CHEMISTRY

BOOKS - BRILLIANT PUBLICATION

NITROGEN COMPOUNDS

Leve 1 Home Work

1. Which of the following is/are derivatives of ammonia ?`

A. $CH_3CH_2NH_2$

B. $(CH_3)_3N$

C. $(CH_3)_2NH$

D. All of these

Answer:

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2. The hybridisation and geometry of amines are sp^3 and pyramidal respectively because of

A. divalent N-atom

B. Trivalent N-atom

C. Monovalent N-atom

D. Tetravalent N-atom

Answer:

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3. If one H-atom of ammonia is replaced by an alkly group, the amine obtained is known as

A. Primary amine

B. Secondary amine

C. Tertiary amine

D. Quarternary amine

Answer:

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4. The IUPAc name of $H_2N - CH_2 - CH_2 - NH_2$ is

A. Ethane -1, 3-diamine

B. Ethane-1, 2-diamine

C. Ethyne-1, 2-diamine

D. Ethene-1, 2-diamine

Answer:

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5. What is the bond angle of C-N-C in trimethyl amine ?

A. 109.5°

B. more than 109.5°

C. 108°

D. more than 108°

Answer:

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6. Select the correct statement about ammonolysis

A. It is the process of cleavage of the C-X bond by ammonia

B. The reaction is carried out in an open tube at $373^\circ K$

C. Both 1 and 2

D. None of the above

Answer:

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7. The reaction which is used for the preparation of amine having one carbon less than the starting material is

A. Reduction of nitriles

B. Hofmann's bromamide reaction

C. Reduction of nitrocompounds

D. All of the above

Answer:

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8. Which of the following products is formed in the given reaction : $RCONH_2 \xrightarrow[H_2O]{LiAlH_4}$?

A. RNH_2

B. RCH_2NH_2

C. $RCH_2CH_2NH_2$

D. RCN

Answer:

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9. Which of the following statements is/are true about Hofmann bromamide reaction ?

A. In this reaction, migration of an alkly group takes place from nitrogen atom of amide to carbonyl carbon

B. The amine formed contains one carbon more than that present in the amide

C. The amine formed has one carbon less than in the amide

D. All are correct

Answer:

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10. Choose the correct order of boiling point of amines

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

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

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

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

Answer:

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11. For the reaction $RNH_2 + H_2O \Leftrightarrow R.\overset{+}{N}H_3 + OH^-$. The correct expressions are

A. $K[H_2O] = \dfrac{\left[R\overset{+}{N}H_3\right][OH^-]}{[RNH_2]}$

B. $K_b = \dfrac{\left[R\overset{+}{N}H_3\right][OH^-]}{[RNH_2]}$

C. $pK_b = -\log K_b$

D. All are correct

Answer:

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12. Which of the following factors affect the basic strength of amines ?

A. Solvation effect

B. Inductive effect

C. Steric effect

D. All the above

Answer:

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13. The correct order of the basic strength of amines in aqueous medium is

A. $C_2H_5NH_2 > (C_2H_5)NH > (C_2H_5)N$

B. $C_2H_5NH_2 > (C_2H_5)_3N > (C_2H_5)_2NH$

C. $(C_2H_5)_2NH > (C_2H_5)_3N > C_2H_5NH_2$

D. $(C_2H_5)_2NH > C_2H_5NH_2 > (C_2H_5)_3N$

Answer:

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14. The increasing order of basic strength of the following compounds is

A. $b < c < a$

B. $c < a < b$

C. $c < b < a$

D. $b < a < c$

Answer:

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15. Which of the groups increases basic strength of substituted aniline ?

A. $-OCH_3$

B. $-CH_3$

C. $-SO_3H$

D. both 1 and 2

Answer:

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16. Which of the following compounds will liberate CO_2 from $NaHCO_3$ solution

A. CH_3CONH_2

B. $CH_3CH_2CH_2NH_2$

C. $CH_3\overset{+}{N}H_3Cl^-$

D. $(CH_3)_4\overset{+}{N}OH^-$

Answer:

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17. Consider the reaction : $CH_3CH_2Cl \xrightarrow{KCN} X \xrightarrow{Ni/H_2} Y \xrightarrow{(CH_3CO)_2O} Z$. Z is

A. $CH_3CH_2CH_2NHCOCH_3$

B. $CH_3CH_2CH_2NH_2$

C. $CH_3CH_2CH_2CONHCH_3$

D. $CH_3CH_2CH_2CONHCOCH_3$

Answer:

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18. Treatment of cyclobutylmethylamine with nitrous acid does not give

A. 

B. 

C. 

D. 

Answer:

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19. The amine which will not liberate nitrogen on reaction with nitrous acid is

A. $(CH_3)_3N$

B. $CH_3CH_2\overset{\overset{NH_2}{|}}{C}HCH_3$

C. $CH_3 - \overset{\overset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{C}} - NH_2$

D. $CH_3CH_2NH_2$

Answer:

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20. Which of the following compounds will not undergo azocoupling reactions with benzene diazonium chloride ?

A. Aniline

B. Phenol

C. Anisole

D. Nitrobenzene

Answer:

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21. Amongst the following compounds, the one that gives a brilliant coloured dye on treatment with $NaNO_2 / HCl$ followed by addition of an alkaline solution of β- naphthol

A. 

B. 

C. 

D. 

Answer:

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22. Aniline is heated with $K_2Cr_2O_7$ and H_2SO_4.

The product is

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23. Aniline with benzaldehyde forms

A. $C_6H_5NHCOC_6H_5$

B. $C_6H_5N = CHC_6H_5$

C. $C_6H_5NHCHOHC_6H_5$

D. $C_6H_5NHCH_2C_6H_5$

Answer:

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24. An optically inactive compound with molecular formula C_6H_7N dissolves in dil. HCl and releases N_2 gas on treatment with nitrous acid. The compound is

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25. Assertion : Order of basicity of amines in gaseous phase of $NH_3 >$ primary $>$ secondary

$>$ tertiary.

Reason : In gaseous phase basic nature of aliphatic amines increases with increase in no. of alkly groups.

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

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

C. Assertion is correct, Reason is incorrect

D. If Assertion is incorrect, Reason is correct

Answer:

26. Assertion : Aromatic amines cannot be prepared by Gabriel's phthalimide synthesis.

Reason : Aryl halides do not undergo electrophilic substitution with anion formed by phthalimide.

A. Both Assertion and Reason are true and reason is the correct explanation of

assertion.

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

C. Assertion is correct, Reason is incorrect

D. If Assertion is incorrect, Reason is correct

Answer:

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Leve 2

1. General formula for saturated aliphatic amines is

A. $C_nH_{2n}N$

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

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

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

Answer:

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2. Number of structuraly isomeric primary amines for the formula $C_4H_{11}N$ is

A. 2

B. 3

C. 4

D. 5

Answer:

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3. Which of the following compounds will exhibit optical isomerism ?

A. 3° butylamine

B. Secondary butyl amine

C. Isobutylamine

D. Neopentylamine

Answer:

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4. Which of the following products is formed in the given reaction : $RCONH_2 \xrightarrow[H_2O]{LiAlH_4}$?

A. RNH_2

B. RCH_2NH_2

C. $RCH_2CH_2NH_2$

D. RCN

Answer:

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5. Which of the following reactions is not a method of preparation of amines ?

A. $RCN \xrightarrow{H_2 / Ni}$

B. $RCONH_2 \xrightarrow[H_2O]{LiAH}$

C. $RCN \xrightarrow{H_2O / H^+}$

D. $RCONH_2 \xrightarrow{OBr^-}$

Answer:

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6. Choose the correct boiling point order of amines

A. $1^\circ > 2^\circ > 3^\circ$

B. $2^\circ > 3^\circ > 1^\circ$

C. $3^\circ > 1^\circ > 2^\circ$

D. $3^\circ > 2^\circ > 1^\circ$

Answer:

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7. Amongst the following the strongest base in aqueous medium is

A. CH_3NH_2

B. $NC - CH_2NH_2$

C. $(CH_3)_2NH$

D. $C_6H_5NHCH_3$

Answer:

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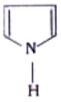
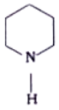
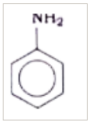
8. Which of the following is the strongest bronsted base ?

A. 

B. 

C. 

D. 

Answer:

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9. The correct basicity order of the following compounds is

(I) $CH_3 - \overset{\overset{NH}{||}}{C} - NH_2$ (II) $CH_3CH_2NH_2$ (III) $(CH_3)_2NH$ (IV) $CH_3 - \overset{\overset{O}{||}}{C} - NH_2$

A. $II > I > III > IV$

B. $I > III > II > IV$

C. $III > I > II > IV$

D. $I > II > III > IV$

Answer:

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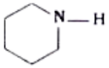
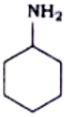
10. Which of the following is the weakest Bronsted base?

A. 

B. 

C. 

D. CH_3NH_2

Answer:

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11. The reaction of p-methyl aniline with chloroform and ethanolic KOH gives

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12. An organic compound (A) could be converted to N-methyl aniline by the following sequence of reactions

$A \xrightarrow[\Delta]{Sn/HCl} B \xrightarrow[\text{alc.KOH}]{CHCl_3} C \xrightarrow[Ni]{H_2} C_6H_5NHCH_3$. What is the structure of compound A

A. 

B. 

C. 

D. 

Answer:

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13. Which of the following compounds will form an yellow N-nitroso aniline on treatment with HNO_2 in cold condition

A. Aniline

B. N-methylaniline

C. p-methylaniline

D. N, N-dimethyl aniline

Answer:

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14. Which of the following reactions /methods has no concern with either synthesis or separation of amines ?

