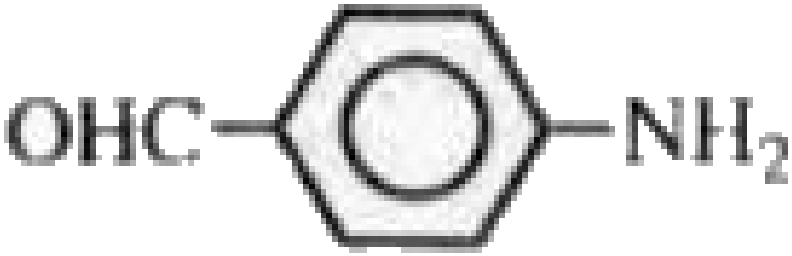
CHEMISTRY

JEE (MAIN AND ADVANCED) CHEMISTRY

AMINES AND DIAZONIUM SLATS

Problems

1. Write the IUPAC names of the following :



(a)

(b) $(CH_3)_3CNH_2$

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2. Write the structure of eight isomeric amines with the formula $C_{14}H_{11}N$.

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3. Classification of aliphatic amines and alcohols is different. Comment

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4. Give the structures and names of various amines with the formula C_7H_9N

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5. Arrange the following in the decreasing order of basic strength: $CH_3CH_2CH_2NH_2, CH_2=CH-CH_2NH_2$ and $CH\equiv -CH_2NH_2$

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6. Which is more basic among benzyl amine and aniline?

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7. Arrange the following in the decreasing order of basic strength:

(a) $C_2H_5NH_2, C_6H_5NHCH_3, (C_2H_5)_2NH$ and $C_6H_5NH_2$

(b) $C_2H_5NH_2, (C_2H_5)_2NH$ and $(C_2H_5)_3N$

(c) $(C_2H_5)_2NH, C_6H_5NH_2, C_2H_5NH_2$ and NH_3

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8. How is aliphatic primary amine distinguished from aromatic primary amine?

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9. How a mixture of nitrobenzene and aniline can be separated?

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10. How is toluene converted to phenyl ethanamine?

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11. Arrange the following in the order of boiling points: (A) n-Butyl amine, (B) Secondary butyl amine, (C) Isobutyl amine and (D) Tertiary butyl amine

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12. How is benzoic acid converted to aniline and benzylamine?

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13. How is aniline converted to benzyl alcohol?

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14. Why aniline does not undergo Friedel - Crafts reaction ?

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15. How do you convert aniline to parabromo aniline.

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16. What is the product of the reaction: $C_6H_5N = NCl \xrightarrow{\text{Phenol}}$?

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17. $C_6H_5N_2Cl \xrightarrow[KCN]{CuCN} A \xrightarrow[H^+]{H_2O} B \xrightarrow[\Delta]{NH_3} C \xrightarrow[NaOH]{Br_2} D$. Identify the final product, D.

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18. How is nitrobenzene converted to benzoic acid?

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19. Write chemical equations for the following reactions :

Ammonolysis of benzyl chloride and reaction of amine so formed with two moles of CH_3Cl.

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20. How benzyl chloride can be converted to 2-phenylethanamine?

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21. Write structures and IUPAC names of

the amide which gives propanamine by Hoffmann bromamide recation.

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Subjective Exercise 1 Long Answer Questions

1. How is aniline prepared from nitrobenzene? Discuss the properties of aniline

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2. How are (a) C_6H_5COOH (b) C_6H_5OH and (c) C_6H_5Cl converted to aniline?

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3. Describe a method for the identification of primary, secondary and tertiary amines. Also write chemical equations of the reactions involved

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Subjective Exercise 1 Short Answer Questions

1. What happends when aniline is treated with $NaNO_2$ and HCl at $0^\circ C$?

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2. Write short notes on carbylamine reaction

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3. How primary amines are distinguished from secondary and tertiary amines?

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4. Write short notes on (i) Hoffmann bromamide reaction (ii) Gabriel phthalimide synthesis and (iii) Ammonolysis

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5. Discuss the mechanism of acetylation of aniline

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Subjective Exercise 1 Very Short Answer Questions

1. How do you convert C_6H_5Cl and C_6H_5OH to aniline?

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2. Give any two physical porperties of Aniline

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3. Give equation for diazotisation reaction? Give the examples

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4. Give one example each for primary, secondary. tertiary amine?

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5. i) Write the IUPAC names of CH_3NH_2.

$(CH_3)_2NH$, $(CH_3)_3N$

ii) $CH_3 - NH - CH_3$ and

$CH_3CH_2 - \underset{\underset{N}{|}}{N} - CH_3$.

Which is tertiary amine? Why?

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6. Write the important uses of aniline

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Subjective Exercise 2 Long Answer Questions

1. How is benzene diazonium chloride prepared ? What are its properties?

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Subjective Exercise 2 Short Answer Questions

1. Write short notes on coupling reactions giving azo-dyes

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2. Discuss the Sandmeyer and Gatterman reactions.

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3. How the following are obtained from benzene diazonium chloride?

