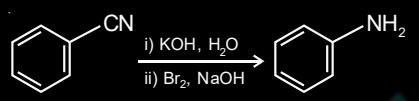
(1) Alcohol, phenol (2) Amine, phenol

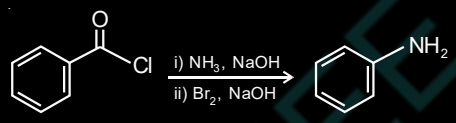
(3) Amine, alcohol (4) Alcohol, amine

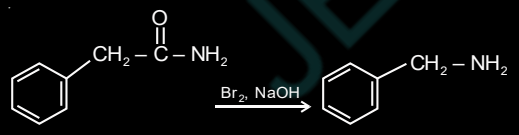
56. Which of the following reaction DOES NOT involve Hoffmann bromamide degradation?

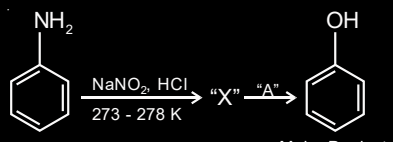
[JEE (Main)-2021]

(1) 

(2) 

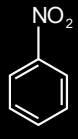
(3) 

(4) 

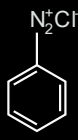
57. 

Major Product

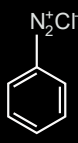
In the above chemical reaction, intermediate "X" and reagent/condition "A" are **[JEE (Main)-2021]**

(1) 

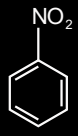
; A - H_2O/NaOH

(2) 

; A - H_2O/NaOH

(3) 

; A - H_2O/Δ

(4) 

; A - H_2O/Δ

58. Ammonolysis of Alkyl halides followed by the treatment with NaOH solution can be used to prepare primary, secondary and tertiary amines. The purpose of NaOH in the reaction is

[JEE (Main)-2021]

(1) To remove basic impurities

(2) To activate NH_3 used in the reaction

(3) To remove acidic impurities

(4) To increase the reactivity of alkyl halide

59. Which of the following is least basic?

[JEE (Main)-2021]

(1) $(CH_3CO)\ddot{N}HC_2H_5$

(2) $(CH_3CO)_2\ddot{N}H$

(3) $(C_2H_5)_2\ddot{N}H$

(4) $(C_2H_5)_3\ddot{N}$

60. Which of the following reaction is an example of ammonolysis? **[JEE (Main)-2021]**

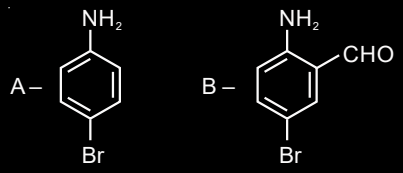
(1) $C_6H_5CH_2Cl + NH_3 \longrightarrow C_6H_5CH_2NH_2$

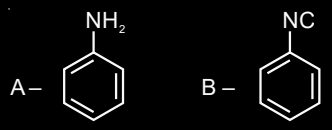
(2) $C_6H_5NH_2 \xrightarrow{HCl} C_6H_5\overset{+}{N}H_3Cl^-$

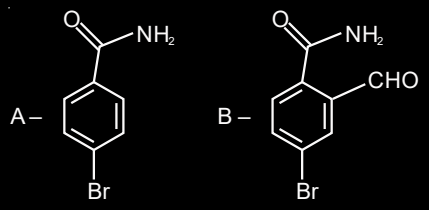
(3) $C_6H_5COCl + C_6H_5NH_2 \longrightarrow C_6H_5CONHC_6H_5$

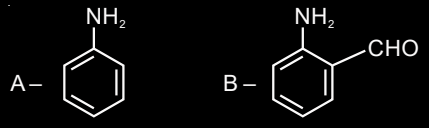
(4) $C_6H_5CH_2CN \xrightarrow{[H]} C_6H_5CH_2CH_2NH_2$

61. Hoffmann bromamide degradation of benzamide gives product A, which upon heating with $CHCl_3$ and NaOH gives product B.
The structures of A and B are:

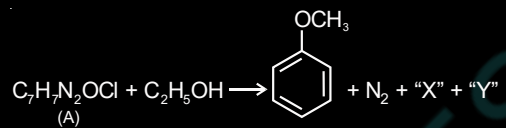
(1) 

(2) 

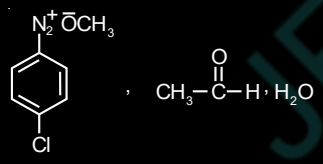
(3) 

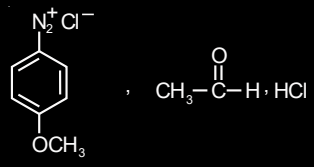
(4) 

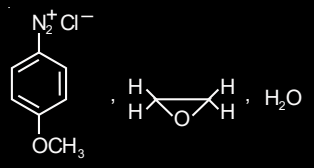
[JEE (Main)-2021]

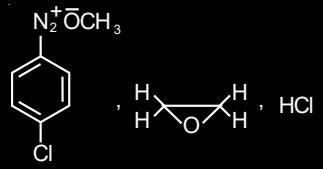
62. 

In the above reaction, the structural formula of (A), "X" and "Y" respectively are **[JEE (Main)-2021]**

(1) 

(2) 

(3) 

(4) 

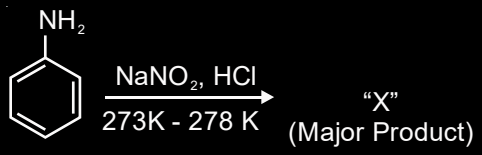
63. Primary, secondary and tertiary amines can be separated using **[JEE (Main)-2021]**

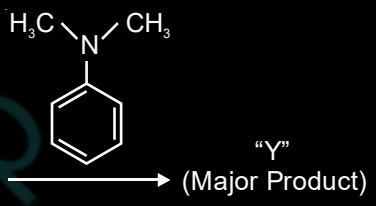
(1) para-Toluene sulphonyl chloride

(2) Acetyl amide

(3) Chloroform and KOH

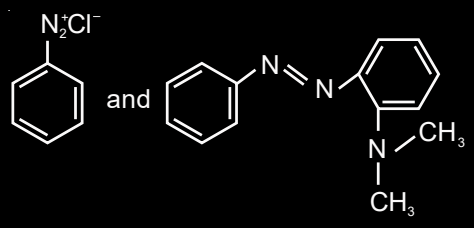
(4) Benzene sulphonic acid

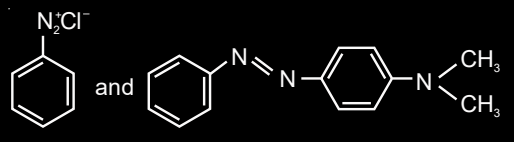
64. 

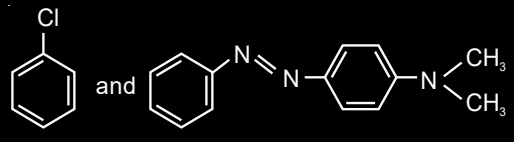


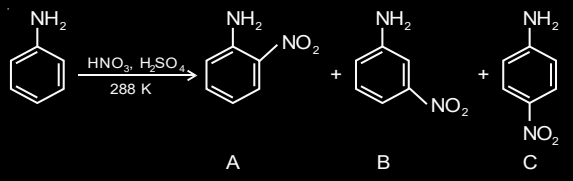
Considering the above reaction, X and Y respectively are **[JEE (Main)-2021]**

(1) 

(2) 

(3) 

(4) 

65. 

Consider the given reaction, percentage yield of :

[JEE (Main)-2021]

(1) C > B > A (2) C > A > B

(3) B > C > A (4) A > C > B

66. An organic compound "A" on treatment with benzene sulphonyl chloride gives compound B. B is soluble in dil. NaOH solution. Compound A is

[JEE (Main)-2021]

(1) $C_6H_5 - N - (CH_3)_2$

(2) $C_6H_5 - CH_2NHCH_3$

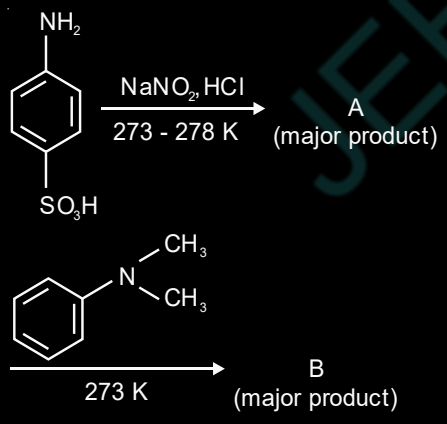
(3) $C_6H_5 - \underset{\displaystyle CH_3}{\underset{|}{CH}} - NH_2$

(4) $C_6H_5 - NHCH_2CH_3$

67. In the reaction of hypobromite with amide, the carbonyl carbon is lost as **[JEE (Main)-2021]**

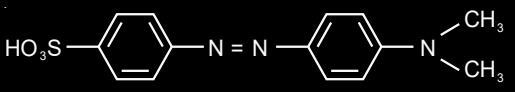
(1) CO_3^{2-} (2) HCO_3^-

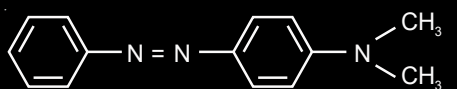
(3) CO_2 (4) CO

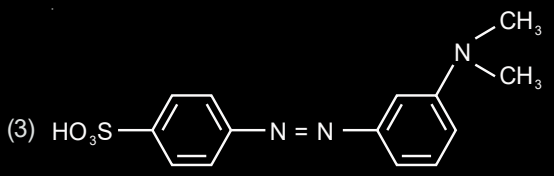
68. 

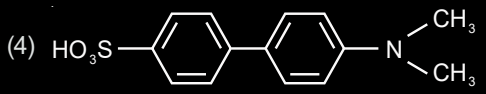
Consider the above reaction, compound B is :

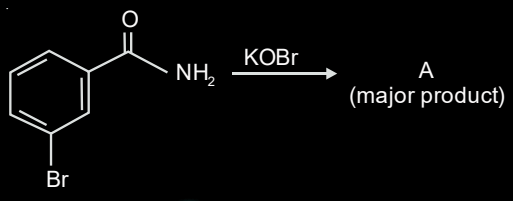
[JEE (Main)-2021]

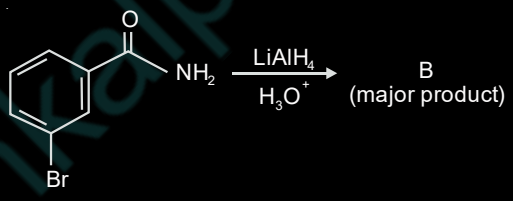
(1) 

(2) 

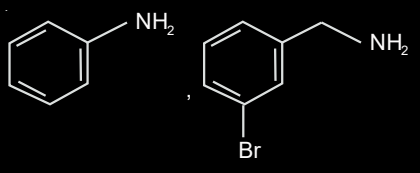
(3) 

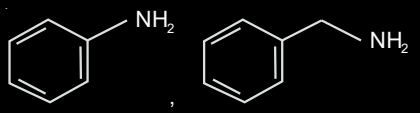
(4) 

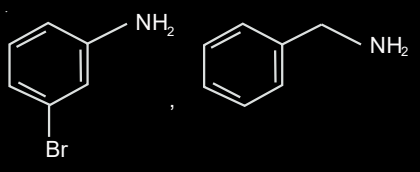
69. 

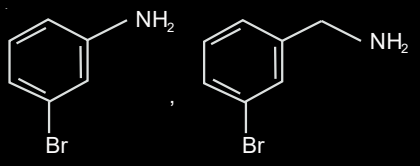


In the above reactions, product A and product B respectively are **[JEE (Main)-2021]**

(1) 

(2) 

(3) 

(4) 

70. Compound A is converted to B on reaction with $CHCl_3$ and KOH. The compound B is toxic and can be decomposed by C. A, B and C respectively are

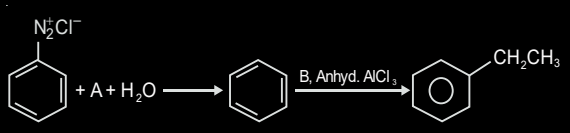
[JEE (Main)-2021]

(1) Secondary amine, isonitrile compound, conc. NaOH

(2) Secondary amine, nitrile compound, conc. NaOH

(3) Primary amine, isonitrile compound, conc. HCl

(4) Primary amine, nitrile compound, conc. HCl

71. 