A. Curtius reaction

B. Wurtz reaction

C. Hinsberg method

D. Hofmann's method

Answer:

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15. Which of the following compounds will give positive carbylamine test

A. Benzamide

B. Benzylamine

C. N-methylaniline

D. Acetamide

Answer:

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16. The product of the reaction $CH_3CH_2NH_2 \xrightarrow[HgCl_2]{CS_2} P$

A. CH_3CH_2NCS

B. CH_3CH_2CNS

C. CH_3CH_2NCO

D. CH_3CH_2CNO

Answer:

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17. In a set of reactions, propanoic acid yielded a compound D.

$\underset{A}{CH_3CH_2COOH} \xrightarrow{SOCl_2} B \xrightarrow{NH_3} C \xrightarrow[KOH]{Br_2} D$. D is

A. $CH_3CH_2NH_2$

B. $CH_3CH_2CH_2NH_2$

C. $CH_3CH_2CONH_2$

D. $CH_3CH_2NHCH_3$

Answer:

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18. Which of the following compounds exist as a Zwitter ion ?

A. p-amino phenol

B. p-amino acetophenone

C. suphanilic acid

D. salicylic acid

Answer:

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19. What is the final product 'C' in the following reaction

$$C_6H_5NH_2 \xrightarrow[0^\circ C]{NaNO_2/HCl} A \xrightarrow[KCN]{CuCN} B \xrightarrow[2.H_2O/\Delta]{1.SnCl_2/HCl} C$$

A. C_6H_5CN

B. $C_6H_5CH_2NH_2$

C. C_6H_5COOH

D. C_6H_5CHO

Answer:

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20. Aniline in a set of reactions yielded a product 'D'.

$C_6H_5NH_2 \xrightarrow[HCl\,.0^\circ C]{NaNO_2} A \xrightarrow{CuCN} B \xrightarrow[Ni]{H_2} C \xrightarrow{HNO_2} D.$ 'D' is

A. $C_6H_5CH_2OH$

B. $C_6H_5CH_2NH_2$

C. C_6H_5NHOH

D. $C_6H_5NHCH_2CH_3$

Answer:

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21. Assertion : Reduction of m-dinitrobenzene with $(NH_4)_2S$ gives gives m-nitroaniline

Reason : m-nitroaniline formed gets precipitated and hence further reduction is prevented (1) If both assertion and reason are true and reason is the correct explanation of assertion. (2) If both assertion and both reason are true and reason is not the correct explanation of assertion (3) If

assertion is true but reason is false (4) If both assertion and reason are false

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and both reason are true and reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

Answer:

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22. Assertion : Pyrrole is more basic than pyridine

Reason : In pyrrole N is sp^3 hybridised.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and both reason are true and reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

Answer:

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23. Assertion : Controlled nitration of aniline at low temperature gives m-nitroaniline as one of the major product.s

Reason : In acidic medium, $-NH_2$ group is converted to $-\overset{+}{N}H_3$ group which is m-directing.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and both reason are true and reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

Answer:

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24. Assertion : p-fluoroanilinium ion is more acidic than anilinium ion

Reason : Electron density in the N-H bond of p-fluoroanilinium ion decreases and releases a proton more readily than from anilinium ion

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and both reason are true and reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

Answer:

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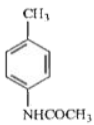
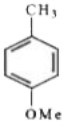
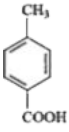
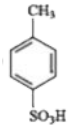
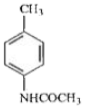
Level I

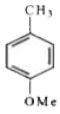
1. Which compounds reacts most readily in the nitration reaction?: 

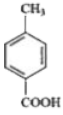
, 

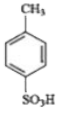
, 

, 

A. 

B. 

C. 

D. 

Answer: B

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2. Which could not be directly prepared from 4-bromobenzenediazonium ion?

A. Bromobenzene

B. 1,4-dibromobenzene

C. 4-bromofluorobenzene

D. 4-bromoacetophenone

Answer: D

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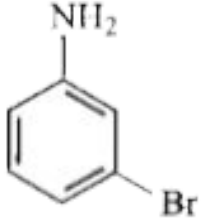
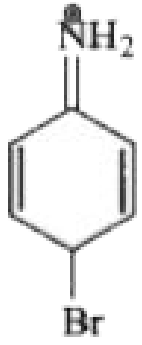
3. Which of the following represents a resonance form of the intermediate formed during bromination of aniline?

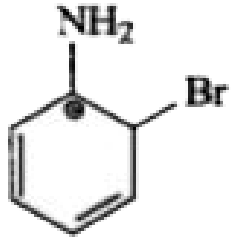
A.



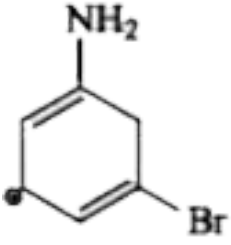
B.



C.



D.



Answer: B

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4. Which of the following is used for the preparation of a primary amine having one C-atom more than the starting haloalkane?

A. Reaction with aqueous KCN followed by reduction

B. Reaction with AgCN followed by reduction

C. Reaction with aqueous NH_3

D. All of the above

Answer: A

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5. Aniline is more stable than anilinium ion because

A. it has more resonating structures than anilinium ion

B. it has less resonating structures than anilinium ion

C. it has more π-bonding than anilinium ion

D. None of the above

Answer: A

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6. N,N-diethyl benzene sulphonamide is not acidic because

A. It does not contain unshared pair of electron on N-atom

B. It does not contain H-atom with the N-atom

C. It contains-OH group with N-atom

D. All of the above

Answer: B

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7. When methyl iodide is heated with ammonia, the product(s) obtained is/are:

A. Methylamine

B. Dimethylamine

C. Trimethylamine

D. A mixture of the above three amines

Answer: D

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8. Which of the following statements about primary amines is 'False'?

A. Alkyl amines are stronger bases than aryl amines

B. Alkyl amines react with nitrous acid to produce alcohols

C. Aryl amines react with nitrous acid to produce phenols

D. Alkyl amines are stronger bases than ammonia

Answer: C

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9. Which of the following reacts with chloroform and a base to form phenyl isocyanide?

A. Aniline

B. Phenol

C. Benzene

D. Nitrobenzene

Answer: A

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10. The amine which can react with $C_6H_5 - SO_2 - Cl$ to form a product insoluble in alkali shall be

A. Primary amine

B. Secondary amine

C. Tertiary amine

D. Both primary and secondary amines

Answer: B

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11. Among the following compounds $C_3H_7NH_2$, NH_3 ,CH_3NH_2, and $C_6H_5NH_2$, the least basic compound is

A. $C_3H_7NH_2$

B. NH_3

C. CH_3NH_2

D. $C_6H_5NH_2$

Answer: D

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12. Which one of the following on reduction with lithium aluminium hydride yields a secondary amine?

A. Methyl isocyanide

B. Acetamide

C. Methyl cyanide

D. Nitroethane

Answer: A

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13. The reduction of nitro compounds is most preferred in the presence of

A. Pd / H_2 in ethanol

B. Sn + HCl

C. finely divided Ni

D. iron scrap and HCI

Answer: D

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14. Ethyl isocyanide on hydrolysis in acidic medium generates

A. propanoic acid and ammonium salt

B. ethanoic acid and ammonium salt

C. methylamine salt and ethanoic acid

D. ethylamine salt and methanoic acid

Answer: D

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15. Which of the following gives propylamine upon hydrolysis? : $CH_3CH_2C \equiv N$, $(CH_3CH_2CH_2)_2NH$,

$$CH_3 - \overset{O}{\overset{||}{C}} - NHCH_2CH_2CH_3,$$

$CH_3CH_2 - CH = NH$

A. $CH_3CH_2C \equiv N$

B. $(CH_3CH_2CH_2)_2NH$

C. $CH_3 - \overset{\overset{O}{||}}{C} - NHCH_2CH_2CH_3$

D. $CH_3CH_2 - CH = NH$

Answer: C

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16. Select the incorrect statement.

A. Methyl cyanide is reduced to methyl amine by $LiAlH_4$

B. Methyl isocyanide is hydrolysed to methyl amino

C. Homologated 1° amine is obtained in the process $R - Br \xrightarrow{NaCN} \xrightarrow{LiAlH_4}$

D. Acetamide is reduced to ethyl amine by $LiAIH_4$

Answer: A

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17. Cope elimination is an intramolecular E_2 reaction because : It is given by tertiary amine, It is given by tertiary amine oxide containing B-hydrogen, The nucleophile and leaving group are in the same molecule, The less substituted alkene is the major product

A. It is given by tertiary amine

B. It is given by tertiary amine oxide containing B-hydrogen

C. The nucleophile and leaving group are in the same molecule

D. The less substituted alkene is the major product

Answer: C

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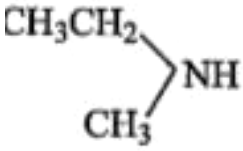
18. Which is most volatile?

A. $CH_3CH_2CH_2NH_2$

B. $(CH_3)_3N$

C. 

D. $CH_3CH_2CH_3$

Answer: B

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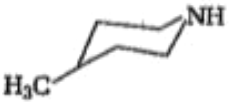
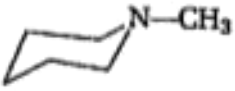
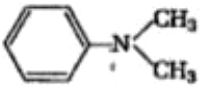
19. Which has maximum boiling point? :

A. 

B. 

C. $(CH_3)_3N$

D. 

Answer: D

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20. The product formed by the reaction of acetamide with bromine in the presence of NaOH is

A. CH_3CN

B. CH_3CHO

C. CH_3CH_2OH

D. CH_3NH_2

Answer: D

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21. Acetamide and ethyl amine are distinguished by reacting with

A. Br_2 water

B. acidic $KMnO_4$

C. aq. NaOH and heat

D. aq. HCl and heat

Answer: C

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22. The reaction in which primary amine is not formed

A. $CH_3NC \xrightarrow{LiAH_4}$

B. $CH_3CONH_2 \xrightarrow{LiAH_4}$

C. $CH_3CN \xrightarrow{LiAH_4}$

D. $CH_3CONH_2 \xrightarrow{KOH\ /\ Br_2}$

Answer: A

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23. Which of these alkyl halides can be used to prepare amines using Gabriel phthalimide synthesis?