(a) Iodobenzene, (b) Chlorobenzene, (c) Phenyl hydrazine and (d) Nitrobenzene

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4. Explain the following:

a) why the boiling points of primary amines are higher than those of the corresponding tertiary amines of similar molar mass.

b) why aromatic amines are lesser basic than aliphatic amines ?

c) why alcohols are more acidic than amines of comparable molar mass?

d) Gabriel phthalimide synthesis is not useful in the preparation of aromatic primary amines?

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5. How the following pairs of compounds are distinguished ?

a) Secondary and tertiary amines

b) Aniline and benzylamine

c) Methyl amine and dimethylamine

d) Methylamine and dimethylamine

e) Aniline and ethylamine

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6. An aromatic compound 'A' on treatment with aqueous ammonia and heating forms compound B which on heating with Br_2 and KOH forms compound 'C' of molecular formula C_6H_7N. Write the structures and IUPAC names of compounds A, B and C.

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7. Write the structures of different isomers corresponding to the molecular formula C_3H_9N. Write IUPAC names of the isomers which will liberate nitrogen gas on treatment with nitrous acid.

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Conversions

1. Ethanamine to methanamine

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2. Methanamine to ethanamine

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3. Ethanoic acid to aminomethane

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4. Pentyl cyanide to 1-aminopentane

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5. Nitromethane to N-methylmethanamine

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6. Benzoic acid to aniline

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7. Accomplish the following conversions.

i) Benzoic acid to benzamide ii) Aniline to P - bromoaniline.

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8. Aniline to benzyl alcohol

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9. Benzamide to toluene

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10. Benzylchloride to 2-phenulethanamine

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11. Aniline to sym-tribromofluorobenzene

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12. Chlorobenzene to p-chloroaniline

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13. Ethylchloride to propanamine-1

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14. Ethyl chloride is

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15. How will you convert

benzene into N, N-dimethlaniline ?

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16. 1,4-Dichlorobutane to hexane-1,6- diamine

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17. Benzene to p-nitrobenzaldehyde

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18. Benzoic acid to m-nitrobenzylalcohol

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19. Write the structure of the major organic product in each of the following reactions :

$$\xrightarrow[\text{deg radation}]{\text{Hoffmann}} \text{Propanamine}$$

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20. Write the structure of the major organic product in each of the following reactions :

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21. Write the structure of the major organic product in each of the following reactions :

$C_6H_5 \xrightarrow{CH_3COCl}$

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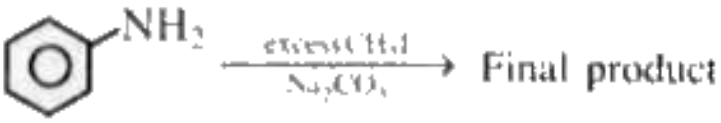
22. Write the structure of the major organic product in each of the following reactions :



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23. Write the structure of the major organic product in each of the following reactions :

$(C_2H_5)_3N + Hcl \rightarrow$

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24. Write the structure of the major organic product in each of the following reactions :

$C_6H_5N_2^+Cl^- \xrightarrow{CuCN} \xrightarrow{(H_2O)/H^+} \xrightarrow{(NH_3)/\triangle}$

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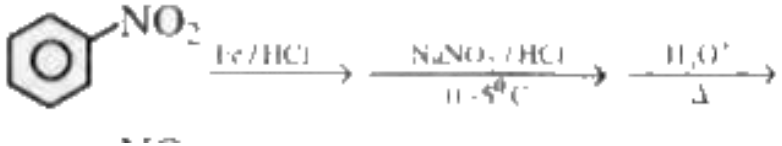
25. Write the structure of the major organic product in each of the following reactions :



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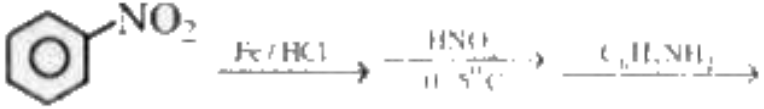
26. Write the structure of the major organic product in each of the following reactions :



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27. Write the structure of the major organic product in each of the following reactions :

$$CH_3CH_2I \xrightarrow{KCN} \xrightarrow[\text{Partial hydrolysis}]{OH^-} \xrightarrow[Br_2]{NaOH}$$

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28. Write the structure of the major organic product in each of the following reactions :

$$CH_3CH_2Br \xrightarrow{NaCN} \xrightarrow{LiAlH_4} \xrightarrow[-05^\circ C]{HNO_2}$$

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29. Write the structure of the major organic product in each of the following reactions :

$$\underset{\text{(Acetic acid)}}{CH_3COOH} \xrightarrow[\Delta]{NH_3} CH_3CONH_2 \xrightarrow{NaOBr} CH_3NH_2 \xrightarrow[0^\circ C]{HNO_2} \underset{\text{(Methanol)}}{CH_3OH}$$

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30. Write the structure of the major organic product in each of the following reactions :

$$C_6H_5NH_2 \xrightarrow[H_2O]{Br_2}$$

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31. Write the structure of the major organic product in each of the following reactions :

$$\underset{\text{(Benzene diazonium chloride)}}{C_6H_5N_2Cl} + HBF_4 \rightarrow \underset{\text{Diazonium fluoroborate}}{C_6H_5N_2^+BF_4^-}$$

$$\xrightarrow{NaNO_2/Cu} \underset{\text{(nitrobenzene)}}{C_6H_5NO_2} \rightarrow + N_2 + NaBF_4$$

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32. Write the structure of the major organic product in each of the following reactions :

$$C_6H_5N_2Cl + H_3PO_2 + H_2O \rightarrow$$

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33. Write the structure of the major organic product in each of the following reactions :

$$C_6H_5NH_2 + Ac_2O \rightarrow$$

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34. Name reactions :

Ammonolysis of alkyl halides

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35. Write short notes on (i) Hoffmann bromamide reaction (ii) Gabriel phthalimide synthesis and (iii) Ammonolysis

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36. How are Amines prepared by Hoffmann bromamide degradation method.