Major Product

In the chemical reactions given above A and B respectively are **[JEE (Main)-2021]**

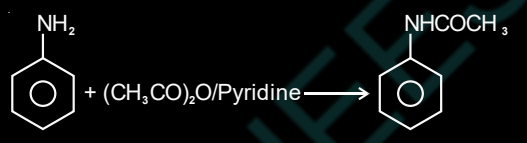
(1) CH_3CH_2Cl and H_3PO_2

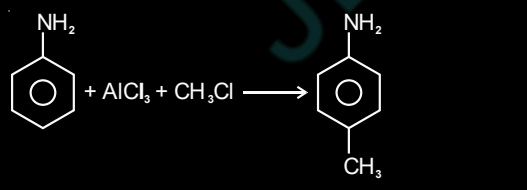
(2) H_3PO_2 and CH_3CH_2OH

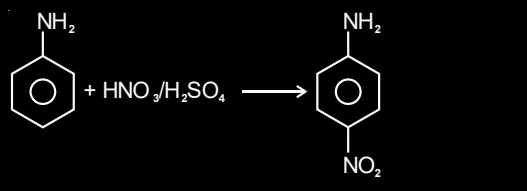
(3) H_3PO_2 and CH_3CH_2Cl

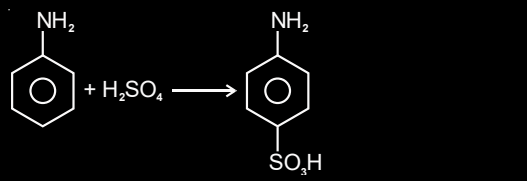
(4) CH_3CH_2OH and H_3PO_2

72. Which one of the following reactions does not occur? **[JEE (Main)-2021]**

(1) 

(2) 

(3) 

(4) 

73. Given below are two statements, one is labelled as **Assertion (A)** and other is labelled as **Reason (R).**

Assertion (A): Gabriel phthalimide synthesis cannot be used to prepare aromatic primary amines.

Reason (R) : Aryl halides do not undergo nucleophilic substitution reaction.

In the light of the above statements, choose the correct answer from the options given below :

[JEE (Main)-2021]

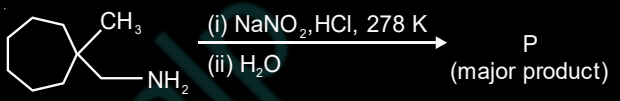
(1) **(A)** is false but **(R)** is true

(2) Both **(A)** and **(R)** are true and **(R)** is correct explanation of **(A)**

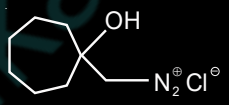
(3) **(A)** is true but **(R)** is false

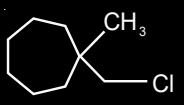
(4) Both **(A)** and **(R)** are true but **(R)** is not the correct explanation of **(A)**

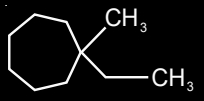
74. What is the major product "P" of the following reaction ?

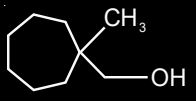


[JEE (Main)-2021]

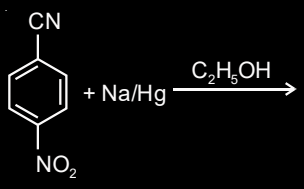
(1) 

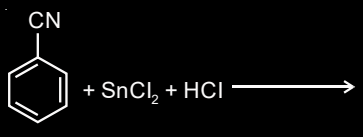
(2) 

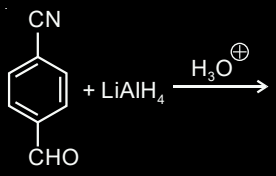
(3) 

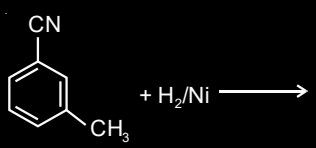
(4) 

75. Which one of the products of the following reactions **does not** react with Hinsberg reagent to form sulphonamide? **[JEE (Main)-2021]**

(1) 

(2) 

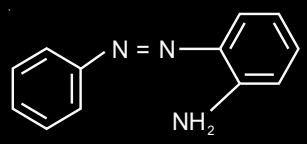
(3) 

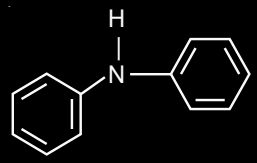
(4) 

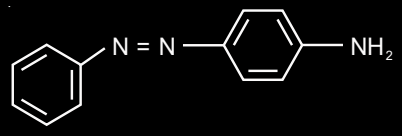
76. $C_6H_5NO_2 \xrightarrow{Sn + HCl}$ "A" $\xrightarrow[H^{\oplus}]{C_6H_5\overset{\oplus}{N_2}Cl^{\ominus}}$ P (Yellow coloured Compound)

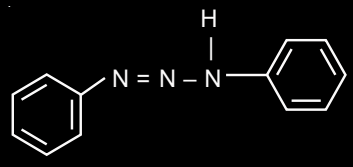
Consider the above reaction, the Product "P" is :

[JEE (Main)-2021]

(1) 

(2) 

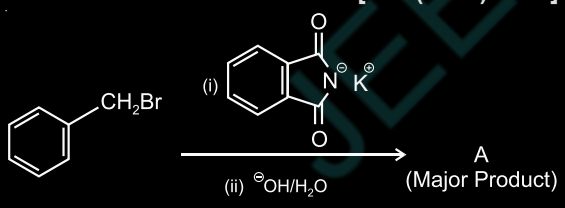
(3) 

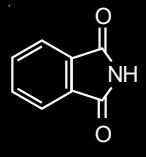
(4) 

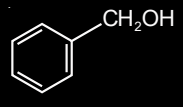
77. In gaseous triethyl amine the "– C – N – C –" bond angle is _____ degree. **[JEE (Main)-2021]**

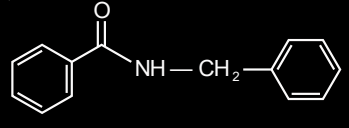
78. What is A in the following reaction ?

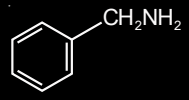
[JEE (Main)-2021]



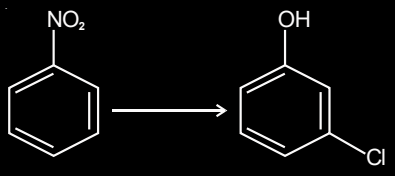
(1) 

(2) 

(3) 

(4) 

79. The correct sequence of correct reagents for the following transformation is



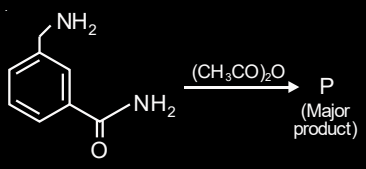
[JEE (Main)-2021]

(1) (i) Fe, HCl
(ii) $NaNO_2$, HCl, 0°C
(iii) H_2O/H^+
(iv) Cl_2, $FeCl_3$

(2) (i) Fe, HCl
(ii) Cl_2, HCl
(iii) $NaNO_2$, HCl, 0°C
(iv) H_2O/H^+

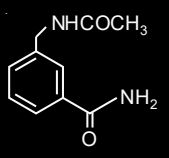
(3) (i) Cl_2, $FeCl_3$
(ii) $NaNO_2$, HCl, 0°C
(iii) Fe, HCl
(iv) H_2O/H^+

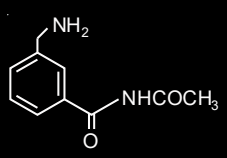
(4) (i) Cl_2, $FeCl_3$
(ii) Fe, HCl
(iii) $NaNO_2$, HCl, 0°C
(iv) H_2O/H^+

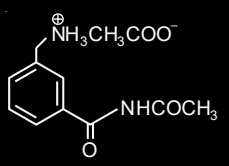
80. 

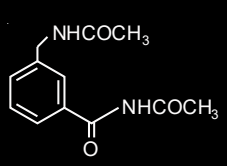
The major product in the above reaction is :

[JEE (Main)-2021]

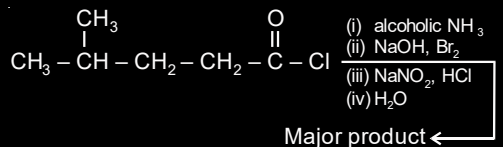
(1) 

(2) 

(3) 

(4) 

81. The major product of the following reaction is :



[JEE (Main)-2021]

(1) $CH_3 - \underset{\underset{CH_3}{|}}{CH} - CH_2 - CH_2OH$

(2) $CH_3 - \underset{\underset{CH_3}{|}}{CH} - \underset{\underset{Br}{|}}{CH} - CH_2OH$

(3) $CH_3 - \underset{\underset{CH_3}{|}}{CH} - CH_2 - CH_2 - Cl$

(4) $CH_3 - \underset{\underset{CH_3}{|}}{CH} - CH_2 - CH_2 - CH_2OH$

82. Which of the following is **not** a correct statement for primary aliphatic amines?

[JEE (Main)-2021]

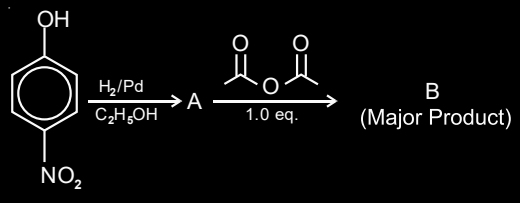
(1) Primary amines on treating with nitrous acid solution form corresponding alcohols except methyl amine.

(2) The intermolecular association in primary amines is less than the intermolecular association in secondary amines.

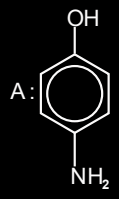
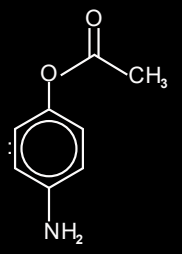
(3) Primary amines can be prepared by the Gabriel phthalimide synthesis.

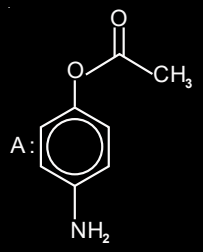
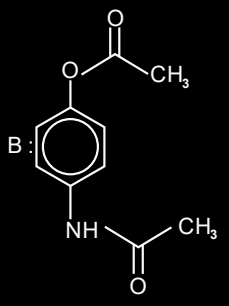
(4) Primary amines are less basic than the secondary amines.

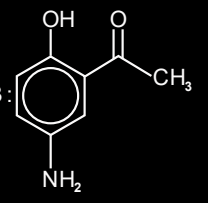
83. The correct structures of A and B formed in the following reactions are :

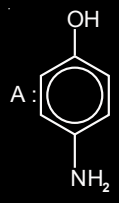
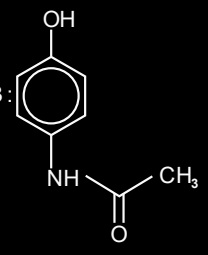


[JEE (Main)-2021]

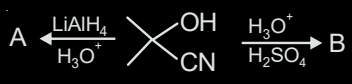
(1) A:  , B: 

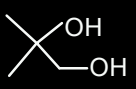
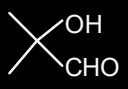
(2) A:  , B: 

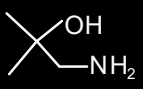
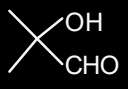
(3) A:  , B: 

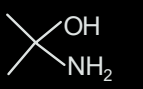
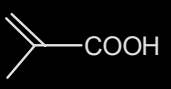
(4) A:  , B: 

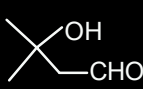
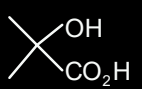
84. The major products A and B in the following set of reactions are **[JEE (Main)-2021]**



(1) A =  , B = 

(2) A =  , B = 

(3) A =  , B = 

(4) A =  , B = 

85. The total number of reagents from those given below, that can convert nitrobenzene into aniline is _____. (Integer answer) **[JEE (Main)-2021]**

I. Sn – HCl

II. Sn – NH_4OH

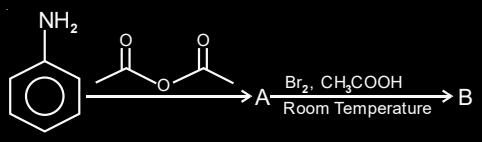
III. Fe – HCl

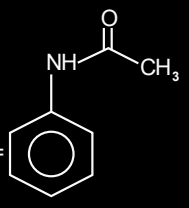
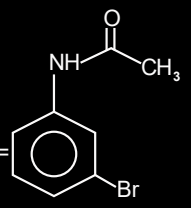
IV. Zn – HCl

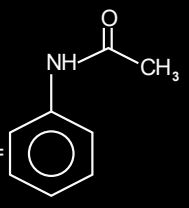
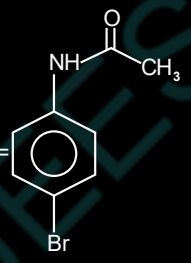
V. H_2 – Pd

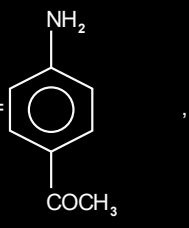
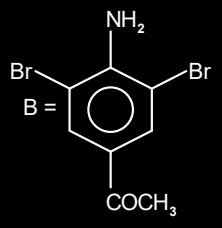
VI. H_2 – Raney Nickel

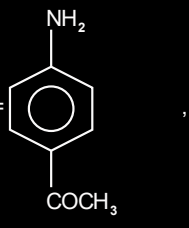
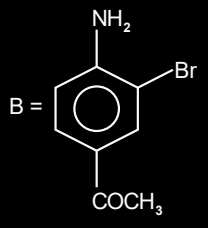
86. The major products A and B formed in the following reaction sequence are : **[JEE (Main)-2021]**



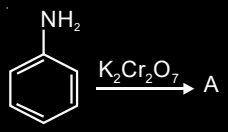
(1) A =  , B = 

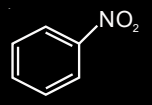
(2) A =  , B = 

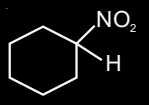
(3) A =  , B = 

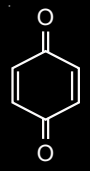
(4) A =  , B = 

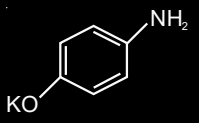
87. Identify A in the following reaction. **[JEE (Main)-2021]**



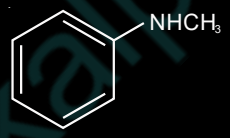
(1) 

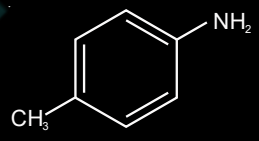
(2) 

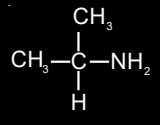
(3) 

(4) 

88. Which one of the following gives the most stable Diazonium salt? **[JEE (Main)-2021]**

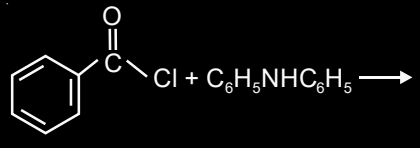
(1) 

(2) 

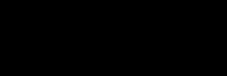
(3) 

(4) $CH_3 - CH_2 - CH_2 - NH_2$

89. 1.86 g of aniline completely reacts to form acetanilide. 10% of the product is lost during purification. Amount of acetanilide obtained after purification (in g) is _____ × 10^{-2}. **[JEE (Main)-2021]**

90. 