A. Vinyl bromide

B. 1-Bromo-3-methylpentane

C. Bromobenzene

D. 2-Bromo-2, 3-dimethylbutane

Answer: B

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24. Which one of the following methods is neither meant for the synthesis nor for separation of amines?

A. Hinsberg method

B. Hofmann method

C. Wurtz reaction

D. Curtius reaction

Answer: C

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25. Considering the basic strength of amines in aqueous solution, which one has the smallest pK_b value?

A. $(CH_3)_2NH$

B. CH_3NH_2

C. $(CH_3)_3N$

D. $C_6H_5NH_2$

Answer: A

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26. In the chemical reaction, $CH_3CH_2NH_2 + CHCl_3 + 3KOH \rightarrow (A) + (B) + 3H_2O$, the compounds(A) and (B) are respectively :

A. C_2H_5CN and $3KCl$

B. $CH_3CH_2CONH_2$ and $3KCl$

C. C_2H_5NC and K_2CO_3

D. C_2H_5NC and $3KCl$

Answer: D

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27. The final product formed when ethyl amine is treated with $NaNO_2$ and HCl is

A. diazomethane

B. ethyl alcohol

C. methyl cyanide

D. nitromethane

Answer: B

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28. Conversion of benzene diazonium chloride to chlorobenzene is an example of which of the following reactions?

A. Claisen

B. Friedel-Craft

C. Sandmeyer

D. Wurtz

Answer: C

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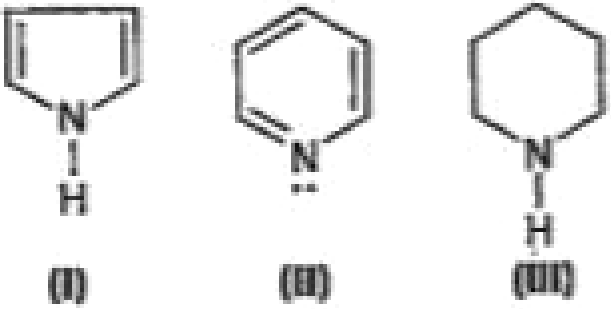
29. Arrange the following compounds in decreasing order of their basic character.



A. $I > II > III$

B. $II > III > I$

C. $III > II > I$

D. $I > III > II$

Answer: C

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30. What is the end product in the following sequence of reactions?

Acetamide $\xrightarrow[\text{Heat}]{P_2O_5} A \xrightarrow[\text{Zn/HCl}]{[H]} B$

A. Methylamine

B. Ethylamine

C. Methyl isocyanide

D. Ammonium acetate

Answer: B

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31. Which of the following cannot produce hydrogen when treated with metallic sodium? : $CH_3NH_2, (CH_3)_3N, (CH_3)_2NH, C_6H_5NH_2$

A. CH_3NH_2

B. $(CH_3)_3N$

C. $(CH_3)_2NH$

D. $C_6H_5NH_2$

Answer: B

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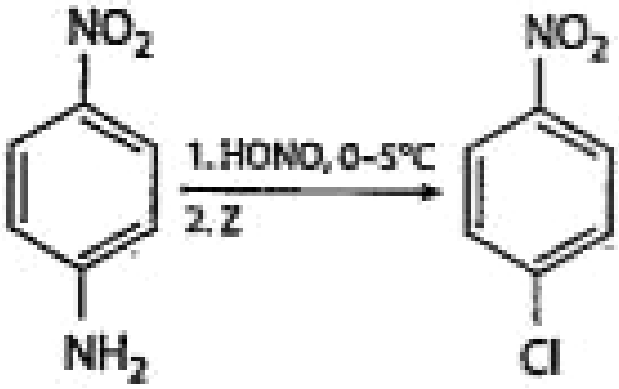
32. Consider the synthesis below. What is reagent Z?



A. $CuCl$

B. $CuCl_2$

C. $NaCl$

D. KCl

Answer: A

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33. The reduction of which of the following compounds would yield secondary amine?

A. Alkyl nitrile

B. Carbylamine

C. Primary amine

D. Secondary nitro compounds

Answer: B

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34. Lowest boiling point will be of the compound

A. Ethylamine

B. Ethylmethylamine

C. 1-Propanamine

D. N,N-Dimethylmethanamine

Answer: D

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35. Which of the following can be detected by carbylamine reaction-

A. Urea

B. CH_3CONH_2

C. $C_2H_5NH_2$

D. $C_2H_5NHCH_3$

Answer: C

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36. Which of the following is produced by reducing RCN in sodium and alcohol?

A. $RCONH_2$

B. $RCOONH_4$

C. RCH_2NH_2

D. $(RCH_2)_3N$

Answer: C

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37. When a solution of aliphatic amine is treated with HNO_2 the effervescence occurs due to the formation of

A. CO_2

B. NO_2

C. N_2

D. H_2

Answer: C

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38. The compound which on reaction with aqueous nitrous acid at a low temperature produces an oily nitrosamine is

A. diethyl amine

B. ethyl amine

C. aniline

D. methyl amine

Answer: A

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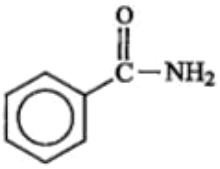
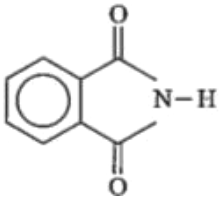
39. Which of the following can not give Hoffmann's bromamide reaction:

A. $Me - \overset{\overset{O}{||}}{C} - NH - Br$

B. 

C. $Me - \overset{\overset{O}{||}}{C} - NH - Me$

D. 

Answer: C

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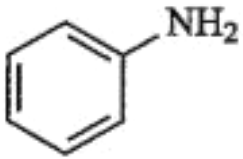
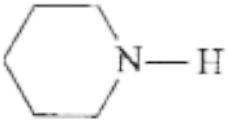
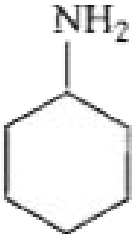
40. Which of the following is the weakest Bronsted base?

A. 

B. 

C. 

D. CH_3NH_2

Answer: A

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41. In the nitration of benzene using a mixture of conc. H_2SO_4 and conc. HNO_3, the species which initiates the reaction is .....

A. NO_2

B. NO^+

C. NO_2^+

D. NO_2^-

Answer: C

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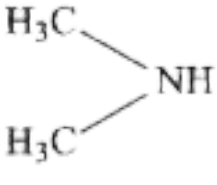
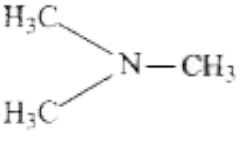
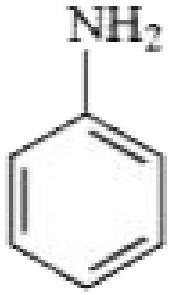
42. The most reactive amine towards dilute hydrochloric acid is .....

A. $CH_3 - NH_2$

B. 

C. 

D. 

Answer: B

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43. Best method for preparing aliphatic primary amines from alkyl halides without changing the number of carbon atoms in the chain is

A. Hofmann bromamide reaction

B. Gabriel phthalimide synthesis

C. Sandmeyer reaction

D. Reaction with NH_3

Answer: B

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44. The electrolytic reduction of nitrobenzene in strongly acidic medium produces

A. azobenzene

B. aniline

C. p-aminophenol

D. azoxybenzene

Answer: C

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45. m-Bromoaniline can be prepared by

A. $C_6H_6 \xrightarrow[H_2SO_4]{HNO_3} \xrightarrow[2.NaO, H_2O]{1.Sn-HCl} \xrightarrow[H_2O]{Br_2}$

B. $C_6H_6 \xrightarrow[FeBr_2]{Br_2} \xrightarrow[H_2SO_4]{HNO_3} \xrightarrow[Pt]{H_2}$

C. $m - BrC_6H_4COOH \xrightarrow{SOCl_2} \xrightarrow{NH_3} \xrightarrow{Br_2, NaOH}$

D. $C_6H_5NH_2 \xrightarrow[Cu_2Br_2]{NaNO_2, HCl} \xrightarrow{SOCl_2} \xrightarrow{NaNH_2}$

Answer: C

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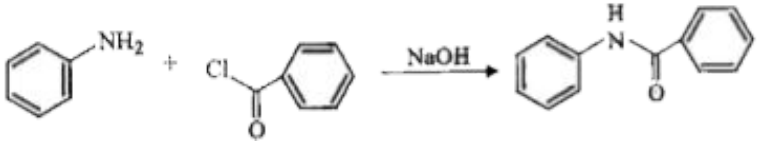
46. The following reaction



is known by the name

A. Perkin's reaction

B. Acetylation reaction

C. Schotten-Baumann reaction

D. Friedel-Craft's reaction

Answer: C

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

A. suppress the concentration of free aniline

B. suppress the hydrolysis to phenol

C. ensure a stochiometric amount of nitrous acid

D. neutralise the base liberated

Answer: A

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48. Which of the following is not the correct reaction of aryl diazonium salts?

A. $C_6H_5N_2^+Cl^- + Cu_2Cl_2 \rightarrow C_6H_5Cl$

B. $C_6H_5N_2^+Cl^- + HBF_4 \xrightarrow{\text{Heat}} C_6H_5F$

C. $C_6H_5N_2^+Cl^- + H_3PO_2 \rightarrow C_6H_5PO_4$

D.

$$C_6H_5N_2^+Cl^- + SnCl_2/HCl \rightarrow C_6H_5NHNH_2$$

Answer: C

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49. Hinsberg's reagent is:

A. benzene sulphonamide

B. benzene sulphonic acid

C. benzene sulphuryl chloride

D. benzene sulphonyl chloride

Answer: D

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50. Methyl ethyl propyl amine forms non-superimposable mirror images but it does not show optical activity because:

A. of rapid flipping

B. amines are basic in nature

C. nitrogen has a lone pair of electrons

D. of absence of asymmetric nitrogen

Answer: A

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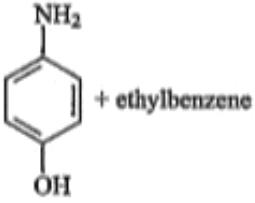
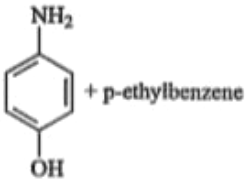
Level Ii

1. Which is the starting reagent used to make the given azo compound?

A. 