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37. Name reactions :

Diazotisation

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38. Explain the following name reactions :

Sandmeyer reaction

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39. Explain the following name reactions :

Gatterman reaction

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40. Name reactions :

Coupling reaction

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41. Name reactions :

Carbylamine reaction.

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42. Hinsberg's reagent is

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43. Name reactions :

Benzene diazonium chloride

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44. Write the structure of the major organic product in each of the following reactions :

$$\underset{\text{(Butanamide)}}{CH_3-CH_2-CH_2-CO-NH_2} \xrightarrow{Br_2.KOH} \underset{\text{(Propanamine)}}{CH_3-CH_2-CH_2-NH_2}$$

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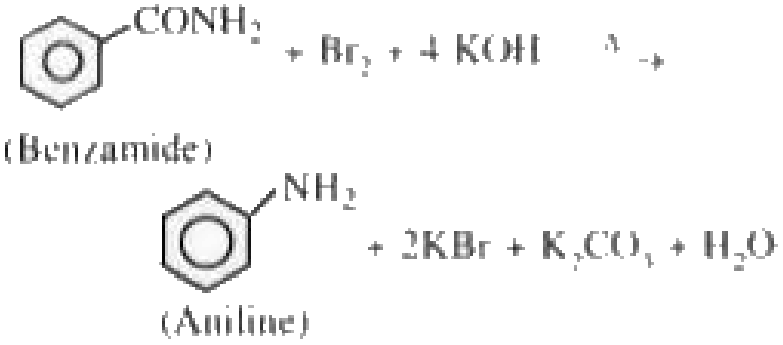
45. Write the structure of the major organic product in each of the following reactions :



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46. Write the structure of the major organic product in each of the following reactions :

$$\underset{\text{(Aniline)}}{C_6H_5NH_2} \xrightarrow{\text{excess } CH_3I} \underset{\substack{\text{Quaternary} \\ \text{ammonium salt}}}{C_6H_5N^+(CH_3)_3I^-}$$

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47. Write the structure of the major organic product in each of the following reactions :

$$(C_2H_5)_3N + Hcl \rightarrow$$

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48. Write the structure of the major organic product in each of the following reactions :

$$\underset{\substack{\text{(Benzenediazonium} \\ \text{chloride)}}}{C_6H_5N_2Cl} \xrightarrow{CuCN} C_6H_5CN \xrightarrow{H_2O/H^+} C_6H_5COOH \xrightarrow[\Delta]{NH_3} \underset{\text{(Benzamide)}}{C_6H_5CONH_2}$$

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49. Write the structure of the major organic product in each of the following reactions :

$$\underset{\text{(nitrobenzene)}}{C_6H_5NO_2} \xrightarrow{Fe\,/\,HCl} C_6H_5NH_2 \xrightarrow[0-5^\circ C]{NaNO_2\,/\,HCl}$$

$$C_6H_5N_2Cl \xrightarrow[\Delta]{H_2O^+} \underset{\text{(Phenol)}}{C_6H_5OH} + N_2 + HCl$$

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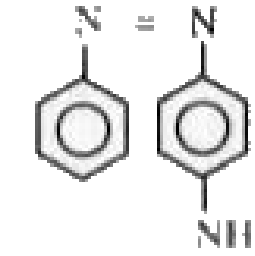
50. Write the structure of the major organic product in each of the following reactions :

$$\underset{\text{(nitrobenzene)}}{C_6H_5NO_2} \xrightarrow{Fe\,/\,HCl} C_6H_5NH_2ovreset(HNO_2) \xrightarrow[0-5^\circ C]{}$$

$C_6H_5N_2Cl \xrightarrow{C_6H_5NH_2}$



p-amino azobenzene
(yellow dye)

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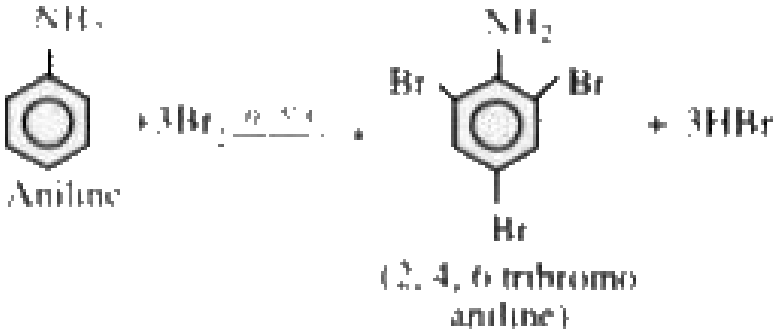