0.140 g 0.388 g



0.210 g

Consider the above reaction. The percentage yield of amide product is ____. (Round off to the Nearest Integer).

(Given : Atomic mass : C : 12.0 u, H : 1.0 u, N : 14.0 u, O : 16.0 u, Cl : 35.5 u)

[JEE (Main)-2021]

91. A reaction of 0.1 mole of Benzylamine with bromomethane gave 23 g of Benzyl trimethyl ammonium bromide. The number of moles of bromomethane consumed in this reaction are $n \times 10^{-1}$, when n = _____

(Round off to the Nearest Integer).

[Given : Atomic masses : C : 12.0 u, H : 1.0 u, N : 14.0 u, Br : 80.0 u] **[JEE (Main)-2021]**

92. Which one of the following compounds will liberate CO_2, when treated with $NaHCO_3$?

[JEE (Main)-2021]

(1) CH_3NH_2 (2) $(CH_3)_3\overset{\oplus}{N}H\overset{\ominus}{Cl}$

(3) $CH_3-\overset{O}{\overset{\|}{C}}-NH_2$ (4) $(CH_3)_4\overset{\oplus}{N}\overset{\ominus}{O}H$

93. Phenol on reaction with dilute nitric acid, gives two products. Which method will be most efficient for large scale separation?

[JEE (Main)-2022]

(1) Chromatographic separation

(2) Fractional crystallisation

(3) Steam distillation

(4) Sublimation

94. The reaction of $R-\overset{O}{\overset{\|}{C}}-NH_2$ with bromine and KOH gives RNH_2 as the end product. Which one of the following is the intermediate product formed in this reaction?

[JEE (Main)-2022]

(1) $R-\overset{O}{\overset{\|}{C}}-NH-Br$

(2) R – NH – Br

(3) R – N = C = O

(4) $R-\overset{O}{\overset{\|}{C}}-NBr_2$

95. Which statement is NOT correct for p-toluenesulphonyl chloride?

[JEE (Main)-2022]

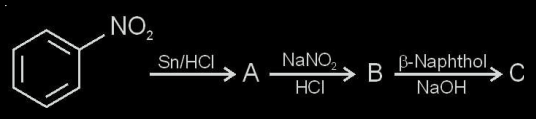
(1) It is known as Hinsberg's reagent

(2) It is used to distinguish primary and secondary amines

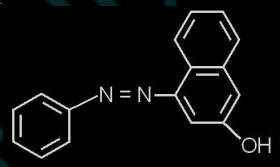
(3) On treatment with secondary amine, it leads to a product, that is soluble in alkali

(4) It doesn't react with tertiary amines

96. The final product 'C' in the following series of reactions

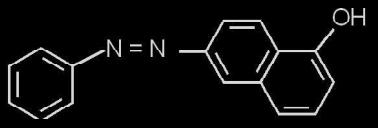


[JEE (Main)-2022]

(1) 

(2) 

(3) 

(4) 

97. Given below are two statements:

Statement-I : In Hofmann degradation reaction, the migration of only an alkyl group takes place from carbonyl carbon of the amide to the nitrogen atom.

Statement-II : The group is migrated in Hofmann degradation reaction to electron deficient atom.

In the light of the above statements, choose the **most appropriate** answer from the options given below:

[JEE (Main)-2022]

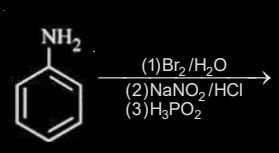
(1) Both **Statement I** and **Statement II** are correct

(2) Both **Statement I** and **Statement II** are incorrect

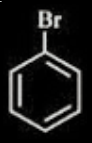
(3) **Statement I** is correct but **Statement II** is incorrect

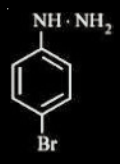
(4) **Statement I** is incorrect but **Statement II** is correct

98. Identify the major product formed in the following sequence of reactions:

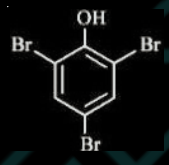


[JEE (Main)-2022]

(1) 

(2) 

(3) 

(4) 

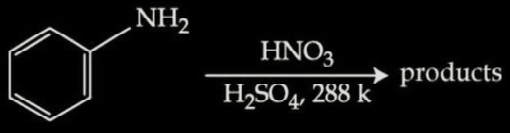
99. A primary aliphatic amine on reaction with nitrous acid in cold (273 K) and there after raising temperature of reaction mixture to room temperature (298 K), gives

[JEE (Main)-2022]

(1) nitrile (2) alcohol

(3) diazonium salt (4) secondary amine

100. With respect to the following reaction, consider the given statements:



(A) o-Nitroaniline and p-nitroaniline are the predominant products.

(B) p-Nitroaniline and m-nitroaniline are the predominant products.

(C) HNO_3 acts as an acid.

(D) H_2SO_4 acts as an acid.

Choose the **correct** option.

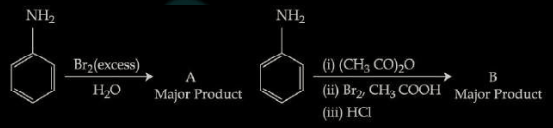
[JEE (Main)-2022]

(1) (A) and (C) are correct statements.

(2) (A) and (D) are correct statements.

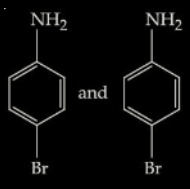
(3) (B) and (D) are correct statements.

(4) (B) and (C) are correct statements.

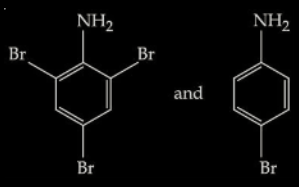
101. 

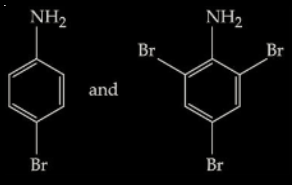
Consider the above reactions, the product A and product B respectively are

[JEE (Main)-2022]

(1) 

(2) 

(3) 

(4) 

102. In Friedel-Crafts alkylation of aniline, one gets

[JEE (Main)-2022]

(1) Alkylated product with ortho and para substitution.

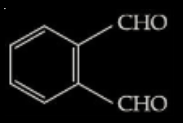
(2) Secondary amine after acidic treatment.

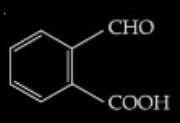
(3) An amide product.

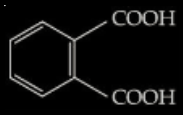
(4) Positively charged nitrogen at benzene ring.

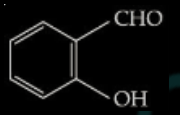
103. An organic compound 'A' on reaction with NH_3 followed by heating gives compound B. Which on further strong heating gives compound $C(C_8H_5NO_2)$. Compound C on sequential reaction with ethanolic KOH, alkyl chloride and hydrolysis with alkali gives a primary amine. The compound A is :

[JEE (Main)-2022]

(1) 

(2) 

(3) 

(4) 

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

Assertion (A) : Experimental reaction of CH_3Cl with aniline and anhydrous $AlCl_3$ does not give *o* and *p*-methylaniline.

Reason (R) : The $-NH_2$ group of aniline becomes deactivating because of salt formation with anhydrous $AlCl_3$ and hence yields *m*-methyl aniline as the product.

In the light of the above statements, choose the **most appropriate** answer from the options given below :

[JEE (Main)-2022]

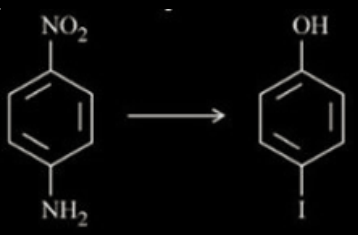
(1) Both **(A)** and **(R)** are true and **(R)** is the correct explanation of **(A)**.

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

(3) **(A)** is true, but **(R)** is false.

(4) **(A)** is false, but **(R)** is true.

105. The correct sequential order of the reagents for the given reaction is



[JEE (Main)-2022]

(1) HNO_2, Fe/H^+, HNO_2, KI, H_2O/H^+

(2) HNO_2, KI, Fe/H^+, HNO_2, H_2O/warm

(3) HNO_2, KI, HNO_2, Fe/H^+, H_2O/H^+

(4) HNO_2, Fe/H^+, KI, HNO_2, H_2O/warm

106. Match List I with List II.

List- I	List-II
A. Benzenesulphonyl Chloride	I. Test for primary amines
B. Hoffmann bromamide reaction	II. Anti Saytzeff
C. Carbylamine reaction	III. Hinsberg reagent
D. Hoffmann orientation	IV. Known reaction of Isocyanates

Choose the correct answer from the options given below:

[JEE (Main)-2022]

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

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

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

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

107. Given below are two statements: one is labelled as Assertion A and the other is labelled as Reason R

Assertion A : Aniline on nitration yields ortho, meta & para nitro derivatives of aniline.

Reason R : Nitrating mixture is a strong acidic mixture.

In the light of the above statements, choose the correct answer from the options given below.

[JEE (Main)-2022]

(1) Both **A** and **R** are true and **R** is the correct explanation of **A**

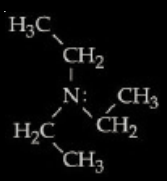
(2) Both **A** and **R** are true but **R** is NOT the correct explanation of **A**

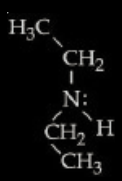
(3) **A** is true but **R** is false

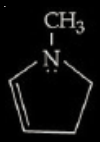
(4) **A** is false but **R** is true

108. Which among the following is the strongest Bronsted base?

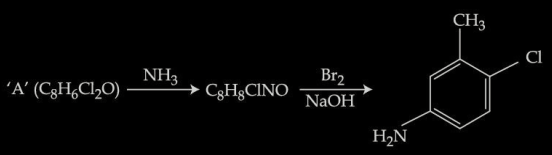
[JEE (Main)-2022]

(1) 

(2) 

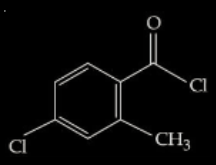
(3) 

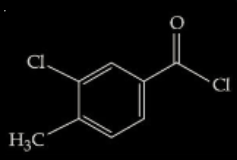
(4) 

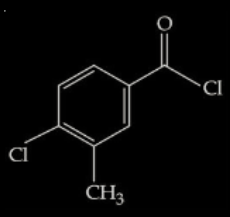
109. 

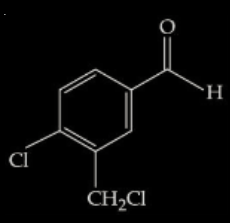
Consider the above reaction, the compound 'A' is:

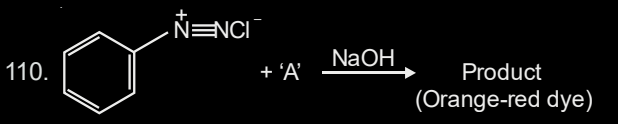
[JEE (Main)-2022]

(1) 

(2) 

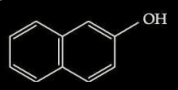
(3) 

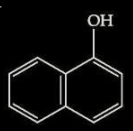
(4) 

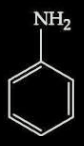
110. 

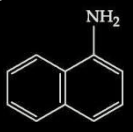
Which among the following represent reagent 'A'?