B. 

C. p-ethylaniline and phenol

D. Aniline and p-ethylphenol

Answer: C

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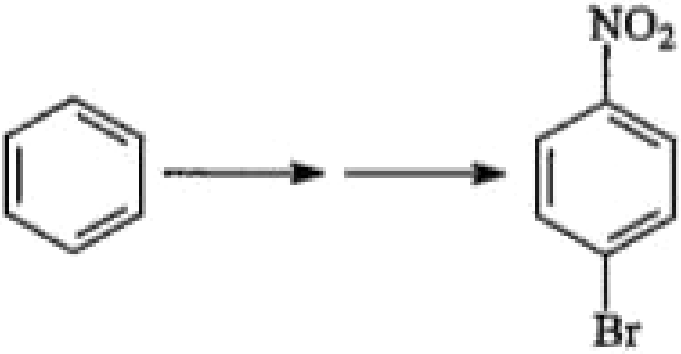
2. Choose the reaction sequence that could be used in the following tranformation.



A. $\xrightarrow[H_2SO_4]{HNO_3} \xrightarrow[FeBr_3]{Br_2}$

B. $\xrightarrow[H_2SO_4]{HNO_3} \xrightarrow{NBS}$

C. $\xrightarrow[HCl]{NaNO_2} \xrightarrow[FeBr_3]{Br_2}$

D. $\xrightarrow[FeBr_3]{Br_2} \xrightarrow[H_2SO_4]{HNO_3}$

Answer: D

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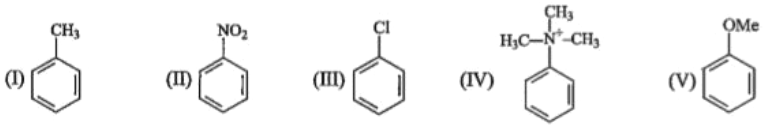
3. Rank the following compounds in terms of their relative reactivity in nitration.



A. $IV > II > III > I > V$

B. $V > I > III > II > IV$

C. $III > II > IV > I > V$

D. $V > I > IV > II > III$

Answer: B

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4. The aromatic heterocyclic base pyridine is sulphonated by heating with conc. sulphuric acid. Which of the following statements about this reaction is correct?

A. Pyridine reacts more rapidly than benzene and is sulphonated at C-3

B. Pyridine reacts more rapidly than benzene and is sulphonated at C-2 and C-4

C. Pyridine reacts more slowly than benzene and is sulphonated at C-3

D. Pyridine reacts more slowly than benzene and is sulphonated at C-2 and C-4

Answer: C

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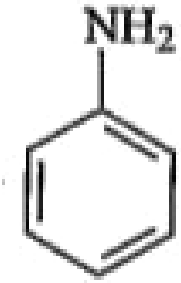
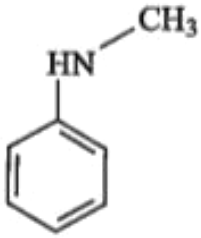
5. In which of the following compounds is there the least delocalization of the lone pair of electrons on the nirtogen atom?

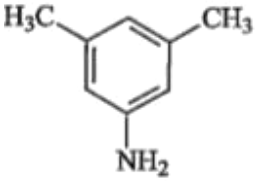
A.



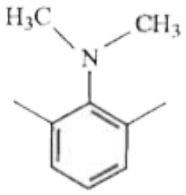
B.



C.



D.



Answer: D

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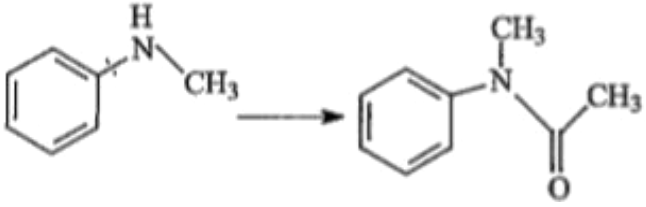
6. Give the reagents that will best accomplish the following transformation



A.

$$NaOH/CH_3CH_2OH/CrO_3, H_2O/H_2SO_4$$

B. Acetone/Heat

C. CH_3CHO/Heat

D. $(CH_3CO)_2O$

Answer: D

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7. Which of the following statements is/are true about amines?

A. A. Amine salts are soluble in ether but insoluble in water

B. B. Amines have an unshared pair of electrons on nitrogen atom due to which they behave as Lewis acid

C. C. Basic character of amines can be understood in terms of their K_b and pK_b values

D. D. All of the above

Answer: C

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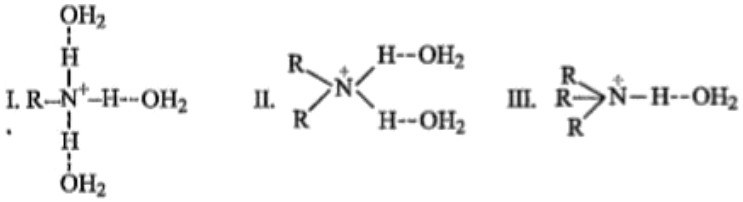
8. Arrange the following structure of quaternary salt in the decreasing order of stability by

solvation.



A. $I > II > III$

B. $I > III > II$

C. $II > III > I$

D. $II > I > III$

Answer: A

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9. Which of the following statements are correct?

1.In Sandmeyer reaction nucleophile like Cl^-, Br^- and CN^- are introduced in benzene ring in the presence of Cu^+ ion

(ii) In Galtermann reaction nucleophiles are introduced in benzene ring in the presence of copper powder and HCI

3. The yield in Gattermann reaction is found to be better than Sandmeyer reaction .

A. (i) and (ii)

B. (i), (ii) and (iii)

C. (ii) and (iii)

D. (i) and (iii)

Answer: A

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10. Indicate which nitrogen compound amongst the following would undergo Hoffmann bromamide reaction to furnish the primary amine $(R - NH_2)$.

A. $RCONHCH_3$

B. $RCOONH_4$

C. $RCONH_2$

D. $R - CO - NHOH$

Answer: C

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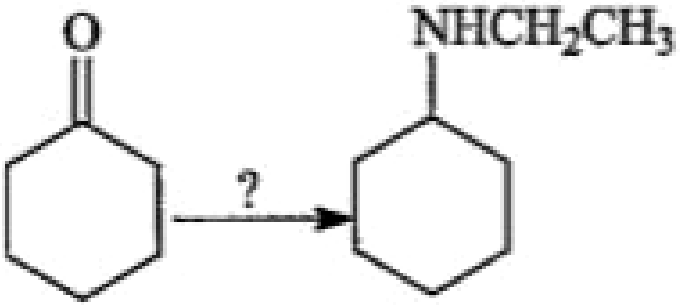
11. Reagents capable of converting cyclohexanone to N-ethyl cyclohexylamine is



A. CH_3CH_2Br and NH_3

B. $CH_3CH_2NH_2$ and H_2/Pt

C. $CH_3CH=O$ and NH_3

D. $LiAlH_4$ followed by H_2O and then CH_3CH_2Br

Answer: B

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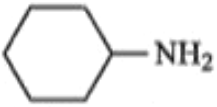
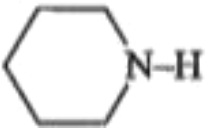
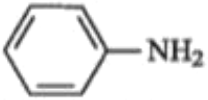
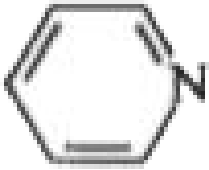
12. Which has the highest value of pk_b ?

A. 

B. 

C. 

D. 

Answer: C

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13. $C_4H_{11}N$ on reaction with HNO_2 forms tertiary alcohol. Thus, $C_4H_{11}N$ is

A. Primary amine

B. Secondary amine

C. Tertiary amine

D. Quaternary ammonium salt

Answer: A

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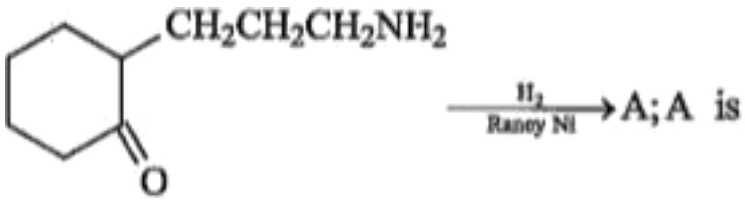
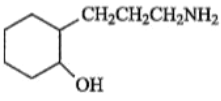
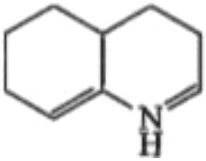
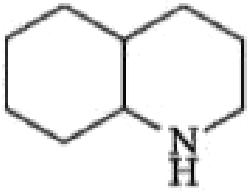
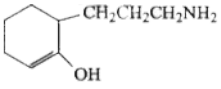
14. 

A. 

B. 

C. 

D. 