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$$\xrightarrow{NaNO_2/Cu} \underset{\text{(nitrobenzene)}}{C_6H_5NO_2} \rightarrow + N_2 + NaBF_4$$

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56. Write the structure of the major organic product in each of the following reactions :

$C_6H_5N_2Cl + H_3PO_2 + H_2O \rightarrow$

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57. Write the structure of the major organic product in each of the following reactions :

$\underset{\text{(Aniline)}}{C_6H_5NH_2} \xrightarrow{(CH_3CO)_2O} \underset{\text{(Acetanilide)}}{C_6H_5NHCOCH_3}$

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Objective Exercise 1 Amines General

1. IUPAC name of $(CH_3)_3C.NH_2$ is

A. trimethyl butanamine - 1

B. 2 - methyl butanamine - 1

C. 2 - methyl propanamine - 2

D. 2 - methyl propanamine - 1

Answer: C

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2. Which one of the following is a tertiary amine?

A. tri ethyl amine

B. tri methyl amine

C. 2 - methyl propanamine - 2

D. N - cthyl - N - methyl propanamine - 1

Answer: C

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3. Which of the following shows optical activity ?

A. butanamine-1

B. butanamine-2

C. isopropylamine

D. ethyl methyl amine

Answer: B

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4. Hinsberg's reagent is

A. $C_6H_5SO_2H$

B. $C_6H_5NHSO_2C_6H_5$

C. $C_6H_5SO_2Cl$

D. $C_6H_5NHCOC_6H_5$

Answer: C

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5. For carbylamine reaction, we need alcoholic KOH and

A. any primary amine and chloroform

B. aromatic primary amine and chloroform

C. aliphatic primary amine and chloroform

D. any amine and chloroform

Answer: A

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6. Aniline on acetylation gives

A. phenol

B. acetamide

C. acetanilide

D. benzene

Answer: C

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7. Treatment of ammonia with excess alkyl halide gives

A. triethyl amine

B. quaternary ammonium salt

C. diethyl amine

D. ethyl amine

Answer: B

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8. Aniline or reaction with con. H_2SO_4 gives X. If X is heated, the product is

A. sulphanilic acid

B. sulphonamide

C. benzene sulphonyl chloride

D. m-amino benzene sulphonic acid

Answer: A

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9. In-correct statement among the following is

A. methanamine is more basic than ammonia

B. ammonia forms H-bonds

C. boiling point of ethyl amine is higher than propane

D. dimethyl amine is less basic than aniline

Answer: D

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10. A primary amine on reaction with alc. KOH and chloroform yields

A. isocyanide

B. aldehyde

C. cyanide

D. alcohol

Answer: A

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11. Primary amines have lower boiling points than

A. corresponding alkanes

B. corresponding 2^0 and 3^0 amines

C. corresponding esters

D. corresponding alcohols

Answer: D

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12. Molecular association is highes in

A. n-propyl amine

B. trimethyl amine

C. ethyl methyl amine

D. equal in all

Answer: A

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13. Among isomeric amines possible for molecular formula C_3H_9N, correct order of basic strength is given by

I) propanamine-1

II) N-methyl ethanamine

III) N,N-dimethyl methanamine

A. III gt I gt II

B. IV gt III gt I gt II

C. II gt I gt III

D. II gt III gt I gt IV

Answer: C

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Objective Exercise 1 Aniline

1. Aniline is less basic than

A. NH_3

B. CH_3NH_2

C. N - Methyl aniline

D. All the above

Answer: D

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2. Which of the following is a lo amine?

A. Tert. butylamine

B. Dimethyl amine

C. N-Methylaniline

D. N, N-Dimethyl aniline

Answer: A

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3. Which functional group responds to carbylamine test

A. $-NH_2$

B. $-NH-$

C. $-CONH_2$

D. $-\overset{|}{N}-$

Answer: A

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4. Among the following which is more basic

A. n - butyl amine

B. isobutylamine

C. sec. butylamine

D. diethylamine

Answer: D

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5. Towards litums, Aniline is

A. Acidic

B. Basic

C. Neutral

D. Bleaching agent

Answer: C

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6. Which of the following can react with an alkyl halide ?

A. 1° amine

B. 2° amine

C. 3° amine

D. all the above

Answer: D

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7. The substance with nauseating smell is

A. C_6H_5CN

B. $C_6H_5NO_2$

C. $C_6H_5NH_2$

D. C_6H_5NC

Answer: D

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8. Aniline doesn't react with

A. dil. HCl

B. dil. $NaOH$

C. CH_3CHO

D. Br_2 water

Answer: B

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9. Aniline is soluble in

A. dil. HCl

B. dil. $NaOH$

C. Water

D. Na_2CO_3 solution

Answer: A

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10. Aniline is treated with excess of CH_3I. The final product is

A. $C_6H_5NHCH_3$

B. $C_6H_5N(CH_3)_2$

C. $C_6H_5N(CH_3)_3I$

D. C_6H_5I

Answer: C

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11. The reagent which gets attached to the nucleus when added to aniline

A. CH_3I

B. C_6H_5COCl

C. CH_3COCl

D. Br_2

Answer: D

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12. Which of the following is not a property of aniline

A. It is basic in nature

B. It gives carbylamine test

C. It can react with 3 moles of alkylhalide

D. It turns blue litmus red

Answer: D

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13. Which of the following is a mixed 2° amine

A. Toluidine

B. N - Methylaniline

C. Dimethylamine

D. Methyladiethyl amine

Answer: B

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14. The general formula of amines is

A. $C_nH_{2n+1}N$

B. $C_nH_{2n+2}N$

C. $C_nH_{2n+3}N$

D. $C_nH_{2n}N$

Answer: C

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15. The general formula of quaternary ammoniam salt is

A. RNH_2

B. R_2NH

C. R_3N

D. R_4NX

Answer: D

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16. The number of hydrogen atoms required to convert 1 mole of nitrobenzene to hydrazobenzene is

A. 5

B. 10

C. 4

D. 8

Answer: A

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17. Which of the following is true ?

