



CHEMISTRY

BOOKS - V PUBLICATION

AMINES

Question Bank

1. Classify the following AMINES as primary, secondary or tertiary

'(##VPS_HSS_CHE_XII_C13_E01_001_Q01##)'

(iii) $(C_2H_3)_2 \cdot CHNH_2$

(iv) $(C_2H_5)_2 \sim NH$

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2. Write the structures of different isomeric amines corresponding to the molecular formula $C_4H_{11}N$

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3. How will you convert: $Cl - (CH_2)_4 - Cl$ into hexane-1,6-diamine?

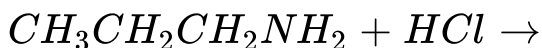
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4. Arrange the following in increasing order of their basic strength: i) $C_2H_5NH_2$, $C_6H_5NH_2$, NH_3 , $C_6H_5CH_2NH_2$ and $(C_2H_5)_2NH$ ii) $C_2H_5NH_2$, $(C_2H_5)_2NH$, $(C_2H_5)_3N$, $C_6H_5NH_2$ iii) CH_3NH_2 , $(CH_3)_2NH$, $(CH_3)_3N$, $C_6H_5NH_2$, $C_6H_5CH_2NH_2$



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5. Complete the following acid-base reactions and name the products



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6. Write reactions of the final alkylation product of aniline with excess methyl iodide in the presence of sodium carbonate solution.

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7. Write chemical reaction of aniline with benzoyl chloride and write the name of the product obtained.

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8. Write structures of different isomers corresponding to the molecular formula C_3H_9N . Write IUPAC names of the

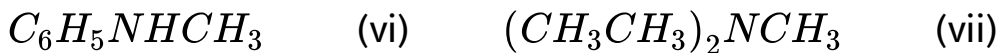
isomers which will liberate nitrogen gas on treatment with nitrous acid.

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9. Convert i. 3-Methylaniline into 3 - nitrotoluene ii. Aniline into 1,3,5 -tribromobenzene.

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10. Write IUPAC names of the following compounds and classify them into primary, secondary and tertiary AMINES. (i) $(CH_3)_2CHNH_2$, (ii) $CH_3(CH_2)_2NH_2$ (iii) $CH_3NHCH(CH_3)_2$, (iv) $(CH_3)_3CNH_2$ (v)



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11. Give one chemical test to distinguish between the following pairs of compounds i. Methylamine and dimethyl amine ii. Secondary and tertiary AMINES iii. Ethylamine and aniline iv. Aniline and benzylamine v. Aniline and N- methyl aniline

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12. Account for the following: i. pK_b of -aniline is more than that of methylamine. ii. Ethylamine is soluble in

water whereas aniline is not. iii. Methylamine in water reacts with ferric chloride to precipitate hydrated ferric oxide. iv. Although amino group is *o* and *p* - directing in aromatic electrophilic substitution reactions, aniline on nitration gives a substantial amount of *m* - nitroaniline. v. Aniline does not undergo Friedel Craft's reaction. vi. Diazonium salts of aromatic AMINES are more stable than those of aliphatic AMINES. vii. Gabriel phthalimide synthesis is preferred for synthesising primary AMINES

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13. Arrange the following: i) In decreasing order of the 'pK', values, ' $C_2H_3NH_2$, ' $C_6H_5NH_2$ ' and ' $(C_2H_3)_2NH$ ' and ' $C_6H_5NH_2$ ' ii) In increasing

order. of basic strength: $\text{C}_6\text{H}_5\text{NH}_2^+$, $\text{C}_6\text{H}_5\text{NH}_2$
 $\sim\text{N}(\text{CH}_3)_2$, $(\text{C}_2\text{H}_5)_2\text{NH}$ and CH_3NH_2 iii. In
increasing order to basic strength, Aniline, p - nitroaniline
and p- toluidine iv. In increasing order of basic strength in
gas phase, $\text{C}_2\text{H}_5\text{NH}_2$, $(\text{C}_2\text{H}_5)_2\text{NH}$, $(\text{C}_2\text{H}_5)_3\text{N}$ ~N
and NH_3 v. In increasing order of solubility in water $\text{C}_6\text{H}_5\text{NH}_2$
 $\text{C}_6\text{H}_5\text{NH}_2$, $(\text{C}_2\text{H}_5)_2\text{NH}$, $\text{C}_2\text{H}_5\text{NH}_2$

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14. How will you convert : i. Ethanoic acid into
methanamine ii. Hexanenitrile into 1 aminopentane iii.
Methanol into methanamine iv. Ethanamine into
methanamine v. Ethanoic acid into propanoic acid vi.