Answer: C

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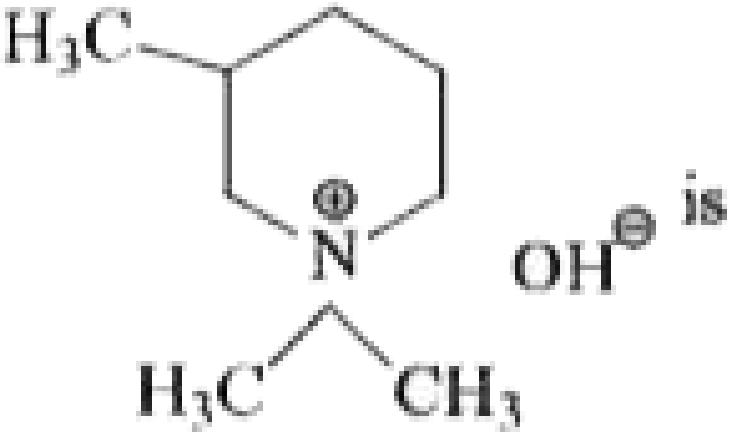
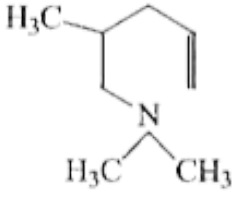
15. Hofmann's elimination product of



is

A.



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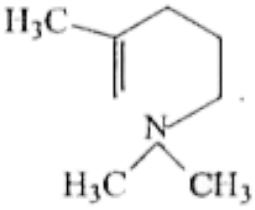
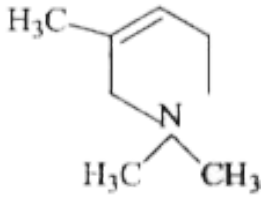


C. 

D. 

Answer: A

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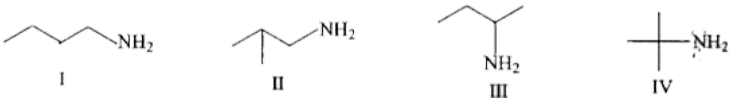
16. Basic nature of the following is in order



A. $I < II < III < IV$

B. $IV < II < III < I$

C. $I < III < IV < II$

D. $II < IV < III < I$

Answer: A

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17. The major products from the following sequence of reactions are

$$(CH_3)_2CHCH_2N(CH_2CH_3)_2 \xrightarrow{CH_3I} \xrightarrow[H_2O]{Ag_2O} \xrightarrow{\text{heat}} ?$$

A. $(CH_3)_2CHCH_2NH_2 + H_2C = CH_2$

B. $(CH_3)_2NCH_2CH_3 + H_2C = C(CH_3)_2$

C.

$$(CH_3)_2CHCH_2\overset{CH_3}{\underset{|}{N}}CH_2CH_3 + H_2C = CH_2$$

D. $(CH_3)_3\overset{+}{N}CH_2CH_3I^- + H_2C = CH_2$

Answer: C

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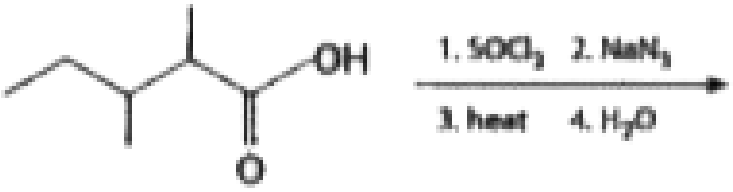
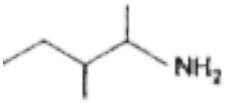
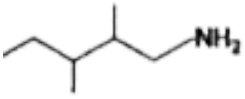
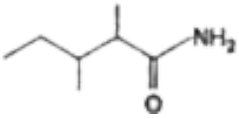
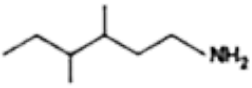
18. What is the product of the following reaction?



A. 

B. 

C. 

D. 

Answer: A

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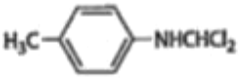
19. The reaction of chloroform with alcoholic KOH and p-toluidine forms

A. 

B. 

C. 

D. 

Answer: D

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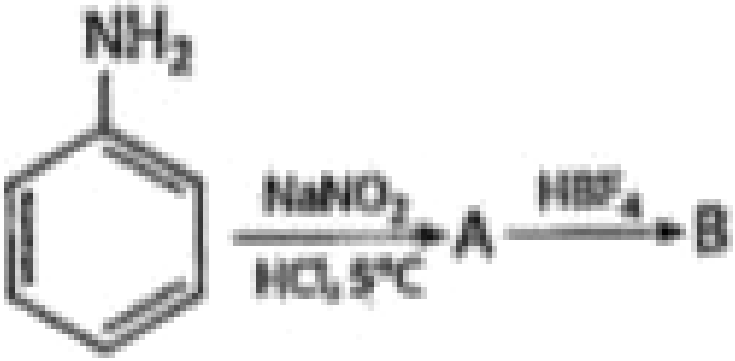
20. In the chemical reaction



the compounds A and B, respectively are

A. nitrobenzene and chlorobenzene

B. nitrobenzene and flurobenzene

C. phenol and benzene

D. benzene diazonium chloride and flurobenzene

Answer: D

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21. Which of the following is the correct statement about coupling reaction of diazonium salts?

A. In coupling reactions, diazonium ion works as a nucleophile

B. Coupling takes place almost exclusively at the ortho position with aniline and phenol

C. Coupling with phenol and aniline is most rapid in slightly acidic medium

D. Coupling with phenol is most rapid in slightly basic medium

Answer: D

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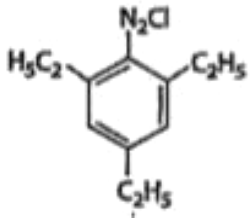
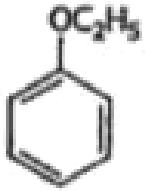
22. Identify the end product Z in the following sequence.

$$C_6H_5NH_2 \xrightarrow[320K]{NaNO_2/HCl} X \xrightarrow{aq.NaOH} Y \xrightarrow{C_2H_5I} Z$$

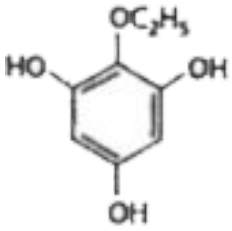
A.



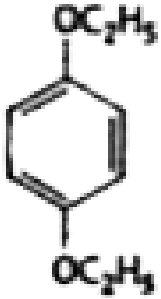
B.



C.



D.



Answer: B

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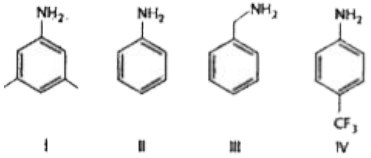
23. Arrange the following amines in order of increasing basicity (least to most) in aqueous solution:



A. $IV < II < I < III$

B. $III < II < IV < I$

C. $III < I < II < IV$

D. $II < III < I < IV$

Answer: A

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24. Aniline is treated with bromine water and the resulting product is treated with an aqueous soluition of sodium nitrite in presence of dilute HCl. The compound so formed is converted into tetrafluoroborate which is subsequently heated dry. The final product is

A. p-bromofluorobenzene

B. p-bromoaniline

C. 2,4,6-tribromofluorobenzene

D. 1,3,5-tribromobenzene

Answer: C

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25. 

In the above sequence, II is

A. alanine

B. glycine

C. ethylenediamine

D. γ -aminobutyric acid

Answer: A

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26. Determine the end product of the following reactions

$$C_2H_5NH_2 \xrightarrow{HNO_2} A \xrightarrow{PCl_5} B \xrightarrow{NH_3} C$$

A. ethyl cyanide

B. methyl amine

C. ethyl amine

D. acetamide

Answer: C

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27. Benzylamine may be alkylated as shown in the following equation:

$C_6H_5CH_2NH_2 + R - X \rightarrow C_6H_5CH_2NHR.$

Which of the following alkyl halides is beset suited for this reaction through S_N 1 mechanism ?

A. CH_3Br

B. C_6H_5Br

C. $C_6H_5CH_2Br$

D. C_2H_5Br

Answer: C

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28. Which of the following reagents would not be a good choice for reducing an aryl nitro compound to an amine?

A. H_2 (excess) Pt

B. $LiAlH_4$ in ether

C. Fe and HCl

D. Sn and HCl

Answer: B

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29. Amongst the given set of reactants, the most appropriate for preparing 2° amine is.....

A. $2^\circ R - Br + NH_3$

B. $2^{\circ} R - Br + NaCN$followed by H_2 / Pt

C. $1^{\circ} R - NH_2 + RCHO$ followed by H_2 / Pt

D. None of these

Answer: C

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30. Which of the following methods of preparation of amines will not give same number of carbon atoms in the chain of amines as in the reactant?

A. Reaction of alkyl nitrile with $LiAlH_4$

B. Reaction of amide with $LiAlH_4$ followed by treatment with water

C. Heating alkyl halide with potassium salt of phthalimide followed by hydrolysis

D. Treatment of amide with bromine in aqeous solution of sodium hydroxide

Answer: D

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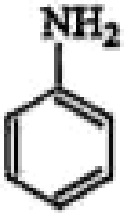
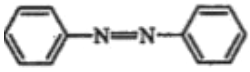
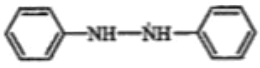
31. The product 'Y' in the following reaction sequence is

A. 

B. 

C. 

D. 

Answer: C

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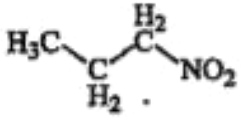
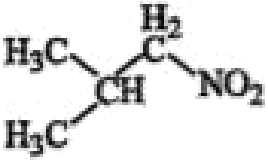
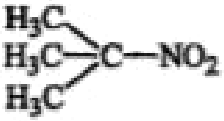
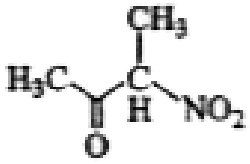
32. Which one of the following nitro-compounds does not react with nitrous acid?

A. 

B. 

C. 

D. 