A. aniline forms salts with aqueous alkali

B. aniline is more basic than ammonia

C. aniline forms benzene diazonium chloride with nitric acid

D. aniline is less basic than ammonia

Answer: D

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18. Aniline forms anilinium salt when it reacts with

A. An alkyl halide

B. Acetyl chloride

C. Sulphuric acid

D. Benzoyl chloride

Answer: C

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19. In the diazotisation of aniline, the reagent or reagents used

A. HNO_3, HCl

B. $NaNO_2$, HCl at $0-5^\circ C$

C. $NaNO_2$, HNO_2 at $0-5^\circ C$

D. HNO_2 only

Answer: B

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Objective Exercise 1 Diazonium Salts

1. In benzene diazonium chloride, the functional group is

A. $-N=N=Cl$

B. $-N=N^+-Cl^-$

C. $-N^+=N-Cl^-$

D. $-N^+\equiv NCl^-$

Answer: D

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2. Stable diazonium salts are formed by

A. aliphatic primary amines

B. aromatic primary amines

C. alicyclic primary amines

D. heterocyclic aromatic nitrogen compounds

Answer: B

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3. Diazotisation means the conversion of

A. any primary amine into diazonium salt using $NaNO_3 + HCI$ at ice cold temperature

B. aromatic primary amine into diazonium salt using $NaNO_2 + HCI$ at $60 - 70^\circ C$

C. aromatic primary amine into diazonium salt using $NaNO_2 + HCl$ at ice cold temperature

D. any primary amine into diazonium salt using $NaNO_3 + HCl$ at ice cold temperature

Answer: C

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4. Which of the following does not give diazonium salt with nitrous acid at 273K?

A. Benzenamine

B. Benzyl amine

C. p-Hydroxy aniline

D. o-Hydroxy aniline

Answer: B

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5. Which diazonium salt is stable at room temperature ?

A. Benzene diazonium chloride

B. Benzene diazonium fluoroborate

C. Benzene diazonium nitrate

D. Benzene diazonium bromide

Answer: B

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6. Replacement of $-N_2^+X$ group by $-Cl$ or $-Br$ or $-CN$ is called

A. Diazo coupling

B. Hoffmann reaction

C. Sandmayer reaction

D. Perkin reaction

Answer: C

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7. Action of HCl on benzene diazonium chloride in the presence of copper powder gives

A. p - Chloro benzene diazonium chloride

B. o-Chloro benzene diazonium chloride

C. Chloro benzene

D. o-Dichloro benzene

Answer: C

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8. One mole benzene diazonium chloride is treated with HBr (excess) in the presence of $CuBr$. Volume of N_2 liberated at STP is

A. 11.2 lit.

B. 22.4 lit.

C. 5.6 lit.

D. 44.8 lit.

Answer: B

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9. Action of KI on benzene diazonium chloride yields

A. sym triiodobenzene

B. p - diiodo benzene

C. o-diiodo benzene

D. iodo benzene

Answer: D

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Objective Exercise 1 Cyanides And Isocyanides

1. Wrong statement of the following regadring (A) Cyanides and (B) Isocyanides is

A. A are polar compounds

B. A have pleagant odour

C. A are stronger bases than amines

D. B boil at low temperature than A

Answer: C

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2. $CH_3 - CO - NH_2 + X \xrightarrow{\text{pyridine}} CH_3CN$. Here 'X' is

A. $C_6H_5SO_2Cl$

B. Ethanolic $AgCN$

C. $(CH_3CO)_2O$

D. $CHCl_3$

Answer: A

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3. The major product in the reaction of ethyl chloride with ethanolic $AgCN$

A. Ethyl cyanide

B. Ethyl isocyanide

C. Ethyl nitrate

D. Nitroethane

Answer: B

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Objective Exercise 1 Assertion And Reason Type

1. (A) : Carbylamine reaction involves chemical reaction between primary amines, chloroform in basic medium.

(R) : In carbylamine reaction $-NH_2$ group changes into $-NC$ group.

A. Both A & R are true, R is the correct explanation of A

B. Both A & R are true, R is not correct explanation of A

C. A is true, R is false

D. A is false, R is true

Answer: B

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2. (A): In strong acidic solutions aniline becomes more reactive towards electrophilic reagents.

(R): The amino group is completely protonated in strong acidic solution, the lone pair of electrons on the nitrogen is no longer available for resonance.