[JEE (Main)-2022]

(1) 

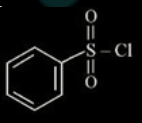
(2) 

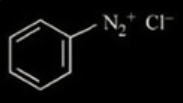
(3) 

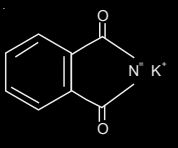
(4) 

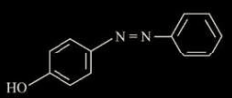
111. The Hinsberg reagent is

[JEE (Main)-2022]

(1) 

(2) 

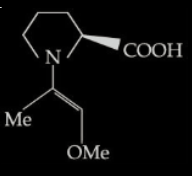
(3) 

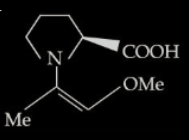
(4) 

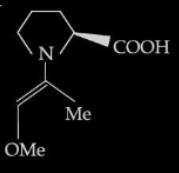
112. Among the following structures, which will show the most stable enamine formation?

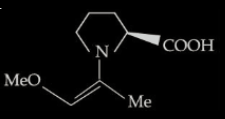
(Where Me is $-CH_3$)

[JEE (Main)-2022]

(1) 

(2) 

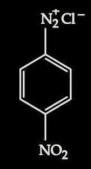
(3) 

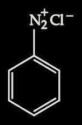
(4) 

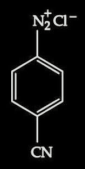
113. The correct stability order of the following diazonium salt is

[JEE (Main)-2022]

(A) 

(B) 

(C) 

(D) 

(1) (A) > (B) > (C) > (D)

(2) (A) > (C) > (D) > (B)

(3) (C) > (A) > (D) > (B)

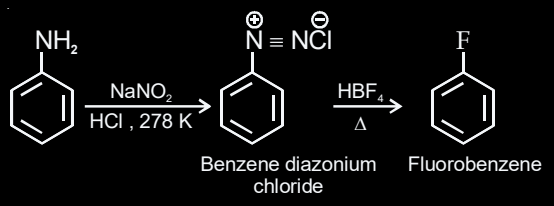
(4) (C) > (D) > (B) > (A)

❑ ❑ ❑

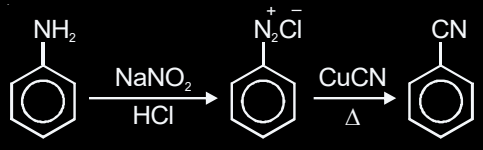
Chapter 27

Amines

1. Answer (4)



2. Answer (3)



3. Answer (2)

$$R-\underset{M}{NH_2}+CH_3COCl \rightarrow \underset{M+42}{RNHCOCH_3}+HCl$$

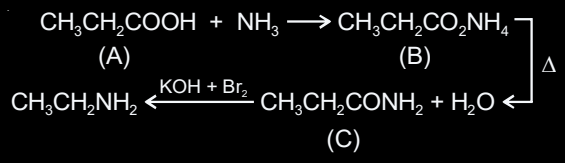
If the increase in molecular mass is 42, the reactant has one NH_2 group.

Actual increase in molecular mass = 390 –180

= 210

Number of NH_2 groups $= \frac{210}{42} = 5$

4. Answer (4)

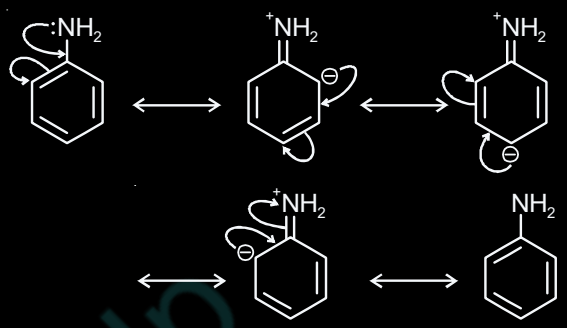


5. Answer (4)

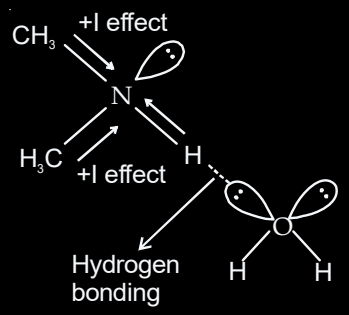
$$R-CH_2-NH_2 \xrightarrow[C_2H_5OH]{CHCl_3/KOH} R-CH_2-NC$$

6. Answer (1)

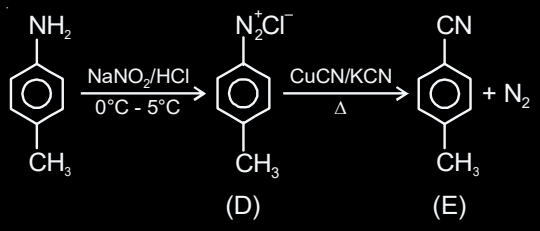
Among $C_6H_5NH_2$, CH_3NH_2, $(CH_3)_2NH$, $(CH_3)_3N \cdot C_6H_5NH_2$ is least basic due to resonance.



Out of $(CH_3)_3N$, CH_3NH_2, $(CH_3)_2NH$. $(CH_3)_2NH$ is most basic due to +I effect and hydrogen bonding in H_2O.



7. Answer (3)



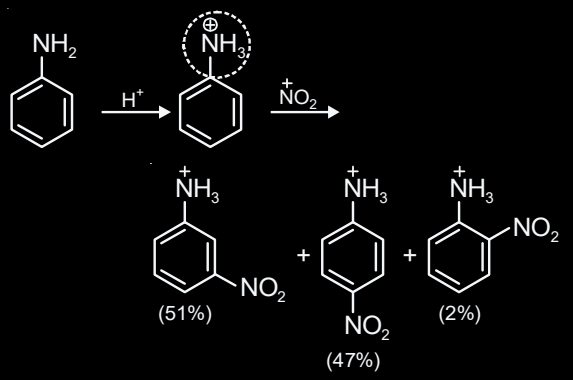
8. Answer (3)

$$R-\underset{\underset{O}{\|}}{C}-NH_2 + Br_2 + 4NaOH \longrightarrow$$

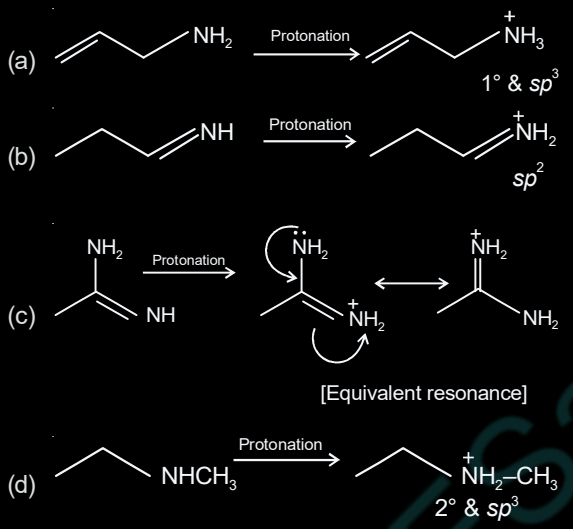
$$RNH_2 + Na_2CO_3 + 2NaBr + 2H_2O$$

From the reaction it can easily be said 4 moles of NaOH and 1 mole of Br_2 is used in this reaction.

9. Answer (1)

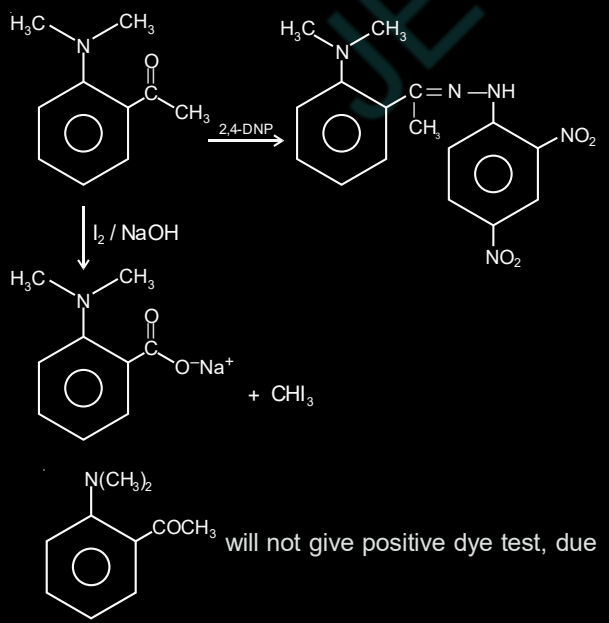


10. Answer (3)



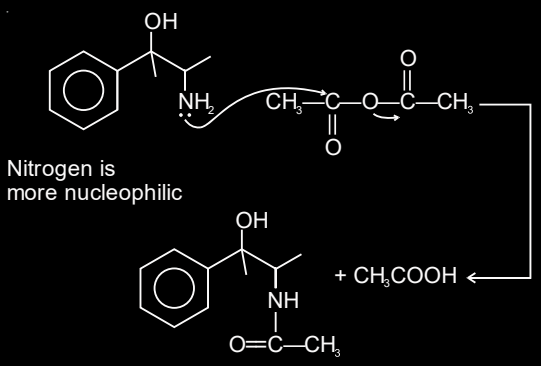
∴ Correct order of basicity : b < a < d < c

11. Answer (1)

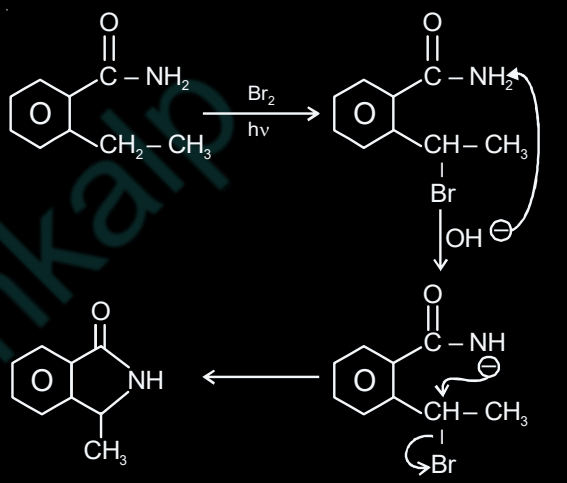


will not give positive dye test, due to the presence of an electron withdrawing group.

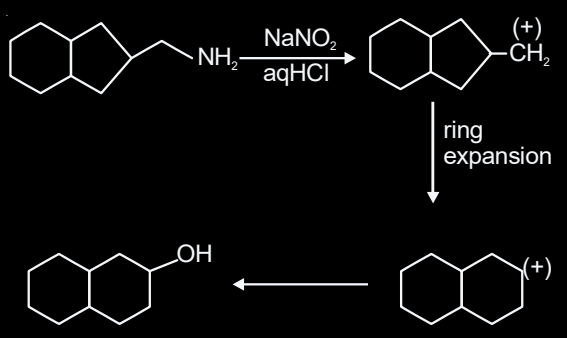
12. Answer (4)



13. Answer (1)



14. Answer (4)



15. Answer (4)

Asn ⇒ $NH_2 - \underset{\underset{O}{\|}}{C} - CH_2 - \underset{\underset{NH_2}{|}}{\overset{\overset{H}{|}}{C}} - COOH$

Ser ⇒ $HO-CH_2-\underset{\underset{NH_2}{|}}{\overset{\overset{H}{|}}{C}}-COOH$

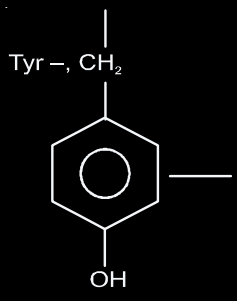
Asn – Ser

⇒ $NH_2-\underset{\underset{O}{||}}{C}-CH_2-\underset{\underset{NH_2}{|}}{\overset{\overset{H}{|}}{C}}-\underset{\underset{O}{||}}{C}-N-\underset{\underset{COOH}{|}}{C}-CH_2-OH$

$\downarrow$ Excess$(CH_3CO)_2O$

$NH_2-\underset{\underset{O}{||}}{\overset{\overset{H}{|}}{C}}-CH_2-\underset{\underset{CH_3CONH}{|}}{\overset{\overset{H}{|}}{C}}-\underset{\underset{O}{||}}{C}-NH-\underset{\underset{COOH}{|}}{\overset{\overset{H}{|}}{C}}-CH_2-O-CO-CH_3$

16. Answer (1)

(P) 

Phthalein dye test (C)

(Q) AsP – $-CH_2-COOH$ – Ester test (A)

(R) Ser – $-CH_2-OH$ – Ester test (A)

(S) Lys – $-(CH_2)_4-NH_2$ – Carbylamine test (B)

17. Answer (1)

C_3H_9N gives carbylamine test.

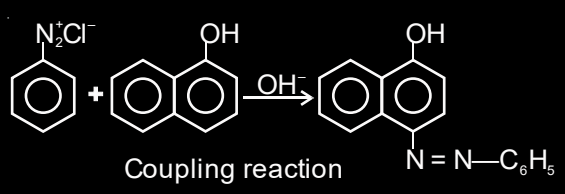
$\therefore$ C_3H_9N is primary aliphatic amine.