Answer: C

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33. 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

A. CH_3CH_2COOH

B. CH_3COOH

C. $CH_3CH_2CH_2COOH$

D. $CH_3 - \underset{\underset{CH_3}{|}}{C}\ H - COOH$

Answer: A

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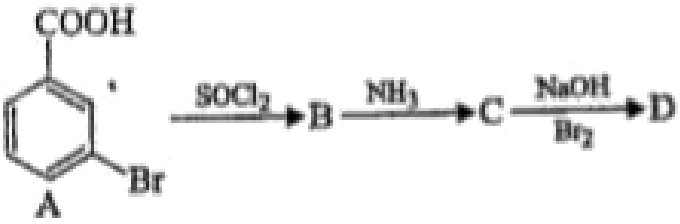
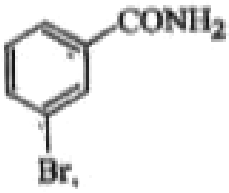
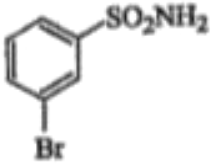
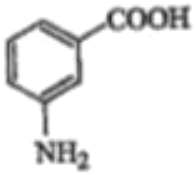
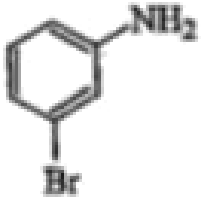
34. In a set of reactions, m-bromobenzoic acid gave a product D. Identify the product D.



A. 

B. 

C. 

D. 

Answer: D

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35. The correct statement regarding the basicity of arylamines is

A. arylamines are generally more basic than alkylamines because of aryl group.

B. arylamines are generally more basic than alkylamines because the nitrogen atom in alkylamines is sp-hybridised.

C. arylamines are generally less basic than alkylamines because the nitrogen lone-pair

electrons are delocalised by interaction with the aromatic ring π-electron system

D. arylamines are generally more basic than alkylamines because the nitrogen lone-pair electrons are not delocalised by interaction with the aromatic ring π-electron system.

Answer: C

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36. An organic compound 'A' on reduction gives compound 'B' which on reaction with trichloromethane and caustic potash forms 'C'. The compound 'C' on catalytic reduction gives N-methylbenzenamine, the compound 'A'is

A. nitrobenzene

B. nitromethane

C. methanamine

D. benzenamine

Answer: A

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37. Although amino group ls-o- and p- directing in aromatic electrophilic substitution reactions, aniline on nitration gives a substantial amount of m-nltro aniline. Why?

A. In nitration mixture, ortho, para-activity of NH_2 group is completely lost

B. $-NH_2$ becomes $-NH_3^+$ which is m-directing

C. $-NH_2$ becomes $-NH^+SO_4^-$ which is m-directing

D. $-NH_2$ becomes $-NH^{-N}O_2^+$ which is m-directing

Answer: B

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38. The correct sequence of reactions to be performed to convert benzene into m-bromoaniline is

A. nitration, reduction, bromination

B. bromination, nitration, reduction

C. nitration, bromination, reduction

D. reduction, nitration, bromination

Answer: C

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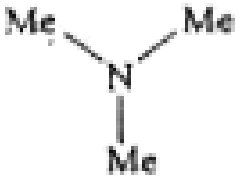
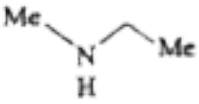
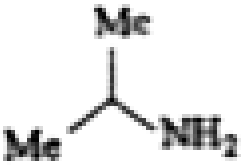
39. An amine reacts with benzene sulphonyl chloride to form a white precipitate which is insoluble in aq. NaOH. The amine is

A. 

B. 

C. 

D. 

Answer: B

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40. When propane is subjected to the treatment with fuming nitric acid at 673 K, which of the following will not be formed?

A. 1-Nitropropane

B. 2-Nitropropane

C. Nitromethane

D. Nitrohexane

Answer: D

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41. A nitrogenous substance (X) is treated with HNO, and the product so formed is further treated with NaOH solution, which produces blue colouration. Which of the following can(X) be?

A. $CH_3CH_2NH_2$

B. $CH_3CH_2NO_2$

C. CH_3CH_2ONO

D. $(CH_3)_2CHNO_2$

Answer: D

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

A. $R - X + NH_3 \rightarrow$

B. $R - CH = NOH + [H] \xrightarrow[C_2H_5OH]{Na}$

C. $R - CN + H_2O \xrightarrow{H^{\oplus}}$

D. $R - CONH_2 + 4[H] \xrightarrow{LiAlH_4}$

Answer: C

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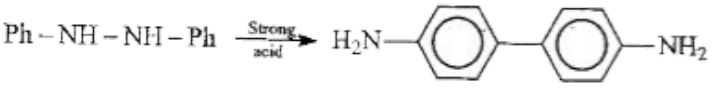
43. The following reaction is:



A. Benzidine rearrangement

B. Pinacol-Pinacolone rearrangement

C. Fries rearrangement

D. Benzil-benzilic acid arrangement

Answer: A

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44. An amine on treatment with HNO_2 evolved N_2 . The amine on exhaustive methylation with CH_3I formed a quaternary salt containing 59.07% iodine. The amine is likely to be:

A. CH_3NH_2

B. $(CH_3)_2NH$

C. $C_2H_5NH_2$

D. $(CH_3)_2N$

Answer: C

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45. Reaction of cyclohexanone with dimethylamine in the presence of catalytic amount of an acid forms a compound if water during the reaction is

continuously removed. The compound formed is generally known as

A. An enamine

B. a Schiff's base

C. an amine

D. an imine

Answer: A

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46. Which gives black precipitate on reaction with CS_2 followed by addition of $HgCl_2$?

A. $(CH_3)_3CNH_2$

B. $(C_2H_5)_2NH$

C. $(CH_3)_3N$

D. all the three

Answer: A

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47. Which among the following amines can be directly oxidised to the corresponding nitro compound by potassium permanganate?

A. CH_3NH_2

B. $(CH_3)_2CH - NH_2$

C. $(CH_3)_2NH$

D. $(CH_3)_3C - NH_2$

Answer: D

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48. Which of the following compounds will dissolve in an alkali solution after it undergoes reaction with Hinsberg's reagent?

A. CH_3NH_2

B. $(CH_3)_3N$

C. $(C_2H_5)_2NH$

D. $C_6H_5NHC_6H_5$

Answer: A

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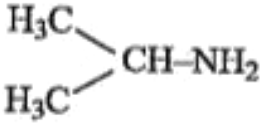
Level Iii Single Correct Answer Type

1. An organic compound (C_3H_9N) (A), when treated with nitrous acid, gave a alcohol and N_2 gas was evolved. (A) on warming with $CHCl_3$ and caustic potash gave (C) which on reduction gave isopropylmethylamine. Predict the structure of(A)

A. 

B. $CH_3CH_2 - NH - CH_3$

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

D. $CH_3CH_2CH_2 - NH_2$

Answer: A

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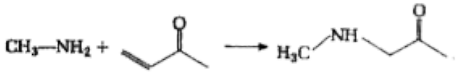
2. CH_3NH_2 reacts with $\alpha - \beta$-unsaturated ketone as shown



Select the correct statements out of I, II and III.

I. Product is by conjugate addition

II. It is called Michael reaction

III. Intermediate is Zwitter ion which tautomerises after the proton transfer

A. I,II

B. I,III

C. II,III

D. I,II,III

Answer: D

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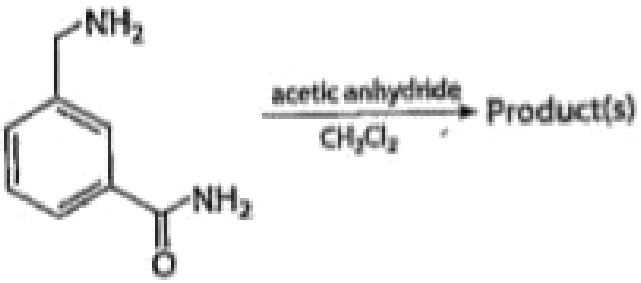
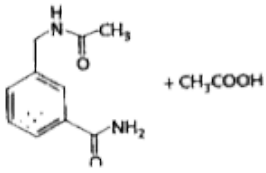
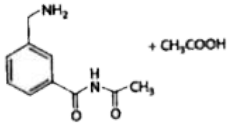
3. In the reaction shown below, the major product(s) formed is/are


NH2
NH2
O
acetic anhydride
CH2Cl2
Product(s)

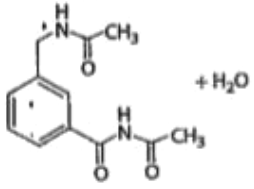
A.


H
N
CH3
O
NH2
+ CH3COOH

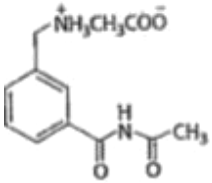
B.


NH2
+ CH3COOH
H
N
CH3
O
O

C.


H
N
CH3
O
+ H2O
H
N
CH3
O
O

D.


NH3CH2COO
H
N
CH3
O
O

Answer: A

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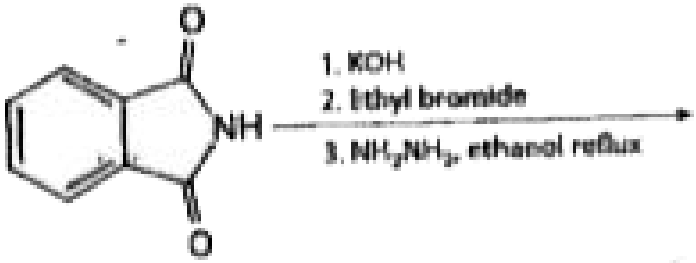
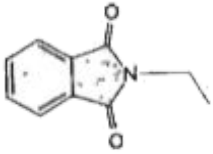
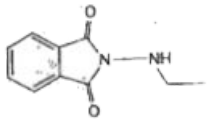
4. What is the product of the following reaction?



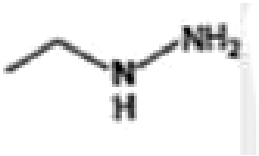
A.



B.



C. 

D. 