Methanamine into ethanamine 'vii. Nitromethane into dimethylamine viii. Propanoic acid into ethanoic acid.

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15. Describe a method for the identification of primary, secondary and tertiary AMINES. Also write chemical equation of the reaction involved.

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16. Write short notes on the following: i) Carbylamine reaction ii) Diazotisation iii) Hoffmann's bromamide reaction iv) Coupling reaction v) Ammonolysis vi) Acetylation vii) Gabriel phthalimide synthesis.



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17. Accomplish the following conversions: i) Nitrobenzene to benzoic acid.



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18. An aromatic compound on treatment with aqueous ammonia and heating forms compound 'B' which on heating with 'Br₂' and 'KOH' forms a compound of molecular formula 'C₆H₇N'. Write the structures and IUPAC names of compounds 'A, B' and 'C'.



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19. Give plausible explanation for each of the following : i)

Why are AMINES less acidic than alcohols of comparable

molecular masses? iii) Why do primary AMINES have

higher boiling point than tertiary AMINES? iii) Why are

aliphatic AMINES stronger bases than aromatic AMINES?



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20. Give the structures of A,B and C in the following

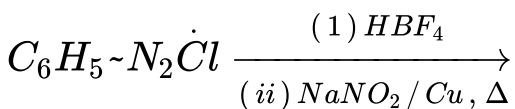
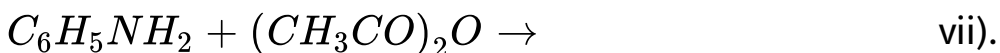
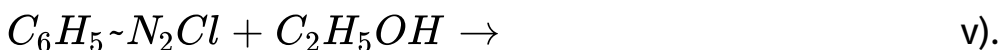
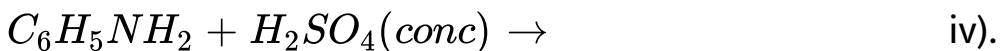
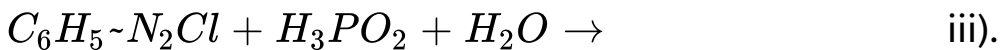
reactions: $\text{CH}_3\text{CH}_2\text{I} \rightarrow \text{NaCN}$ A OH^- Partialhydrolysis

B $\rightarrow \text{NaOH} + \text{Br}_2$ C



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21. Complete the following reactions: i).



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22. Why cannot aromatic primary AMINES be prepared by Gabriel phthalimide synthesis?

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23. Write the reactions of (i) aromatic and (ii) aliphatic primary AMINES with nitrous acid.

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24. (i) How will you convert an alkyl halide into a primary amine having one more carbon atom than the alkyl halide used? (ii) Why do AMINES dissolves in mineral acids?

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25. Can you suggest a method for the conversion of aniline to phenol? Write equations

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26. Alcoholic AgCN, CH_3Cl , alc.KCN and $LiAlH_4$ are good friends. One day CH_3Cl tells friends about its two desires: (i) to become ethylamine (ii) to become dimethylamine. The friends are ready to help methylchloride. Is it possible to fulfill the desires of methylchloride?

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27. Ammonia is a base because it has a lone pair of electrons. Predict the change in basicity in the following cases and give reason for each. a) When one hydrogen of ammonia is replaced by methyl group. b) When one hydrogen of ammonia is replaced by phenyl group.



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28. During a lab work a student is given 1° , 2° and 3° aliphatic AMINES in three unlabelled test tubes. To distinguish the AMINES, student uses a mixture of sodium nitrate and dilute hydrochloric acid. a) Can the student distinguish the AMINES by using the reagents?

Justify your answer. b) illustrate Hinsberg test to distinguish the above AMINES. "

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29. i. Watch the diagram and fill the boxes labelled A, B
C diagram ii. If you are treating B with nitrous acid,
predict the products that can be formed.

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30. a. A student arranges certain AMINES in the following
order of basicity in solutions. $C_6H_5NH_2 > (Et)_2NH > (Et)_3N > EtNH_2$
Do you agree with this order? if not, what is
the correct order?



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31. Give the functional isomers of C_3H_9N



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32. In the reduction of aromatic nitrocompounds to AMINES, Fe scrap and HCl is preferred to Sn/HCl. Why?