$X + Br_2 + NaOH \longrightarrow \underset{\text{(Primary amine)}}{C_3H_9N}$

$\therefore$ X is acid amide having formula

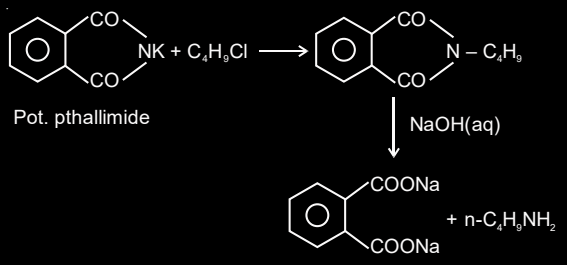
$CH_3-CH_2-CH_2-\overset{\overset{O}{||}}{C}-NH_2$

18. Answer (3)



19. Answer (2)

Primary amines are prepared by Gabriel pthallimide synthesis.



20. Answer (4)

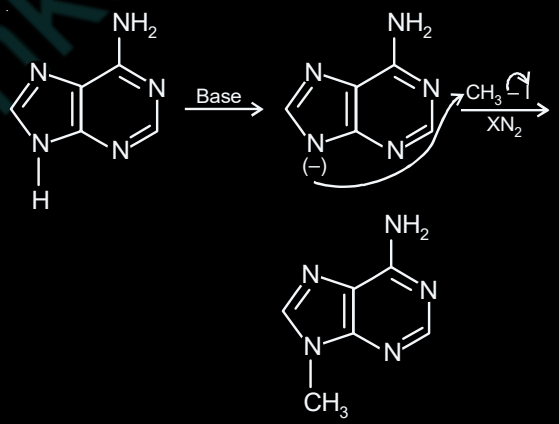
Correct order of K_b value

$(C_2H_5)_2\ddot{N} > (C_2H_5)_3N > NH_3$

In aqueous medium sec. amines are most basic.

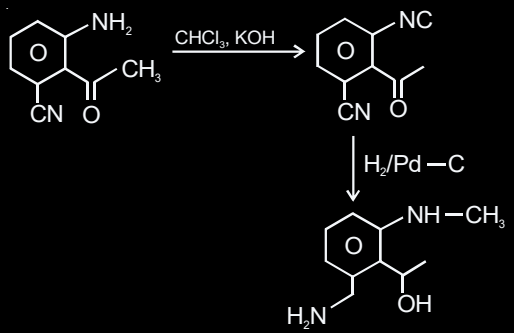
3°amines are more basic than NH_3 as +I factor dominate over steric factor.

21. Answer (4)



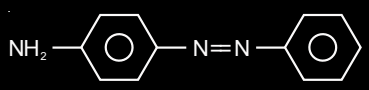
In the given compound, H-atom attached to secondary N-atom is more acidic. The base removes the more acidic H-atom and the conjugate base of the given compound attacks at CH_3 group to give the final product shown above.

22. Answer (1)



23. Answer (2)

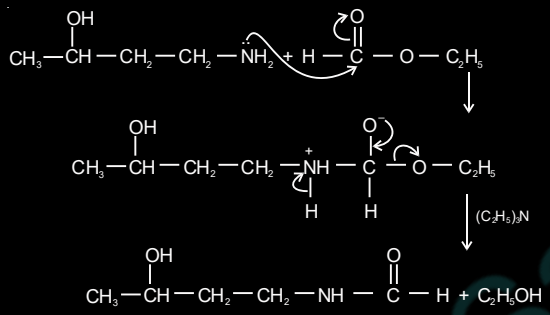
In acidic medium aniline is more reactive than phenol that's why electrophilic aromatic substitution of $Ph—\overset{+}{N}_2$ takes place with aniline



24. Answer (1)

Hinsberg's reagent is benzenesulphonyl chloride.

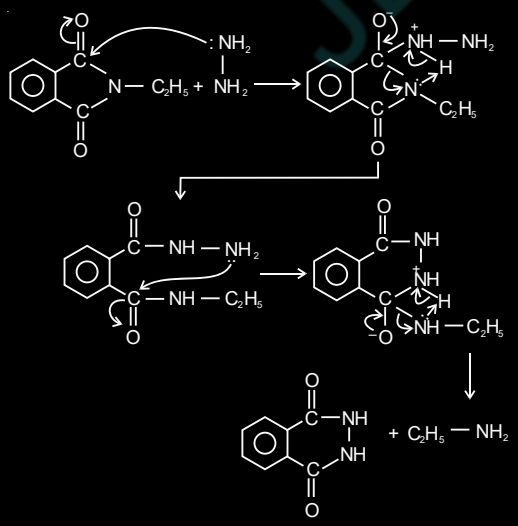
25. Answer (4)



The acylation of NH_2 group takes place and not of OH group due to lower electronegativity of N-atom.

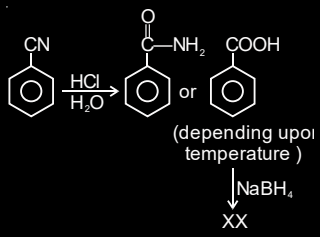
26. Answer (1)

N-ethyl phthalimide on treatment with $NH_2—NH_2$ gives ethylamine.

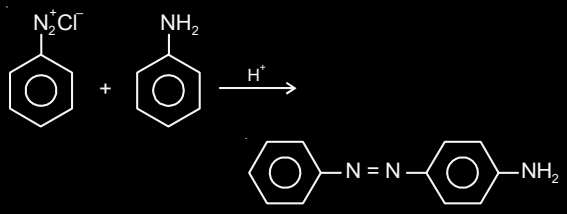


Note: In place of NH_2NH_2, H_2O can also be used in presence of H^+ or OH^- as a catalyst.

27. Answer (4)



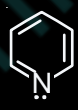
28. Answer (3)



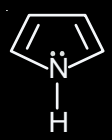
p-aminoazobenzene

29. Answer (3)

most basic

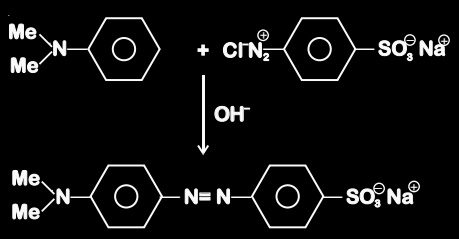


lone pair is not involved in resonance but N atom is sp^2 hybridsed.



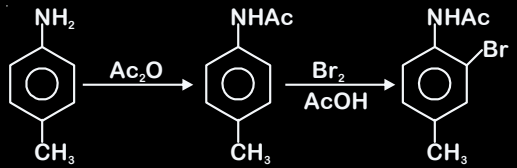
lone pair of nitrogen is involved in aromaticity.

30. Answer (1)

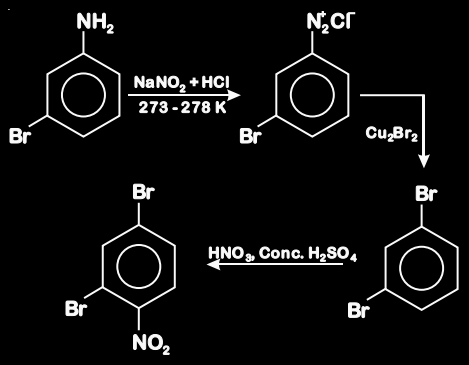


Formed product is methyl orange and it is used as an indicator in acid base titrations.

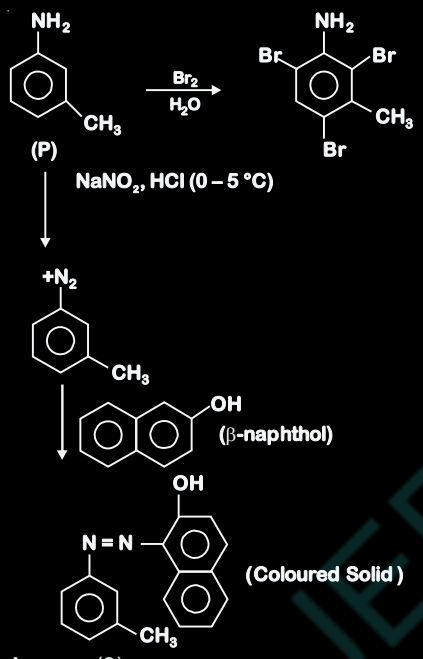
31. Answer (2)



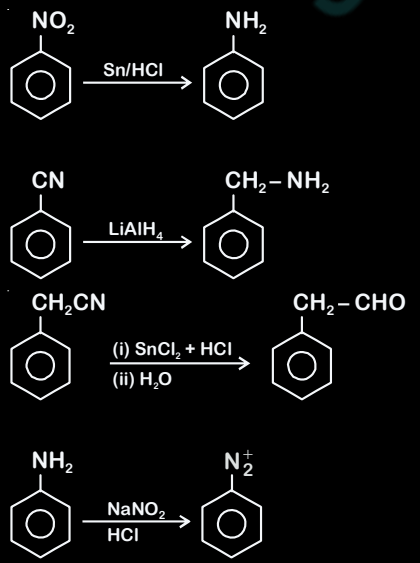
32. Answer (3)



33. Answer (4)

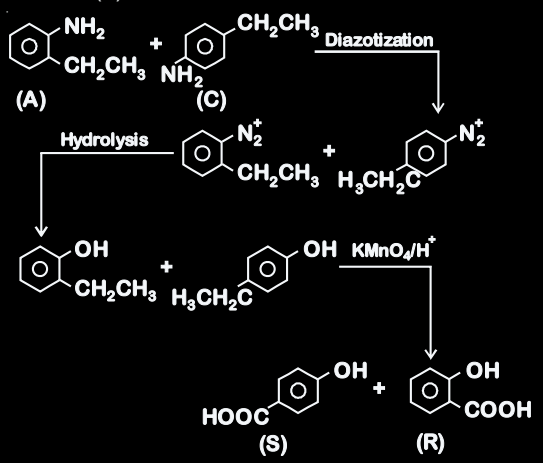


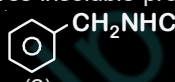
34. Answer (3)



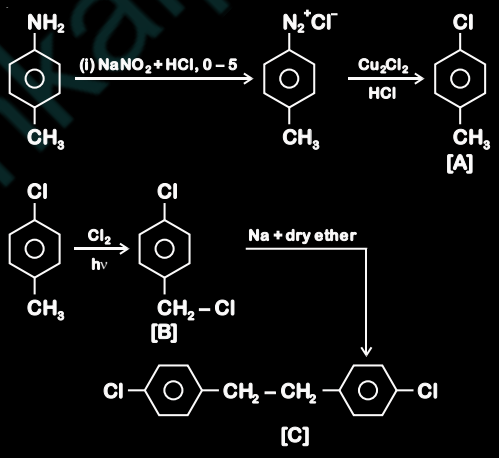
Nitro and diazo compounds do not give Kjeldahl estimation of Nitrogen.

35. Answer (4)



(B) gives insoluble product with $C_6H_5SO_2Cl$. Hence (B) is 

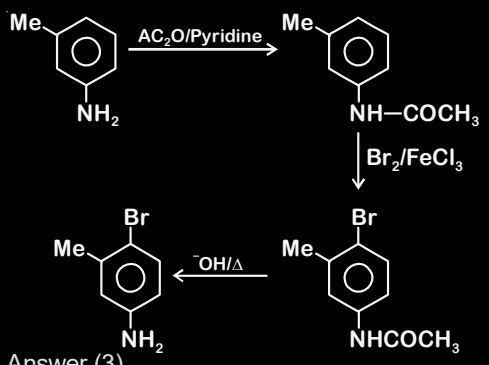
36. Answer (2)



37. Answer (4)

$C_2H_5CN \xrightarrow{LiAlH_4} C_2H_5CH_2NH_2$

38. Answer (2)



39. Answer (3)

Gabriel phthalimide synthesis gives 1° amine in good yield.