Answer: C

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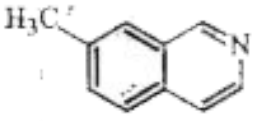
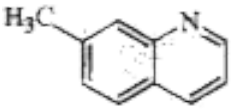
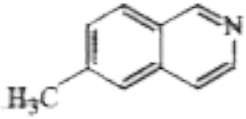
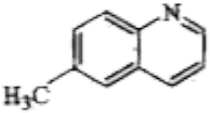
5. In the following reactions, the product S is,

A. 

B. 

C. 

D. 

Answer: B

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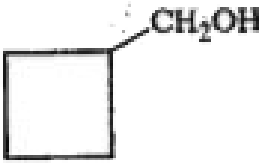
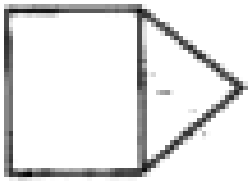
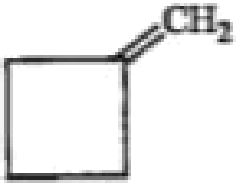
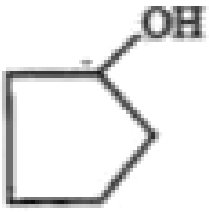
6. Treatment of cyclobutylmethylamine with nitrous acid does not give

A. 

B. 

C. 

D. 

Answer: D

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7. 4-Nitrotoluene is treated with bromine water to get compound 'P'. P is reduced with Sn and HCl to compound 'Q'. 'Q' is diazotised to and the product is treated with phosphinic acid to get compound 'R'. It is oxidised with alkaline $KMnO_4$ to get compound 'S' Compound 'S' is

A. 2-bromo-4-hydroxybenzoic acid

B. benzoic acid

C. 4-bromobenzoic acid

D. 2-bromobenzoic acid

Answer: D

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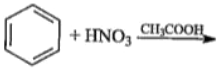
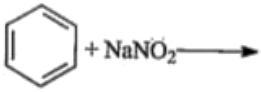
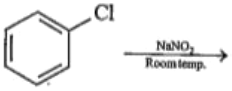
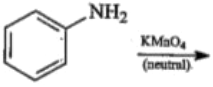
Level Iii Multiple Choice Answer Type

1. Which of the following reaction(s) will give nitrobenzene?

A. 

B. 

C. 

D. 

Answer: A::D

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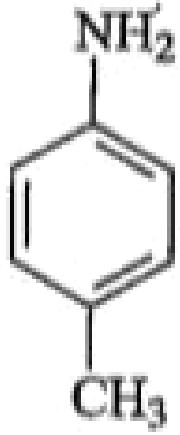
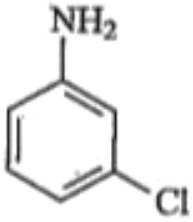
2. Diazonium salt of which of the following substituted aromatic amine undergoes faster couplings with phenol than benzenediazonium chloride?

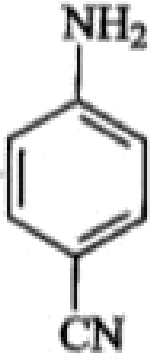
A.



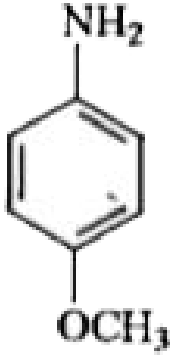
B.



C.



D.



Answer: B::C

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3. Which of the following reagent(s) can be used for protection of amine($-NH_2$) group of aniline during electrophilic aromatic substitution reaction and that too without changing orientational effect?

A. $(CH_3CO)_2O$

B. $C_6H_5SO_2Cl$

C. $KMnO_4/OH$

D. C_6H_5COCl

Answer: A::B::D

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4. When the dehydration of acetamide to acetonitrile occurs, which of the following observation can not take place?

A. P_2O_5 can be used as dehydrating agent

B. Hybridisation of carbon in reactant to product changes sp^2 to sp

C. N-atom of reactant is less basic than that of product

D. This reaction is known as nucleophilic substitution reaction

Answer: A::B::C

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5. By reacting with which of the following reagents CH_3NH_2 will form a solid derivative?

A. $PhSO_2Cl$

B. $(COOEt)_2$

C. H_2SO_4

D. $CHCl_3 + KOH$

Answer: A::B::C

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6. Which of the following statements is/are true

A. Acidic and alkaline hydrolysis of isocyanides produce the same products

B. Acidic and alkaline hydrolysis of cyanides produce the same products

C. Cyanides on partial hydrolysis form amides

D. Among isomeric cyanides and isocyanides, cyanides are higher boiling than isocyanides

Answer: C::D

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7. Which of the following give primary amine on reduction?

A. $CH_3 - CH_2 - O - N = O$

B. $CH_3CH_2ONO_2$

C. $CH_3CH_2CH_2ONO_2$

D. $CH_3 - CH_2 - \overset{\overset{O}{||}}{N} \rightarrow O$

Answer: A::B::C

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8. The reagents used to distinguish between $(CH_3)_3N, (CH_3)_2NH$ is/are

A. Benzene sulphonyl chloride

B. CS_2 followed by $HgCl_2$

C. Baeyer's reagent

D. $NaNO_2$ and HCI

Answer: A::B::D

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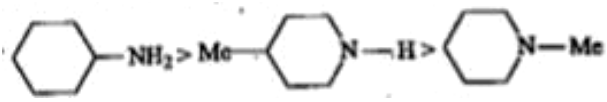
9. Which of the following statements are correct?

A. The extent of H-bonding is greater in 1° than 2° and 3° amines

B. The boiling points of isomeric amines are in the order: $1^\circ > 2^\circ > 3^\circ$

C. The boiling points of



D. The boiling points of

$C_6H_9NH_2 > Me_2N - Et > (C_2H_5)_2NH.$

Answer: A::B::C

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10. Which of the following statements are correct?

A. In gas phase, the basic character of amine is $3^{\circ} > 2^{\circ} > 1^{\circ}$. Due to the +I effect of $\left(R^{-}\right)$, the availability of LP $\bar{e}$'s on N increases.

B. In aqueous medium, the basic character of amine is $Me_2NH > Me_3N > MeNH_2 > NH_3$

C. In aqueous medium, the addition of protons increases crowding and thus strains setup, which being the highest in 3° amine decreases its basic character.

D. In aqueous medium, the ammonium ions in solution are stabilised not only by alkyl groups but also by H-bond donation to the solvent.

Answer: A::C::D

11. A negative carbylamine test is given by

A. N,N-dimethylaniline

B. 2,4-dimethylaniline

C. N-methyl-o-methylaniline

D. p-methylbenzylamine

Answer: A::C

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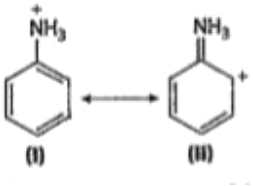
12. Examine the following structures for the anilinium ion, and choose the correct statement from the ones given below.



A. II is not an acceptable canonical structure because carbonium ions are less stable than ammonium ions

B. II is not an acceptable canonical structure because it is not aromatic

C. II is not an acceptable canonical structure because the nitrogen has 10 valence electrons

D. II is an acceptable canonical structure

Answer: A::C

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Level Iii Numerical Type

1. The total number of lone-pairs of electrons in melamine is.....

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2. The number of nitrogen atoms present in chloramphenicol is.....

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3. Number of structural isomers possible for the molecular formula C_3H_9N is

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4. 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

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5. How many of the following amines will undergo diazotisation?

tert-Butylamine, ethanamine, aniline, N-methylaniline, p-toluidine, m-chloroaniline, 2-phenylethanamine o-anisidihe, 2,4,6-tribromoaniline.

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Level Iii Matching Column Type

1. Match the following columns :

Column-I (Reagent/Reaction		Column-II (Product)	
(a)	Reductive amination	(p)	1° amines
(b)	Isonitriles	(q)	2° amines
(c)	Hofmann bromamide	(r)	3° amines
(d)	Alkyl azides	(s)	Isocyanate is formed as intermediate

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2. Match the following columns :

Column-I (Reagent)		Column-II (Use)	
(a)	$PhSO_2Cl$	(p)	Distinction of $1^{\circ}, 2^{\circ}, 3^{\circ}$ amines
(b)	$(COOC_2H_5)_2$	(q)	Separation of $1^{\circ}, 2^{\circ}, 3^{\circ}$ amines from their mixture
(c)	$CHCl_3 + KOH$	(r)	Distinction of 1° amines from 2° and 3° amines
(d)	PhCOCl	(s)	Schotten-Baumann reaction

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3. Match the reaction with the product obtained

Column I	Column II
A) Reaction product of amines with alcoholic KOH and $CHCl_3$	p) $C_6H_5CH_2NH_2$
B) Reduction product of nitrogen containing compound with $LiAlH_4$	q) $C_6H_5NH_2$
C) Reaction product of 1° amides with Br_2+KOH	r) C_6H_5NC
D) Gabriel phthalimide reaction	s) $CH_3CH_2NH_2$

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4. Match the reactant with the reaction it undergoes.

Column I	Column II
A) $CH_3CH_2CH_2CN$	p) Reduction with Pd/H_2
B) $CH_3CH_2CONH_2$	q) Reduction with $SnCl_2/HCl$
C) $C_6H_5N(CH_3)COCH_3$	r) Development of foul smell on treatment with KOH and $CHCl_3$
D) $CH_3CH_2CH_2CH_2NH_2$	s) Reduction with diisobutyl aluminium hydride (DIBAL-H)
	t) Reaction with bromine in NaOH

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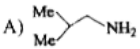
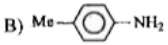
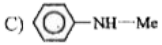
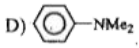
5. Matching

Column I Compound	Column II Characteristics
A) 	p) Liebermann's nitroso reaction
B) 	q) Evolution of N_2 with HNO_2
C) 	r) Dye test
D) 	s) Green colour with HNO_2 t) Carbylamine test

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Level Iii Statement Type

1. Statement 1 : Alkyl cyanide can be prepared by carbylamine reaction.

Statement 2 : Ethyl amine when heated with chloroform in presence of alcoholic KOH gives isocyanide

A. Statement 1 is True, statement 2 is True, Statement 2 is Correct explanation for Statement 1.

B. Statement 1 is True, Statement 2 is True, Statement 2 is NOT a correct explanation for Statement 1.

C. Statement 1 is True, Statement 2 is False.

D. Statement 1 is False, Statement 2 is True.

Answer: D

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2. Statement 1 : In strongly acidic solutions, aniline becomes more reactive towards electrophilic reagents

Statement 2 : The amino group is protonated in strongly acidic solution, and thus the lone pair of electron on the nitrogen is no longer available for resonance.