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33. Arrange the following in, the order of their increasing basicity : p-toluidine, N, N -dimethyl -p-toluidine, p-nitroaniline, aniline.



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34. Give the structure of A (C_3H_9N) if it reacts with benzene sulphonyl chloride to form a solid insoluble in alkali.



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35. Arrange the following in increasing order of their acid strength: methyl amine, dimethyl amine, aniline, N-methyl aniline.



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36. How will you convert benzene into aniline?

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37.

How is aminoethane (ethyl amine) obtained from ethanal (acetaldehyde) ?

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38. Aniline gets coloured on standing in air for a long time. Why?

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39. Give reason Electrophilic substitution in case of aromatic amines takes place more readily than in benzene.

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40. Which reagent is used to convert an amide into an amine with the same number of carbon atoms?

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41. Which reaction is used for converting a primary amide into a primary amine containing one carbon atom less than the parent amide?



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42. CH_3CONH_2 is a weaker base than $\text{CH}_3\text{CH}_2\text{NH}_2$.

Why?



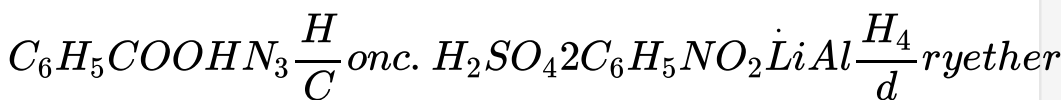
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43. Nitro compounds have higher boiling points than hydrocarbons having almost the same molecular mass?



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44. Complete the following reactions (i)





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45. Why is it necessary to add excess of mineral acid to diazotise AMINES?



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46. What is Sandmeyer reaction?



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47. Suggest a method to convert cyclohexanol to cyclohexylamine.



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48. Direct nitration of aniline is not carried out why?

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49. Primary, secondary and tertiary amines can be distinguished using Hinsberg's reagent.

What is Hinsberg's reagent?

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50. A mixture of two aromatic compounds (A) and (B) was separated by dissolving in chloroform followed by

extraction with aqueous KOH solution. The organic layer containing (A), when heated with alcoholic solution of KOH produce (C) C₇H₇N associated with unpleasant odour. The alkaline aqueous layer on the other hand, when heated with chloroform and then acidified gave a mixture of two isomeric compounds (D) and (E) of molecular formula C₇H₆O₂. Identify (A) to (E).



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51. Compound (A) with empirical formula C₆H₉N on diazotisation gives a product which undergoes Sandmeyer reaction with Cu₂Cl₂ and HCl to give a compound (B). (B) on oxidation gives a compound (C) which when heated with sodalime gives chlorobenzene.

Give the structural formula of (A) (B) and (C) and explain the reactions involved.

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52. Why does bromination of aniline, even under very mild conditions, gives 2,4,6-tribromo aniline instantaneously.

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53. Discuss one method by which we can separate p-hydroxybenzoic acid and p-aminobenzoic acid from a mixture of the two and write down the confirmatory tests of the functional group.



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54. Sulphanilic acid is soluble in dil NaOH but not in dil HCl .Explain



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55. The aqueous solution of a nitrogen and chlorine containing organic compound (A) is acidic to litmus. (A) on treatment with aqueous NaOH, it gives a compound (B) containing nitrogen, but not chlorine. Compound (B) on treatment with $C_6H_5SO_2Cl$ in the presence of NaOH gives an insoluble product (C) $C_{13}H_{13}NO_2$. Give the structures of (A) and (B).



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56. Suggest a convenient scheme for separating aniline, N - methyl aniline, toluene and phenol present together in a mixture. Distillation is not to be used.



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57. $C_5H_{13}Naq \cdot NaNO_2^- / HCl / -N_7 / ^T Y +$ other products
i. Identify X, Y
ii. Is Y optically active
iii. Give structures of intermediates, if any, in the formation of X
Y



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58. Which is more acidic. Explain

'(##VPS_HSS_CHE_XII_C13_E03_041_Q01##)' ii.convert fig.,
to fig., in not more than 4 steps. Clearly show the
reagents and intermediates in the above conversion



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59. (##VPS_HSS_CHE_XII_C13_E03_042_Q01##)'

Identify 'A, B, C, D' give reactions only for 'A rarr B' '

~A rarr fC . !