40. Answer (2)

Lucas reagent – Conc. $HCl/ZnCl_2$

Dumas method – CuO/CO_2

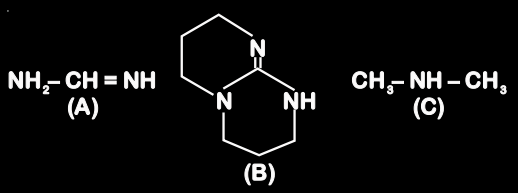
Kjeldahl's method – H_2SO_4

Hinsberg test – $C_6H_5SO_2Cl$/aq. KOH

41. Answer (2)

$pK_b = -\log K_b$

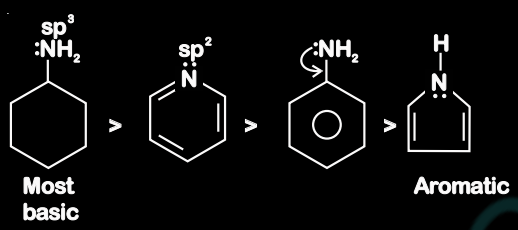
So, as K_b increases, pK_b decreases



K_b : (B) > (A) > (C)

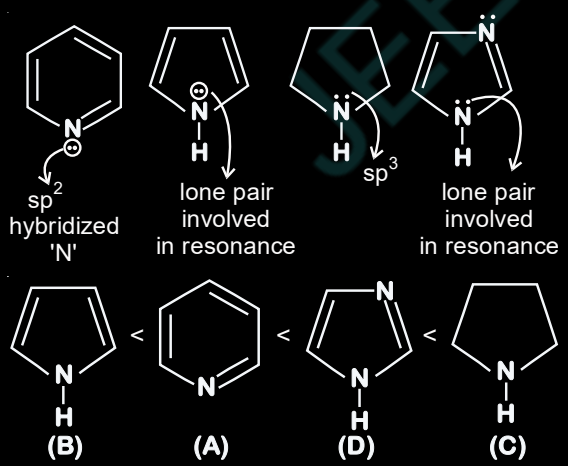
pK_b : (B) < (A) < (C)

42. Answer (4)

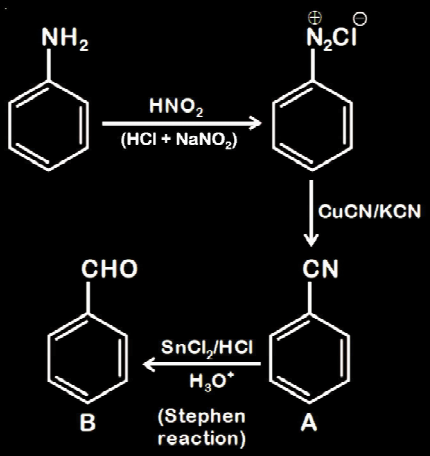


∴ Correct order : III > II > I > IV

43. Answer (1)

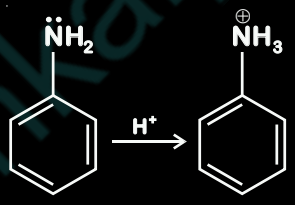


44. Answer (2)



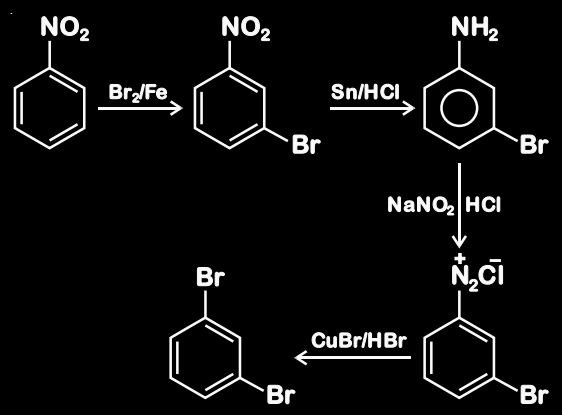
45. Answer (1)

Aniline itself is strong ortho/para director but on addition of acid it becomes anilinium ion which is a meta director.

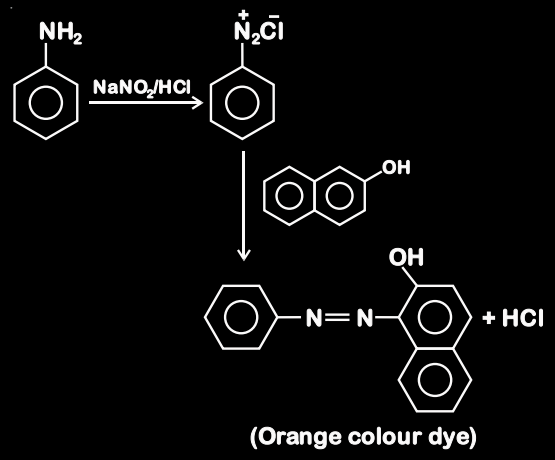


So the answer should be 1.

46. Answer (4)



47. Answer (3)



(Orange colour dye)

48. Answer (2)

(a) $R-\overset{O}{\overset{\|}{C}}-Cl \xrightarrow[BaSO_4]{H_2/Pd} R-CHO$ (Rosenmund's reduction)

(b) $R-CH_2COOH \xrightarrow{Cl_2/Red\ P, H_2O} R-\underset{Cl}{\underset{|}{CH}}-COOH$

(Hell-volhard-zelinsky reaction)

(c) $R-\overset{O}{\overset{\|}{C}}-NH_2 \xrightarrow{Br_2/NaOH} R-NH_2$ (Hoffmann bromamide)

(d) $R-\overset{O}{\overset{\|}{C}}-CH_3 \xrightarrow[Con\,HCl]{Zn(Hg)} R-CH_2CH_3$

(Clemmensen reduction)

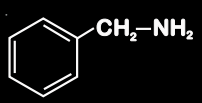
49. Answer (3)

Only aliphatic primary amines can be synthesised by Gabriel phthalimide synthesis.

Out of the given amines the following amines can be synthesised by Gabriel synthesis.

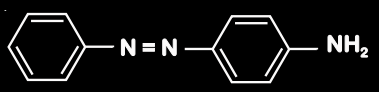
(1) $\begin{matrix}CH_3\\CH_3\end{matrix}\!\!>\!CH-CH_2-NH_2$

(2) $CH_3CH_2NH_2$

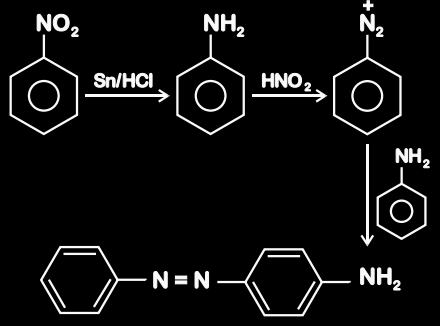
(3) 

50. Answer (2)

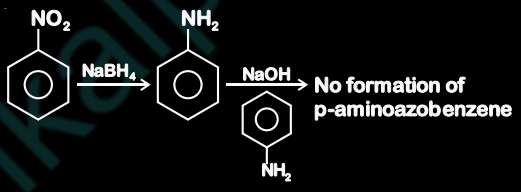
p-aminoazobenzene



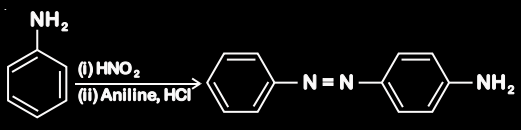
(A)



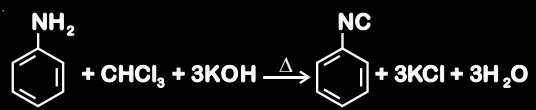
(B)



(C)



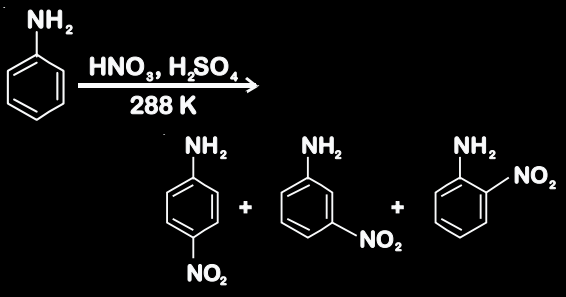
51. Answer (4)



aniline

52. Answer (3)

A will be the major product.



(51)% A (47%) B (2%) C

In strongly acidic medium aniline is protonated to

form anilinium ion which is a meta directing. That is why besides the ortho para derivatives, significant amount of meta derivatives is also formed.

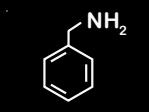
53. Answer (1)

Given amine on reaction with $PhSO_2Cl$ produces a compound insoluble in alkaline solution it means it is a 2° amine.

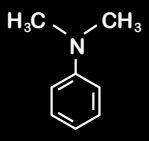
$\because$ It is prepared by ammonolysis of C_2H_5Cl, it must contain an ethyl group

$CH_3CH_2CH_2\underset{\underset{H}{|}}{N}-CH_2CH_3$ is a 2° amine as well as it contain ethyl group.

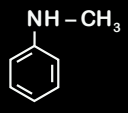
54. Answer (4)



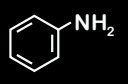
(A) Phenyl methanamine $pK_b = 4.7$



(B) N, N-Dimethylaniline $pK_b = 8.92$



(C) N-Methyl aniline $pK_b = 9.3$



(D) Benzenamine $pK_b = 9.38$

$$pK_b \propto \frac{1}{\text{Basicity}}$$

(A) > (B) > (C) > (D)

55. Answer (4)

Ceric ammonium nitrate is used for the identification of alcohol.

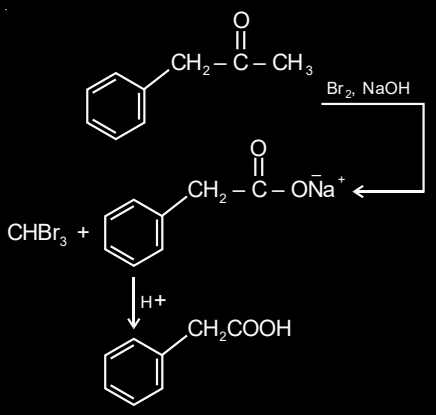
$$2R-OH + (NH_4)_2Ce(NO_3)_6 \longrightarrow \underset{\substack{\text{Alkoxy cerium (IV)}\\ \text{Compound}\\ \text{(Pink or Red colour)}}}{(ROH)_2Ce(NO_3)_4} + 2NH_4NO_3$$

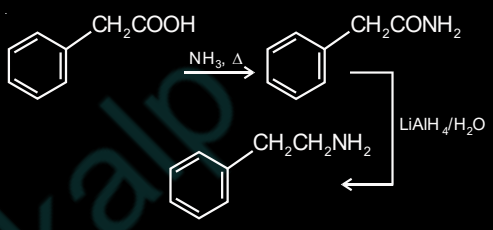
$CHCl_3$/KOH is used for the identification of primary amines.

$$R-NH_2 + CHCl_3 + 3KOH(alc) \xrightarrow{\text{warm}}$$

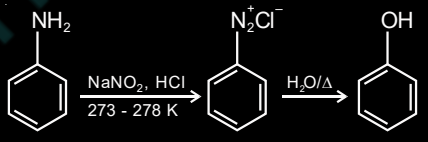
$$R-NC + 3KCl + 3H_2O$$

56. Answer (1)



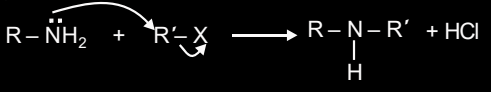


57. Answer (3)



58. Answer (3)

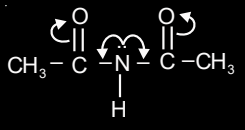
With each substitution reaction, acidic concentration increases in reaction mixture



So to remove acidic impurities , NaOH is added.

59. Answer (2)

Basic strength $\propto$ availability of lone pair.



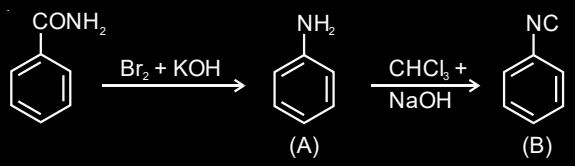
In this case lone pair of $\ddot{N}$ is highly participating in resonance.

60. Answer (1)

Ammonolysis of alkyl halides is the reaction of alkyl halide with NH_3 which leads to the preparation of amines.

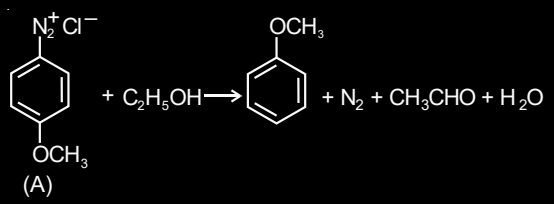
$$C_6H_5CH_2Cl + NH_3 \longrightarrow C_6H_5CH_2NH_2$$

61. Answer (2)



Hoffmann bromamide degradation of benzamide gives aniline (A) which upon heating with $CHCl_3$ and NaOH gives phenyl isocyanide (B).

62. Answer (2)



C_2H_5OH behaves as mild reducing agent and itself gets oxidised to ethanal.

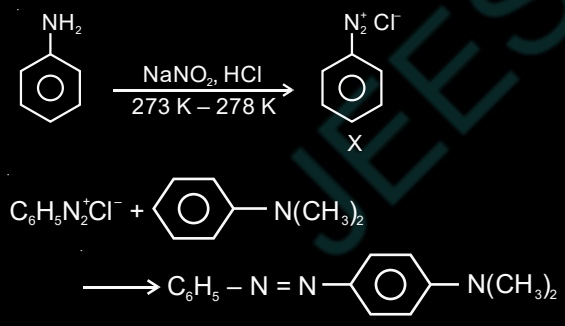
63. Answer (1)

Hinsberg test is used to distinguish 1°, 2° and 3° amines.

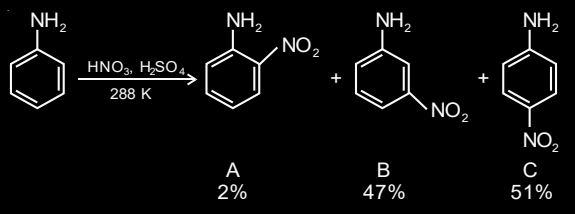
Reagent used is ($PhSO_2Cl$).

So, para-toluene sulphonyl chloride can be used.