A. Both A & R are true, R is the correct explanation of A

B. Both A & R are true, R is not correct explanation of A

C. A is true, R is false

D. A is false, R is true

Answer: A

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3. (A): Methylisocyanide can be easily hydrolysed by acids but not by alkalies.

(R): The carbon atom of isocyanide group in methyl isocyanide carries a negative charge which readily accepts the proton and repels the OH^- ion.

A. Both A & R are true, R is the correct explanation of A

B. Both A & R are true, R is not correct explanation of A

C. A is true, R is false

D. A is false, R is true

Answer: A

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4. (A) : Aniline does not undergo Friedal-Crafts reaction

(R): $-NH_2$ group of aniline reacts with $AICI_3$,

A. Both A & R are true, R is the correct explanation of A

B. Both A & R are true, R is not correct explanation of A

C. A is true, R is false

D. A is false, R is true

Answer: A

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5. (A): Isocyanides are prepared by carbylamine reaction.

(R) : Carbylamine on reduction always gives 2^0 amines.

A. Both A & R are true, R is the correct explanation of A

B. Both A & R are true, R is not correct explanation of A

C. A is true, R is false

D. A is false, R is true

Answer: B

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6. (A): Aniline is a weak Lewis base than benzylamine.

(R): In aniline, there is mesomeric effect between benzene ring and amino group.

A. Both A & R are true, R is the correct explanation of A

B. Both A & R are true, R is not correct explanation of A

C. A is true, R is false

D. A is false, R is true

Answer: A

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7. (A): Cyclohexanamine. is more basic than aniline.

(R): pK_b of cyclohexanamine is less than that of aniline.

A. Both A & R are true, R is the correct explanation of A

B. Both A & R are true, R is not correct explanation of A

C. A is true, R is false

D. A is false, R is true

Answer: B

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8. (A) : With Br_2 water, aniline gives 2,4,6 tribromoaniline.

(R): In aniline, NH_2 group is ring activating and ortho and para directing group.

A. Both A & R are true, R is the correct explanation of A

B. Both A & R are true, R is not correct explanation of A

C. A is true, R is false

D. A is false, R is true

Answer: A

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Objective Exercise 2 Amines General

1. Which of the following statements is wrong?

I) amines possess pyramidal shape

II) amines act as Bronsted bases

III) 1^0 amines show metamerism IV) 2^0 amines show metamerism

A. I, II and III

B. II, III and IV

C. III only

D. I, II and IV

Answer: C

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2. N,N-dimethylbutanamine-2 contains

A. six sp^3 hybridised carbon atoms

B. seven sp^3 hybridised atoms

C. two sp^3 hybridised nitrogen atoms

D. Both 1 and 2 are correct

Answer: D

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3. Primary amino group is absent in

A. p-amino phenol

B. o-amino phenol

C. N-methyl ethanamine

D. phenyl amine

Answer: C

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4. N,N-dimethylbutanamine-2 is the functional isomer of

A. N-butanamine-2

B. N-methyl-2-ethyl butanamine-2

C. trimethyl amine

D. triethyl amine

Answer: D

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5. n-butylamine and isobutylamine are ..... isomers

A. optical

B. functional

C. chain

D. Position

Answer: C

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6. The number of structurally isomeric primary amines for $C_4H_{11}N$

A. 1

B. 2

C. 3

D. 4

Answer: D

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Objective Exercise 2 Aniline

1. Aniline can react with maximum ... moles of CH_3I

A. 4

B. 3

C. 2

D. 1

Answer: B

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2. In the nitration of aniline, the amino group is protected by conversion into

A. Tribromo derivative

B. Isocyanide

C. Diazonium salt

D. Acetyl derivative

Answer: D

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3. In the preparation of N-phenyl benzene sulphonamide from aniline, the reagent used

A. H_2SO_4

B. $SOCl_2$

C. C_6H_5Cl

D. $C_6H_5SO_2Cl_2$

Answer: D

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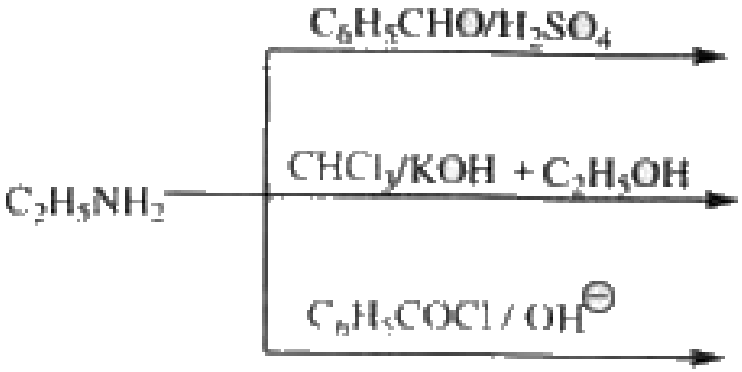
4. A, B and C in the following reaction ?



A. $A: C_2H_5CH_2 - NHC_6H_5$

$B: C_6H_5NC$

$C: C_6H_5N(COC_6H_5)_2$

B. $A: C_6H_5 - N = CH - C_6H_5$

$B: C_2H_5NC$

$C: C_2H_5 - NH - CO - C_6H_5$

C. $A: C_6H_5 - N = CH - C_6H_5$

$B: C_6H_5CN$

$C: C_6H_5CO - C_6H_5NH_2$

D. $A: C_6H_5 - CH(OH) - NH - C_6H_5$

$B: C_6H_5 - NC$

$C: C_6H_5 - C(OH) = N - C_6H_5$

Answer: B

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5. Which of the following is correct with respect to the order of basic natures of different amines given below ?