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60. Aspartame, an artificial sweetener a peptide having the following structure $\text{CH}_2\text{C}_6\text{H}_5$, $(\text{H}_2\text{N}-\text{CH}-\text{CONH}-\text{CH}-\text{COOCH}_3)$, $(\text{CH}_2-\text{COOH})$. (i) Identify, the four functional groups. (ii) Write the zwitter ion structure. (iii). Write the structures of amino acids obtained as a result of hydrolysis of aspartame. (iv) Which of amino acids formed is more hydrophobic?



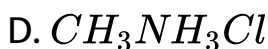
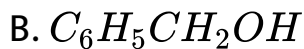
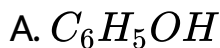
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61. Give various possible products of the reaction between n - propylamine and nitrous acid



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62. Among the following dissociation constant is highest for



Answer: D

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63.

$C_6H_5CONHCH_3$, can be converted into

$C_6H_5CH_2NHCH_3$, by : $NaBH_4$, $\frac{H_2 - Pd}{C}$, $LiAlH_4$,
 $\frac{Zn - Hg}{HCl}$

A. $NaBH_4$

B. $H_2 - Pd / C$

C. $LiAlH_4$

D. $Zn - Hg / HCl$

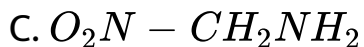
Answer: C



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64. Among the following the weakest base is

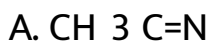
A. $C_6H_5CH_2NH_2$



Answer: D

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65. $CH_3NH_2 + CHCl_3 + KOH \rightarrow$ nitrogen
containing compound $+ KCl + H_2O$: Nitrogen
containing compound is: $CH_3C = N$, CH_3NHCH_3 ,
 $CH_3\bar{N} \equiv C^+$, $CH_3\overset{+}{N} \equiv C^-$



B. CH_3NHCH_3

C. $\text{CH}_3\text{N}^+\text{equiv C}^+$

D. $\text{CH}_3\text{N}^+\text{equiv C}^-$

Answer: D

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66. The strongest base among the following is

'(##VPS_HSS_CHE_XII_C13_E04_005_Q01##)'

A. fig

B. fig

C. fig

D. fig

Answer: C



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67. The following sequence of reaction on A gives

'(##VPS_HSS_CHE_XII_C13_E04_006_Q01##)'

A. fig

B. fig

C. fig

D. fig

Answer: C



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68. Intermolecular Hydrogen bonding is strongest in

A. methylamine

B. phenol

C. formaldehyde

D. methanol

Answer: D



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69. In the following reaction

'(##VPS_HSS_CHE_XII_C13_E04_008_Q01##)'

Structure of X is

A. fig

B. fig

C. fig

D. fig

Answer: B



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70. Which of the following will give N_2 gas on treatment with nitrous acid ($NaNO_2 + HCl$) ?

A. $C_2H_5NH_2$

B. CH_3NH_2

C. $(CH_3)_2CHNH_2$

D. all will give ' N_2 '

Answer: D



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71. In HS^- , I^- , $R-NH_2$, NH_3 , the order of proton accepting tendency will be:



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72. Which of the following is the strongest base

A. fig

B. fig

C. fig

D. fig

Answer: D



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73. Among the following compounds, most basic is

A. aniline

B. acetanilide

C. P - nitroanilme

D. benzyl amine

Answer: D



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74. (##VPS_HSS_CHE_XII_C13_E04_013_Q01##)'

the alkene formed as a major product in the above elimination reaction is

A. fig

B. ItsmilesgtC=Clt/smilesgt

C. fig

D. fig

Answer: D

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75. Aniline first reacts with acetyl chloride producing compound A. A reacts with nitric acid/ sulphuric acid mixture and produces compound 'B', which hydrolyses to compound 'C'. What is C?

A. acetanilide

B. p - nito acetanilide

C. p - nitroaniline

D. aniline

Answer: C



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76. Which of the following is more basic than aniline?

A. benzylamine

B. diphenylamine

C. triphenylamine

D. p - nitroaniline

Answer: A



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77. Which of the following is the strongest base in aqueous solution?