A. Statement 1 is True, statement 2 is True, Statement 2 is Correct explanation for Statement 1.

B. Statement 1 is True, Statement 2 is True, Statement 2 is NOT a correct explanation for Statement 1.

C. Statement 1 is True, Statement 2 is False.

D. Statement 1 is False, Statement 2 is True.

Answer: D

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3. Statement 1 Aromatic primary amines cannot be prepared by Gabriel phthalimide synthesis.

Statement 2 : Aryl halides do not undergo electrophilic substitution with anion formed by phthalimide.

A. Statement 1 is True, statement 2 is True, Statement 2 is Correct explanation for Statement 1.

B. Statement 1 is True, Statement 2 is True, Statement 2 is NOT a correct explanation for Statement 1.

C. Statement 1 is True, Statement 2 is False.

D. Statement 1 is False, Statement 2 is True.

Answer: C

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4. Statement 1 : Hofmann bromamide reaction takes place between an amide and Br_2 in basic medium.

Statement 2: The reaction proceeds by the formation of $\left(R-\ddot{\dot{N}}:\right)$

A. Statement 1 is True, statement 2 is True, Statement 2 is Correct explanation for Statement 1.

B. Statement 1 is True, Statement 2 is True, Statement 2 is NOT a correct explanation for Statement 1.

C. Statement 1 is True, Statement 2 is False.

D. Statement 1 is False, Statement 2 is True.

Answer: C

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5. Statement 1 : Coupling of $PhN\overset{\oplus}{H}_2$ with aniline is faster than with phenol.

Statement 2 : Aniline is more electron donating than phenol.

A. Statement 1 is True, statement 2 is True, Statement 2 is Correct explanation for Statement 1.

B. Statement 1 is True, Statement 2 is True, Statement 2 is NOT a correct explanation for Statement 1.

C. Statement 1 is True, Statement 2 is False.

D. Statement 1 is False, Statement 2 is True.

Answer: A

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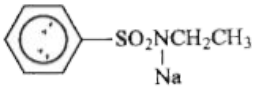
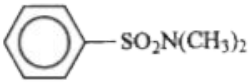
Level Iii Linked Comprehension Type

1. Mixture of two isomeric amines (C_2H_7N)A and B was treated with benzene sulphonyl chloride and $NaOH$ and ether were added. Two layers were separated. Ethereal layer containing A on acidification followed by distillation generates A .

Aqueous layer containing (B) followed by acidification and distillation generates (B)

Compound in ethereal layer is in the form

A. 

B. 

C. Both (A) and (B)

D. None of the above

Answer: B

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2. Mixture of two isomeric amines (C_2H_7N)A and B was treated with benzene sulphonyl chloride and $NaOH$ and ether were added. Two layers were separated. Ethereal layer containing A on acidification followed by distillation generates A . Aqueous layer containing (B) followed by acidification and distillation generates (B)

Compound (A) is thus

A. $(CH_3)_2NH$

B. $CH_3CH_2NH_2$

C. Both (A) and (B)

D. None of the above

Answer: A

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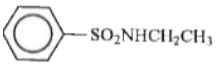
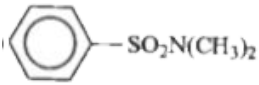
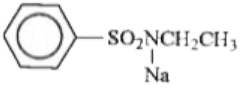
3. Mixture of two isomeric amines (C_2H_7N)A and B was treated with benzene sulphonyl chloride and $NaOH$ and ether were added. Two layers were separated. Ethereal layer containing A on acidification followed by distillation generates A . Aqueous layer containing (B) followed by

acidification and distillation generates (B)

Compound in aqueous layer is in the form of

A. 

B. 

C. 

D. None of the above

Answer: C

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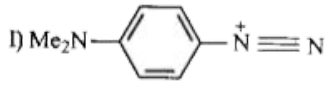
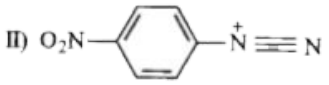
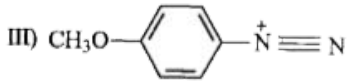
4. Arene diazonium salts are more stable than alkanediazonium salts due to dispersal of the positive charge on the benzene ring. Obviously, electron-donating groups favour diazotisation by retarding the decomposition of diazonium salts to phenyl cation. The high reactivity of arenediazonium salts is due to the excellent leaving ability of the diazo group as N_2 gas.

Consider the following ions:







The reactivity of these ions towards azo coupling reactions under similar conditions is

A. $I < IV < II < III$

B. $I < III < IV < II$

C. $III < I < II < IV$

D. $III < I < IV < II$

Answer: B

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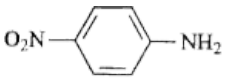
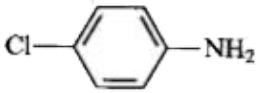
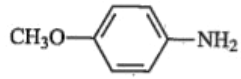
5. Arene diazonium salts are more stable than alkanediazonium salts due to dispersal of the positive charge on the benzene ring. Obviously, electron-donating groups favour diazotisation by

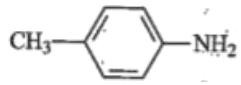
retarding the decomposition of diazonium salts to phenyl cation. The high reactivity of arenediazonium salts is due to the excellent leaving ability of the diazo group as N_2 gas.

Which of the following arylamines undergoes diazotisation most readily?

A. 

B. 

C. 

D. 

Answer: C

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6. Arene diazonium salts are more stable than alkanediazonium salts due to dispersal of the positive charge on the benzene ring. Obviously, electron-donating groups favour diazotisation by retarding the decomposition of diazonium salts to phenyl cation. The high reactivity of arenediazonium salts is due to the excellent leaving ability of the diazo group as N_2 gas.

The product formed when bromobenzene reacts with benzenediazonium chloride in presence of NaOH is

A. diphenyl

B. p-bromodiphenyl

C. p,p'-dibromodiphenyl

D. p-bromoazobenzene

Answer: B

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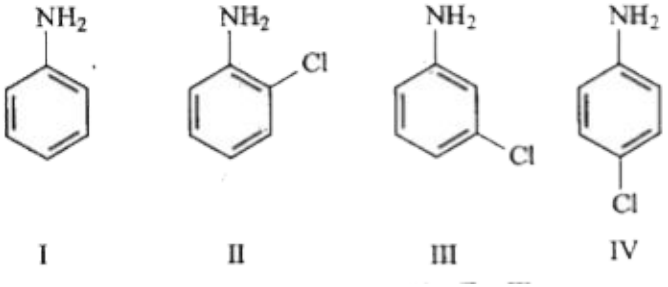
7. All aliphatic amines are more basic than ammonia but due to delocalization of lone pair of electrons of the nitrogen atom on the benzene ring, aniline is a weaker base than ammonia. The

basic strength of the substituted anilines, however, depends upon the nature of the substituent. Whereas electron-donating groups tend to increase, electron-withdrawing groups tend to decrease the basic strength. The base strengthening effect of the electron-donating groups and base weakening effect of the electron-withdrawing groups is, however ,more pronounced at p-than at m-position. However, due to ortho effect, o-substituted anilines are weaker bases than anilines regardless of the nature of substituent whether electron-donating or electron-withdrawing.

Arrange the following amines in decreasing order

of their basic strength



A. $I > II > III > IV$

B. $I > IV > II > III$

C. $II > I > IV > III$

D. $I > IV > III > II$

Answer: D

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8. All aliphatic amines are more basic than ammonia but due to delocalization of lone pair of electrons of the nitrogen atom on the benzene ring, aniline is a weaker base than ammonia. The basic strength of the substituted anilines, however, depends upon the nature of the substituent. Whereas electron-donating groups tend to increase, electron-withdrawing groups tend to decrease the basic strength. The base strengthening effect of the electron-donating groups and base weakening effect of the electron-withdrawing groups is, however ,more pronounced at p-than at m-position. However, due

to ortho effect, o-substituted anilines are weaker bases than anilines regardless of the nature of substituent whether electron-donating or electron-withdrawing.

What is the order of basicity of

I. p-methylaniline

II. m-methylaniline

III, aniline

IV. o-methylaniline

A. $I > II > III > IV$

B. $I > II > IV > III$

C. $IV > I > II > III$

D. $II > I > IV > III$

Answer: A

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9. All aliphatic amines are more basic than ammonia but due to delocalization of lone pair of electrons of the nitrogen atom on the benzene ring, aniline is a weaker base than ammonia. The basic strength of the substituted anilines, however, depends upon the nature of the substituent. Whereas electron-donating groups

tend to increase, electron-withdrawing groups tend to decrease the basic strength. The base strengthening effect of the electron-donating groups and base weakening effect of the electron-withdrawing groups is, however ,more pronounced at p-than at m-position. However, due to ortho effect, o-substituted anilines are weaker bases than anilines regardless of the nature of substituent whether electron-donating or electron-withdrawing.

Among the following, the weakest base is

A. $C_6H_5NH_2$

B. $p-CH_3O-C_6H_4NH_2$

C. $m - CH_3O - C_6H_4NH_2$

D. $o - CH_3O - C_6H_4NH_2$

Answer: C

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