A. $C_6H_5NH_2 > NH_3 > CH_3NH_2 > (CH_3)_2NH$

B. $(CH_3)_2NH > CH_3NH_2 > C_6H_5NH_2 > NH_3$

C. $CH_3NH_2 > (CH_3)_2NH > C_6H_5NH_2 > NH_3$

D. $(CH_3)_2NH > CH_3NH_2 > NH_3 > C_6H_5NH$

Answer: D

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Objective Exercise 2 Diazonium Salts

1. Benzene diazonium chloride on reaction with KCN in the presence of CuCN yields X. X on hydrolysis yields Y. Y can also be obatained from

A. Toluene by the action of $Cl_2 / FeCl_3$

B. Toluene by oxidation by $KMnO_4$

C. Toluene by nitration

D. Toluene by sulphonation

Answer: B

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2. $ArN_2Cl \xrightarrow{dil.\ H_2SO_4} X + N_2 + HCl$

It Regarding X, correct statement is

A. it is weakly acidic

B. it liberates H_2 with Na

C. it is stronger acid than acetic acid

D. 1 and 2

Answer: D

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3. Benzene diazonium salt on reduction with X yields benzene. X is

A. $K_2Cr_2O_7 / H^+$

B. O_3

C. H_3PO_4

D. H_3PO_2

Answer: D

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4. During diazo coupling, the following group is retained

A. $N = N$

B. N_2Cl

C. NH_2

D. NHR'

Answer: A

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5. Which of the following is an example of electrophilic substitution?

A. Diazotisation

B. Sandmayer reaction

C. Diazo coupling

D. Action of KCN on ArN_2Cl

Answer: C

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6. Which of the following is the correct order of ease of coupling with $C_6H_5N_2Cl$?

A) Benzene

B) Nitro benzene

C) Phenol

D) Chloro benzene

A. A gt D gt B gt C

B. C gt A gt B gt D

C. C gt A gt D gt B

D. B gt D gt A gt C

Answer: C

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7. Coupling of phenol with benzene diazonium salt yeilds

A. o - hydroxy derivative of salt

B. p - hydroxy derivative of salt

C. m - hydroxy derivative of salt

D. a mixture 1, 2 and 3

Answer: B

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8. N, N - dimethylaniline on coupling with $C_6H_5N_2Cl$ yields

A. 4 - (N, N - dimethyl) aminoazobenzene

B. 4 - (N, N - dimethyl) nitrosobenzene

C. 4 - (N, N - dimethyl) aminoazoxybenzene

D. 4 - (N, N - dimethyl) aminohydrazobenzene

Answer: A

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9. Correct order of basic strength of various amines given below :

$C_6H_5CH_2NH_2(A), C_6H_5NH_2(B), CH_3NH_2(C), (CH_3)_2NH(D)\&(CH_3)$

A. D gt C gt E gt B gt A

B. D gt E gt C gt A gt B

C. D gt C gt E gt A gt B

D. A gt C gt E gt D gt B

Answer: C

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10. Arrange the following in increasing order of their basic strength.

$C_2H_5NH_2, C_6H_5NH_2, NH_3, C_6H_5CH_2NH_2$ and $(C_2H_5)_2NH$

A. EgtAgtDgtCgtB

B. E gtAgtCgtBgtD

C. DgtEgtAgtCgtB

D. DgtBgtCgtAgtB

Answer: A

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Objective Exercise 2 Cyanides And Isocyanides

1. Alkylcyanides and alkylisocyanides are together called a pair of

A. Functional isomers

B. Geometrical isomers

C. Positional isomers

D. Optical isomers

Answer: A

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2. Alkylisocyanide test with chloroform is given by

A. Primary amines

B. Secondary amines

C. Tertiary amines

D. Anilides

Answer: A

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Practice Exercise

1. IUPAC name of $(C_2H_5)_3C - NH_2$ is

A. 3-ethylpropanamine-1

B. 3-ethylpentanamine-2

C. 3-ethylpentanamine-3

D. 2-ethylpentanamine-3

Answer: C

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2. Number of saturated isomeric primary amines possible for the molecular formula C_3H_5N is

A. Zero

B. 3

C. 2

D. 4

Answer: A

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3. Nitrobenzene on reduction with hydrogen in presence of nickel gives

A. Azobenzene

B. Hydrazobenzene

C. Phenyl hydroxylamine

D. Aniline

Answer: D

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4. Which of the following contains imino group $\left[\backslash \diagup NH\right]$

A. Aniline

B. O - Toluidine

C. Benzylamine

D. N - Methylaniline

Answer: D

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5. Bromination of aniline with bromine water mainly gives

A. Red precipitate of 2,4,6 - tribromo aniline

B. Ortho and parabromoanilines

C. 2, 4 - Dibromoaniline

D. White precipitate of 2, 4, 6 - tribromoaniline

Answer: D

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6. The amine that does not form hydrogen bonds is