64. Answer (3)

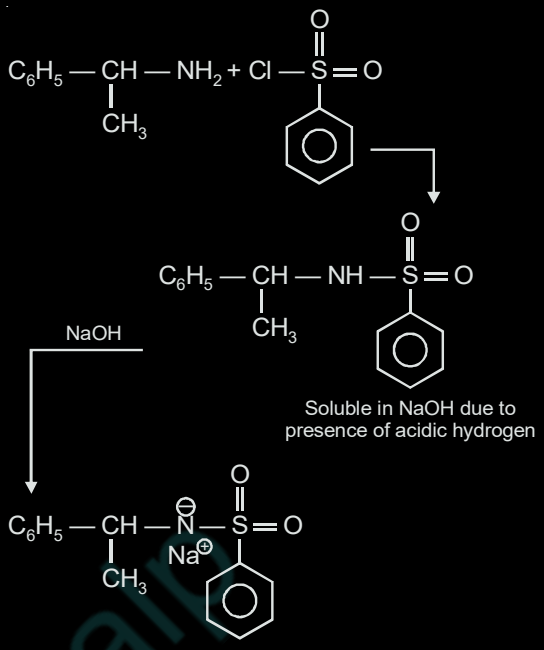


65. Answer (1)

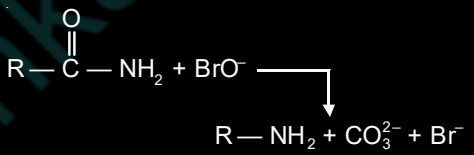


In strongly acidic medium aniline is protonated to form anilinium ion making it m-directing but p-derivative is also formed in significant amount which is a major product.

66. Answer (3)

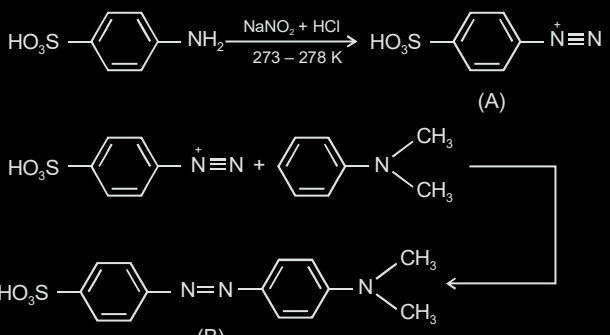


67. Answer (1)

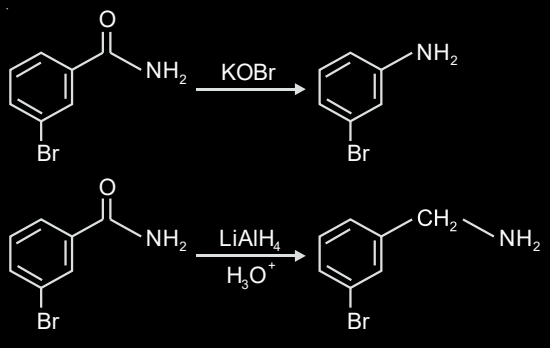


Carbonyl carbon is lost as CO_3^{2-}.

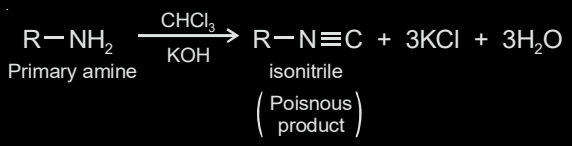
68. Answer (1)



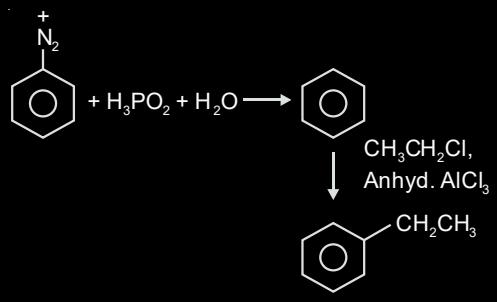
69. Answer (4)



70. Answer (3)



71. Answer (3)



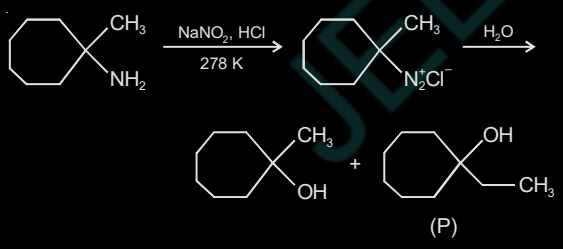
72. Answer (2)

Aniline does not give Friedel craft reactions

73. Answer (2)

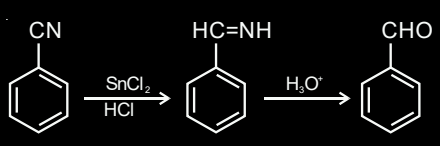
Gabriel phthalimide synthesis cannot be used to prepare aromatic primary amines because aryl halides do not undergo nucleophilic substitution with the anion formed by phthalimide.

74. Answer (4)

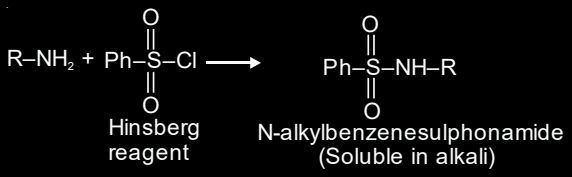


In this reaction major product (P) is a tertiary alcohol formed due to rearrangement of carbocation. But option (4) is one of the products formed though it is not the major product.

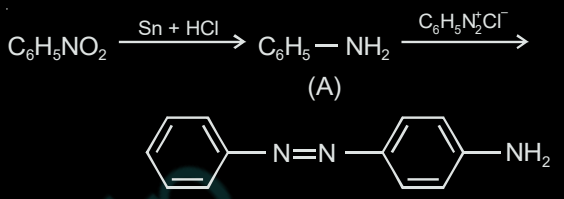
75. Answer (2)



Rest of the reactions give amine group containing product. So, they can react with Hinsberg reagent

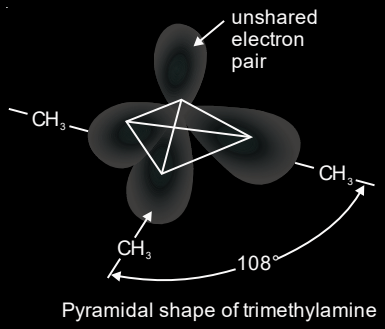


76. Answer (3)



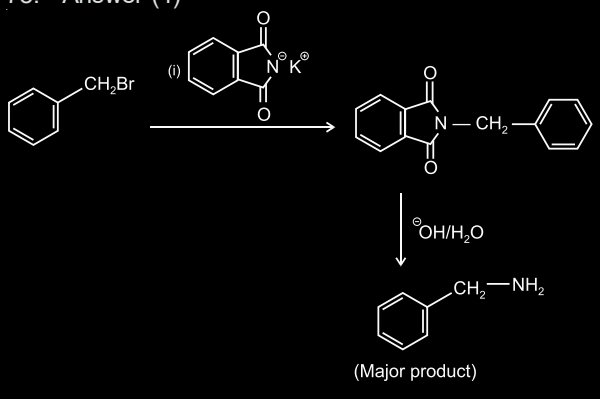
Diazonium cation attacks at the para position of aniline to form azo compound.

77. Answer (108)

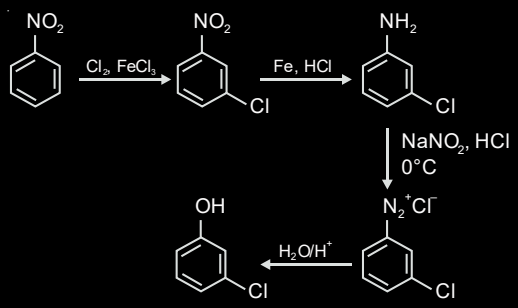


Pyramidal shape of trimethylamine

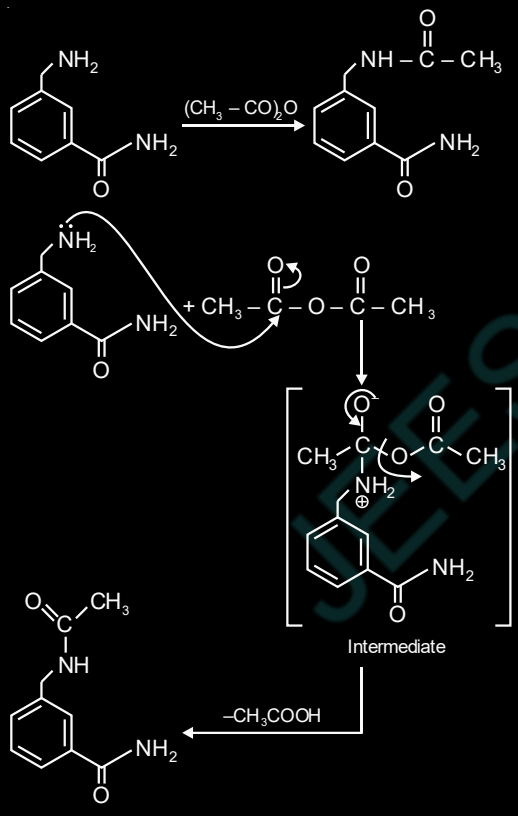
78. Answer (4)



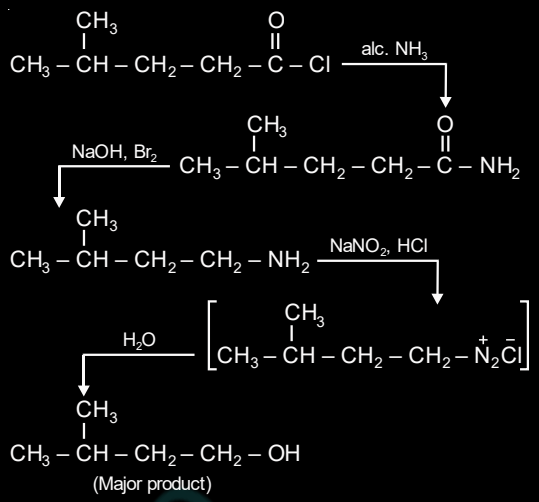
79. Answer (4)



80. Answer (1)



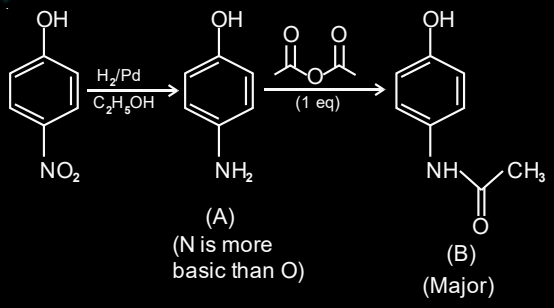
81. Answer (1)



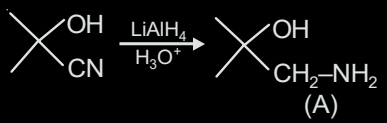
82. Answer (2)

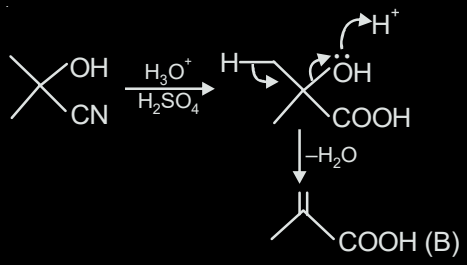
Intermolecular association due to H-bonding in primary amines is more than in secondary amines because primary amines have more number of H-atoms bonded to N-atom.

83. Answer (4)

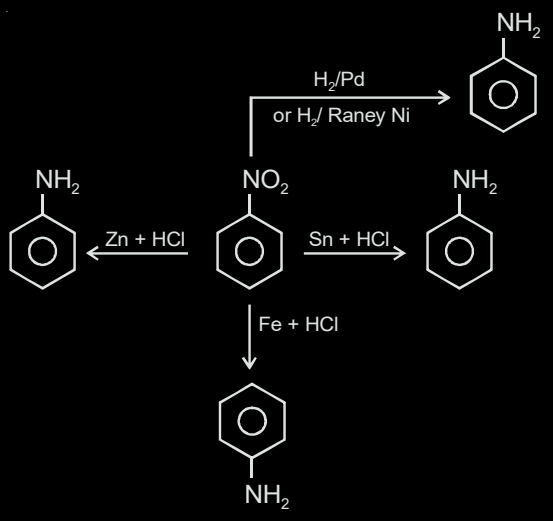


84. Answer (3)

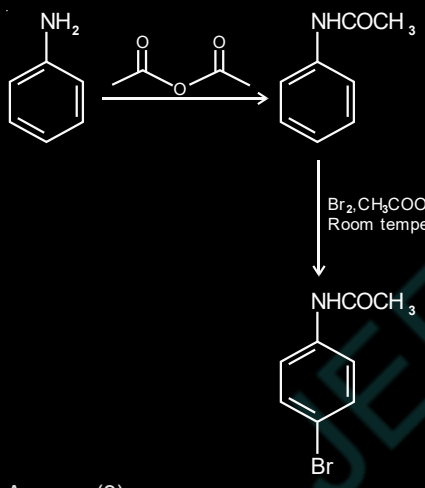




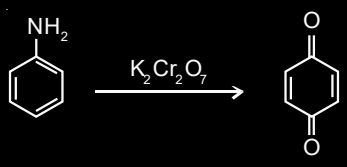
85. Answer (5)



86. Answer (2)



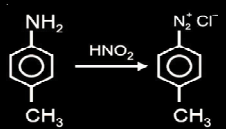
87. Answer (3)



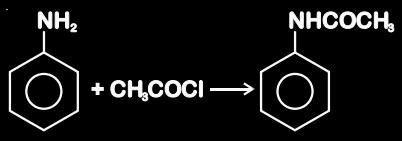
$K_2Cr_2O_7$ is oxidizing agent.