- A. methylamine
- B. trimethylamine
- C. aniline
- D. dimethylamine

Answer: D



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78. Presence of a nitro group in a benzene ring

A. deactivates the ring towards electrophilic substitution

B. activates the ring towards electrophilic substitution

C. renders the ring basic

D. deactivates the ring towards nucleophilic substitution

Answer: A



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79. Which of the following reactions will not give a

primary amine? a) $CH_3CONH_2 \xrightarrow{Br_2, KOH}$ b)

$CH_3CN \xrightarrow{LiAlH_4, H^+}$ c) $CH_3NC \xrightarrow{LiAlH_4, H^+}$ d)

$CH_3CONH_2 \xrightarrow{LiAlH_4, H^+}$

A. $CH_2CONH_2 \xrightarrow{Br_2 / KOH}$

B. $CH_3CN \xrightarrow{LiAlH_4 / H^+}$

C. $CH_3NC \xrightarrow{LiAlH_4}$

D. $CH_3CONH_2 \xrightarrow{LiAlH_4}$

Answer: C



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80. Toluene is nitrated and the resulting product is reduced with tin and hydrochloric acid. The product so obtained is diazotised and then heated with cuprous bromide. The reaction mixture so formed contains

- A. mixture of o- and m - bromotoluenes
- B. mixture of o - and p - bromotoluenes
- C. mixture of o- and p - dibromobenzenes
- D. mixture of o- and p - bromoanilines

Answer: B



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81. Which of the following statements is true :

Trimethylamine forms a soluble compound with Hinsberg's reagent and KOH , Dimethylamine reacts with KOH -and phenol to form an azodye, Methylamine reacts with nitrous acid and liberates N_2 from' aqueous solution, none

A. Trimethylamine forms a soluble compound with

Hinsberg's reagent and KOH

B. Dimethylamine reacts with ' KOH ' -and phenol to

form an azodye

C. Methylamine reacts with nitrous acid and liberates

' N_2 ' from' aqueous solution.

D. none

Answer: C



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82. Aniline is treated with bromine water and the resulting product is treated with an aqueous solution 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

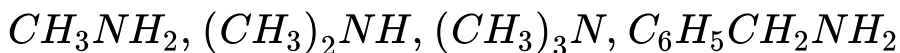
D. 1, 3, 5 - tribromobenzene

Answer: C



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83. Arrange the following in increasing order of basic strength:



A. $(CH_3)_3N > (CH_3)_2NH > CH_3NH_2 > C_6H_5CH_2NH_2$

B. Reverse (a)

C. $C_6H_5NH_2 + (CH_3)_3N \rightleftharpoons C_6H_5NH_2 + (CH_3)_2N^+$

NH'

D. reverse of ©

Answer: C



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84. The indicator that is obtained by coupling the diazonium salt of sulphanilic acid with N, N - dimethyl aniline is

A. methyl orange

B. methyl red

C. phenolphthalein

D. indigo

Answer: A

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85. Among the following compounds $C_3H_7NH_2$, NH_3 , CH_3NH_2 , $C_2H_5NH_2$ and $C_6H_5NH_2$, the least basic compound is

A. $C_3H_7NH_2$

B. NH_3

C. CH_3NH_2

D. C₆H₅NH₂

Answer: D



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86. In the following reaction

'(##VPS_HSS_CHE_XII_C13_E04_025_Q01##)'

A. fig

B. fig

C. fig

D. fig

Answer: C



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87. In the chemical reaction, $\text{CH}_3\text{CH}_2\text{NH}_2 + \text{CHCl}_3 + 3\text{KOH} \rightarrow (\text{A}) + (\text{B}) + 3\text{H}_2\text{O}$, the compounds (A) and (B) are respectively :

- A. $\text{C}_2\text{H}_5\text{NC}$ and 3KCl
- B. $\text{C}_2\text{H}_5\text{CN}$ and 3KCl
- C. $\text{CH}_3\text{CH}_2\text{CONH}_2$ and 3KCl
- D. $\text{C}_2\text{H}_5\text{NC}$ and K_2CO_3

Answer: A



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

A. CH_3NH_2

B. $(\text{CH}_3)_2\text{CHNH}_2$

C. $(\text{CH}_3)_2\text{NH}$

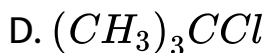
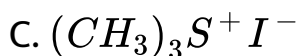
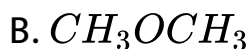
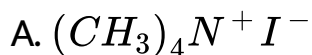
D. $(\text{CH}_3)_3\text{C-NH}_2$

Answer: D



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89. The compound that will react most readily with NaOH to form methanol is : $(CH_3)_4N^+I^-$, CH_3OCH_3 , $(CH_3)_3S^+I^-$, $(CH_3)_3CCl$



Answer: A



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90. Aniline when diazotised in cold and then treated with dimethyl aniline gives a coloured product. give its structure



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