A. Isopropyl amine

B. Neopentyl amine

C. Tertiary butyl amine

D. N, N - Dimethyl amino ethane

Answer: D

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7. The number of primary, secondary and tertiary amine isomers possible for the compound with formula $C_4H_{11}N$ are

A. 4, 3,1

B. 4, 3, 2

C. 3, 2, 1

D. 4, 2,1

Answer: A

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8. Aniline can be converted into Benzene by

A. diazotization reaction

B. diazotization followed by treating with $\mathrm{H_3\ P\ O_2}$

C. treating with H_3PO_2

D. diazotization followed by treating with steam

Answer: B

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9. Benzene diazonium fluoro borate on heating to dryness yields

A. Fluorobenzene

B. Benzene

C. Aniline

D. o-Fluoroaniline

Answer: A

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10. Most reactive towards electrophillic substitution is

A. aniline

B. aniline hydrochloride

C. nitrobenzene

D. N-acetyl aniline

Answer: A

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11. Zwitter ion is formed by

A. aniline

B. sulphanilic acid

C. glycine

D. both (2) and (3)

Answer: D

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12. $CH_3CH_2OH \xrightarrow{x} CH_3COH.$

Out of the following three reagents, X may be

a) PDC in CH_2Cl_2 b) $Cu, 300^\circ C$, c) $C_6H_5N_2Cl$

A. A,b and c

B. A and b

C. Only b

D. Only a

Answer: A

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13. $C_6H_5NH_2 \xrightarrow[283K]{NaNO_2+HCl}$

Products in the reaction are

A. $C_6H_5N_2Cl$

B. C_6H_5OH, HCl

C. C_6H_5OH, N_2, HCl

D. C_6H_6, N_2, HCl

Answer: C

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14. The hybridization of nitrogen atom in amines

A. sp

B. sp^2

C. sp^3

D. dsp^2

Answer: C

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15. Which of the following is the correct decreasing order basicity ?

A. $CH_3CH_2NH_2 > HOCH_2CH_2CH_2NH_2 > HOCH_2CH_2NH_2$

B. $CH_3CH_2NH_2 > HOCH_2CH_2NH_2 > HOCH_2CH_2CH_2NH_2$

C. $HOCH_2CH_2CH_2NH_2 > HOCH_2CH_2NH_2 > CH_3CH_2NH_2$

D.

$HOCH_2CH_2NH_2 > HOCH_2CH_2CH_2CH_2NH_2 > CH_3CH_2NH_2$

Answer: A

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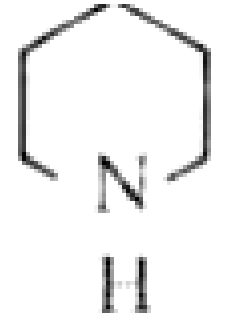
16. One mole of an amine (A) consumes two moles of methyl bromide to give a quaternary ammonium salt. The amine (A) is

A. $(CH_3)_3CCH_2NH_2$

B. $(CH_3)_2NCH_2CH_3$

C. 

D. 

Answer: C

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17. When an aliphatic organic compound was treated with in ice-cold condition, nitrogen was evolved. The compound is

A. a secondary amine

B. a primary amine

C. a nitro compound

D. a tertiary amine

Answer: B

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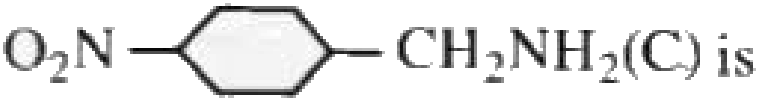
18. The correct increasing order of basicity of $C_6H_5CH_2NH_2(A)$,

(B) and



is

A. A ltBlt C

B. CltAltB

C. BltAlt C

D. CltBltA

Answer: B

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19. Secondary amines on oxidation with Caro's acid gives

A. dialkyl hydroxylamine

B. tetraalkyl hydrazine

C. amine oxide

D. ketones

Answer: A

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20. The boiling points of amines and their corresponding alcohols and acids vary in the order

A. $RCH_2NH_2 > RCOOH > RCH_2OH$

B. $RCH_2NH_2 > RCH_2OH > RCOOH$

C. $RCH_2NH_2 < RCOOH < RCH_2OH$

D. $RCH_2NH_2 < RCH_2OH < RCOOH$

Answer: D

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21. Carbylamine reaction can help us to test which of the following functional group in the organic molecule ?

A. $-NH_2$

B. $=NH$

C. 

D. $-OH$

Answer: A

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22. Diazo coupling is useful to prepare

A. dyes

B. pesticides

C. vitamines

D. proteins

Answer: A

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23. The colour of p-aminoazobenzene is

A. indigo

B. congored

C. orange

D. blue

Answer: C

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24. When primary amine is heated with CS_2 in the presence of excess of $HgCl_2$, it gives isothiocyanate. This reaction is called

A. Hoffmann elimination reaction

B. Perkin condensation

C. Hoffmann mustard oil reaction

D. Hoffmann bromamide reaction

Answer: C

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25. When phenol is heated with ammonia in presence of ..... at $300^\circ C$, it gives aniline

A. anhydrous $AICl_3$

B. anhydrous $ZnCl_2$

C. Conc.H_2SO_4

D. P_2O_5

Answer: B