88. Answer (2)

1° aromatic amines give the most stable diazonium salt



89. Answer (243)



No. of moles of aniline = $\frac{1.86}{93} = 0.02$

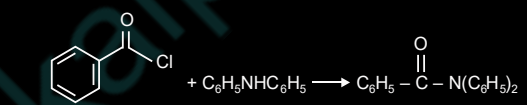
Moles of acetanilide formed = 0.9×0.02

$= 0.018$

Mass of acetanilide formed (ing)

$= 0.018 \times 135 = 243 \times 10^{-2}$

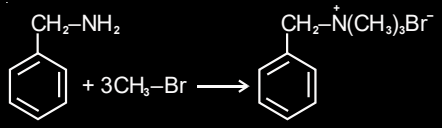
90. Answer (77)



Mass	0.140 g	0.388 g	0.210 g (Observed yield)
Moles	$\approx 10^{-3}$ (Limiting Reagent)	2.3×10^{-3}	Theoretical yield $= 10^{-3} \times 273$ $= 0.273$ g

$\therefore$ % yield = $\frac{0.210}{0.273} \times 100 \approx 77\%$

91. Answer (03)



Number of moles of benzyl trimethyl ammonium bromide formed = $\frac{23}{230} = 0.1$

$\therefore$ No. of moles of bromomethane consumed

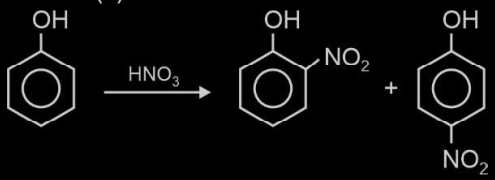
$= 3 \times 0.1$

$= 3 \times 10^{-1}$

92. Answer (2)

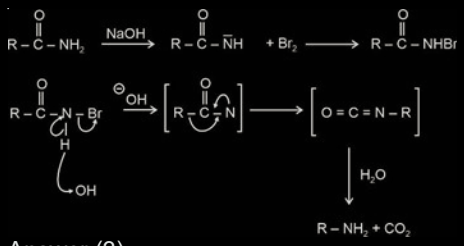
$(CH_3)_3\overset{\oplus}{N}H\overset{\ominus}{Cl}$ } contains strong conjugate acid

93. Answer (3)

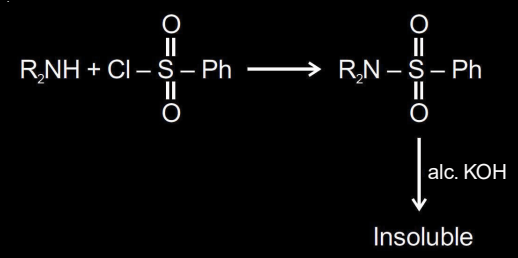


o-Nitrophenol and p-Nitrophenol can be easily separated by steam distillation.

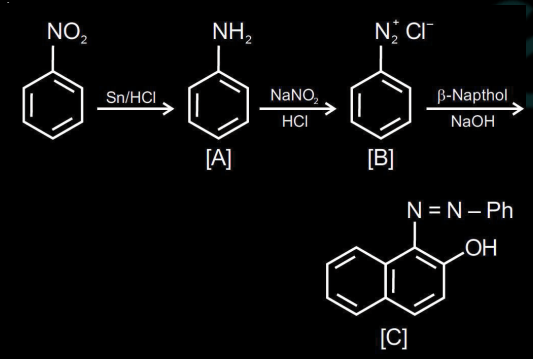
94. Answer (3)



95. Answer (3)



96. Answer (3)



97. Answer (4)

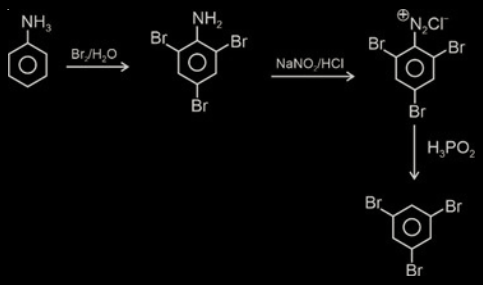
Hofmann bromamide degradation

In this degradation, the migration of the alkyl/aryl group occurs to the electron deficient nitrogen (nitrene).

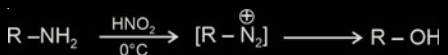
Statement (I) is not absolutely correct as it mentions only the alkyl group, whereas migration of aryl groups may also occur depending on migratory aptitude.

Statement (II) is correct as migration occurs to electron deficient atom.

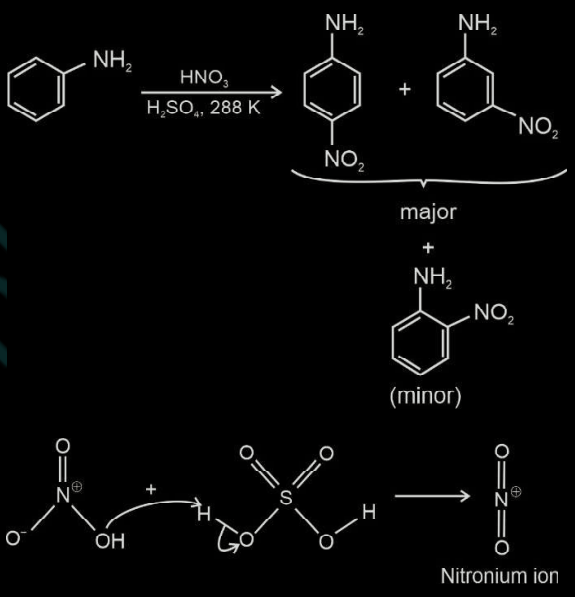
98. Answer (3)



99. Answer (2)

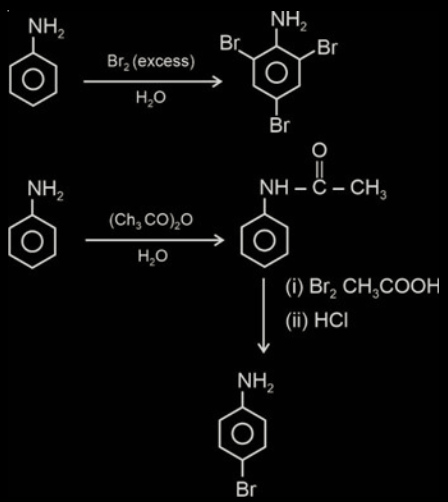


100. Answer (3)

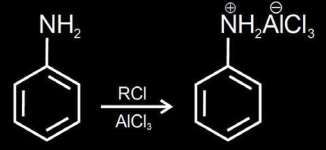


Hence H_2SO_4 acts as an acid

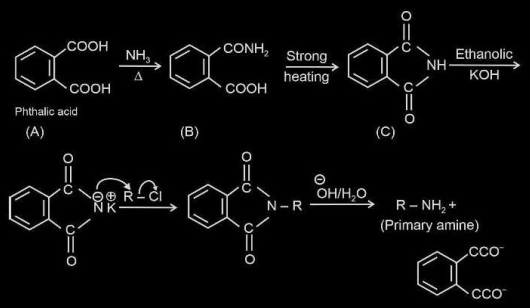
101. Answer (3)



102. Answer (4)

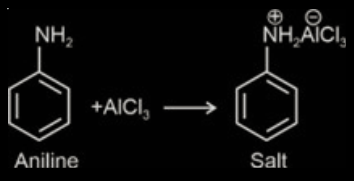


103. Answer (3)



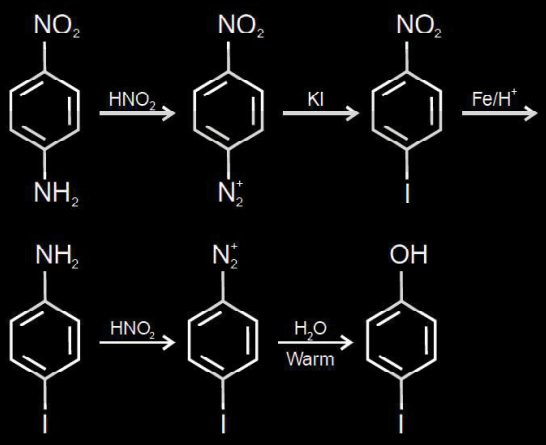
All the given reactions can be explained if organic compound (1) is phthalic acid.

104. Answer (3)



Aniline does not undergo Friedel Craft reaction because the reagent $AlCl_3$ being electron deficient acts as a Lewis acid.

105. Answer (2)



(A) Benzene sulphonyl chloride is also known as Hinsberg reagent.

(B) Hoffmann bromamide reaction involves conversion of amide to amine having one C-atom less. This reaction involves isocyanate as intermediate.

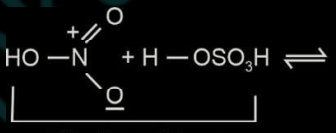
(C) Carbylamine reaction is a test given by all primary amines.

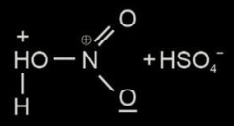
(D) Hoffmann orientation refers to the addition of molecules to unsymmetrical alkenes according to anti Saytzeff's rule.

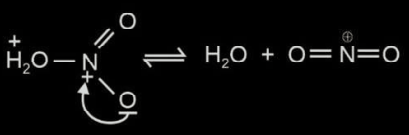
Correct match is

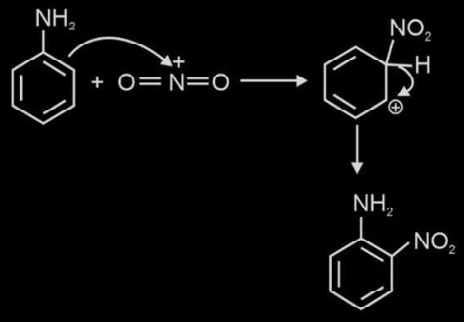
A – III; B – IV; C – I; D – II

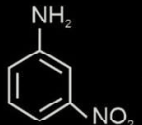
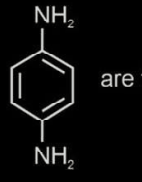
107. Answer (1)







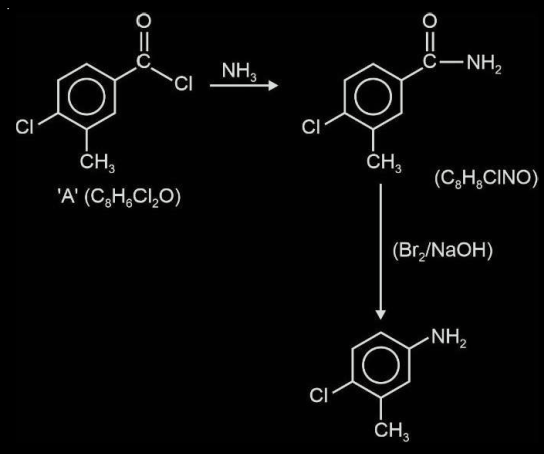


Similarly  and  are formed

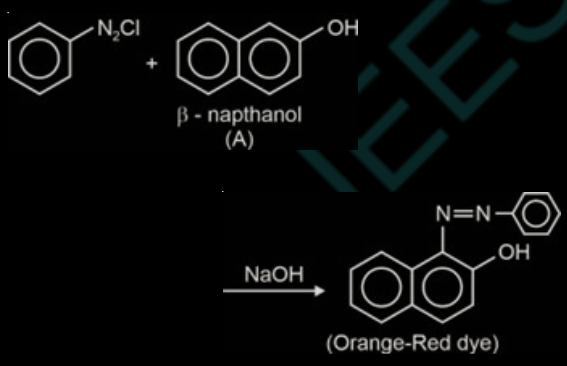
108. Answer (4)

is the strongest base among the given compounds due to the maximum +I effect and the lone pair of N is not in dynamic state so it can be donated easily.

109. Answer (3)

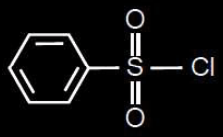


110. Answer (1)



111. Answer (1)

Hinsberg reagent is :

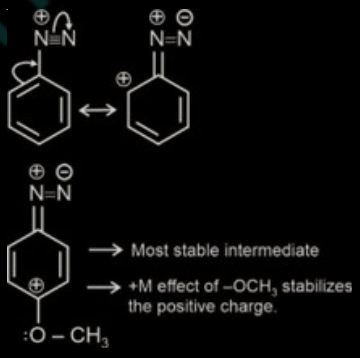


112. Answer (3)

The most appropriate option is (3) as one group is far enough from –COOH group.

113. Answer (2)

Diazonium salt containing aryl group directly linked to electron donating group is most stable due to resonance. The +M effect stabilizes the intermediate whereas Electron withdrawing group on benzene destabilizes the intermediate at para position.



Order will be A > C > D > B.

❑ ❑ ❑