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_2 H_3)_2 dotC H N H_2'

(iv) '(C_2 H_s)_2 ~N H'

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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_2 H_5 NH_2, C_6 H_5 NH_2, NH_3, C_6 H_5 CH_2 NH_2 and (C_2 H_5)_2 NH ii) C_2 H_5 NH_2, (C_2 H_5)_2 NH,(C_2 H_5)_3 N, C_6 H_5 NH_2 iii) CH_3 NH_2, (CH_3)_2 NH_4, (CH_3)_3 N, C_6 H_5 NH_2, C_6 H_5 CH_2 NH_2

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

$CH_3CH_2CH_2NH_2 + HCl \rightarrow$

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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 teritary 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)

$C_6H_5NHCH_3$ (vi) $(CH_3CH_3)_2NCH_3$ (vii)

$m - BrC_6H_4NH_2$

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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. Methylaminé in water reacts with ferric chloride to precipitate.hydrated.ferric oxide. iv. Athough amino group is o and p - directing in aromatic electrophilic substitution reactions, aniline on nitration gives a substäntial amount of m - nitroaniline. v. Aniline does not undergo Friedel Craft's reaction. vi. Díazonium 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_2 H_3 NH_2, C_6 H_5 NH overrarrCH_32 dot(C_2 H_3)_2 NH' and ' ^* C_6 H_5 NH_2' ii) In inćreasing

order. of basic stren>h: 'C_6 H_3 NH_2^* , C_6 H_3 ~N(CH_3)_2,(C_2 H_5)_2^* NH' and 'CH_3 NH_2' iii. In increasing order to basic stren>h, Aniline, p - nitroaniline and p- toluidine iv. In increasing order of basic stren>h in gas phase, C_2 H_s NH_2,(C_2 H_s)_2 NH,(C_2 H_s)_3 ~N and NH_3 v. In increasing order of solubility in water C_6 H_5 NH_21^circ(C_2 H_3)_2 NH, C_n H_5 NH_2

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

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

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15. Describe a method for the identification of primary, secondary and teritary 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) Hoffmånn's bromamide reaction iv) Coupling reaction v) Ammonolysis vi) Acetylation vii) Gabriel phthalimide śynthesis.

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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 'Br_2' and 'KOH' forms a còmpound of molecular formula 'C6 H7N'. 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: $CH_3CH_2I \xrightarrow{NaCN} A \xrightarrow{OH^-, \text{Partialhydrolysis}} B \xrightarrow{NaOH+Br_2} C$

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21. Complete the following'reactions: i).

$C_6H_5NH_2 + CHCl_3 + alcKOH \rightarrow$ ii).

$C_6H_5\text{-}N_2Cl + H_3PO_2 + H_2O \rightarrow$ iii).

$C_6H_5NH_2 + H_2SO_4(conc) \rightarrow$ iv).

$C_6H_5\text{-}N_2Cl + C_2H_5OH \rightarrow$ v).

$C_6H_5NH_2 + Br_2(aq) \rightarrow$ vi).

$C_6H_5NH_2 + (CH_3CO)_2O \rightarrow$ vii).

$C_6H_5\text{-}N_2\dot{C}l \xrightarrow[(ii)\, NaNO_2/Cu,\, \Delta]{(1)\, HBF_4}$

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22. Why cannot aromtic primary AMINES be prepared by gabrile 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 yousuggest a method for the conversion of aniline to phenol? Write equations

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26. Alcoholic AgCN, CH_3CI, alc.KCN and $LiAlH_4$ are good friends.One day CH_3CI tells friends about its two desires: (i)to become ethylamine (ii)to become dimethyl amine.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. distinguisii the AMINES, student uses a mixture of sodiom nitrate and'dilute hydrochloric acid. a) Can the student distinguish the AMINES by us: ing 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. 'C6 H5 NH2>(E t)2 NH>(Et)3 N> Et NH2 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_3 CONH_2 is a weaker base than CH_3 CH_2 N H_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) $C_6H_5COOHN_3\frac{H}{C}onc.\ H_2SO_4 2C_6H_5NO_2\dot{L}iAl\frac{H_4}{d}ryether$

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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 teritary amines can be distinguished using hinsberg's reagent.

What is Hinsberg's reagent?

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50. A mixture of two aromatic cómpounds (A) and (B) wás separated by dissolving in chiloroform followed by

extraction with aqueous KOH solution. The organic layer'containing (A), wheri heated with alcoholic solution of'KOH produce (C) C,H,N associated with unpleas- ant .odour. The alkaline aqueous layer on the other hand, when heated with chloroform and. then acidified gave a mixture of two isömeric compounds (D) and (E) of molecular formula C '_-j H_6 O_2^*' Identify (A) to (E).

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51. Compound (A) with empirical formula 'fC, fH_9 fN' on diazotisation gives a product which undergoes Sandmeyer reaction with 'Cu_2 Cl_2' 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_6 H_5SO_2 Cl in the presence of NaOH gives an insoluble product (C) C13H13NO2 S. 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. Distallation is not to be used.

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57. C_5 H_13, Naq dot 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 CH_(2)C_(6)H_(5)),(" |"),(H_(2)N-CH-CONH-CH-COOCH_(3)),(" |"),(CH_(2)-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

A. C_6H_5OH

B. $C_6H_5CH_2OH$

C. $CH_3C = CH$

D. CH_3NH_3Cl

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. $C_6H_5CH_2NH_2$

B. $C_6H_5CH_3NHCH_3$

C. $O_2N - CH_2NH_2$

D. CH_3NHCHO

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, $CH_3\overset{-}{N} \equiv C^+, CH_3\overset{+}{N} \equiv C^-$

A. CH_3 C=N

B. CH_3 NHCH_3

C. CH_3 overlineN equiv C^+

D. CH_3 stackrel+/N= 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 thee 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. ltsmilesgtC=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 subsitution

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) $CH_3CONH_2 \xrightarrow{Br_2KOH}$ b) $CH_3CN \xrightarrow{LiAlH_4, H^+}$ c)$CH_3NC \xrightarrow{LiAlH_4, H^+}$ d) $CH_3CONH_2 \xrightarrow{Li.AlH_4, H^+}$

A. CH_2 CONH_2 stackrel Br_2 / KOH/rarr'

B. CH_3 CN stackre lLiAlH/ stackrelCi/ ^+'

C. CH_3 NC stackrel. LiAlH_4/rarr'

D. CH_3 CONH_2: stackrelLi.AlH_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 0- and m - bromotoluenes

B. mixture of o - and p - bromotoluenes

C. mixture of 0- 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 form' 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 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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83. Arrange the following in increasing order of basic strength:

$CH_3NH_2, (CH_3)_2NH, (CH_3)_3N, C_6H_5CH_2NH_2$

A. (CH_3)_3 ~Nlt(CH_3)_2 NHltCH_3 NH_2ltC_6 H_5 NH_2'

B. Reverse (a)

C. $C_6H_5NH_2lt(CH_3)_3 ~NltCH_3NH_2lt(CH_3)_2^*$

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. $C_3H_3NH_2$

B. NH_3

C. CH_3NH_2

D. $C_6H_5NH_2$

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

A. C_2H_5NC and 3 KCl

B. C_2H_5CN and 3KCl

C. $CH_3CH_2CONH_2$ and 3KCl

D. C_2H_5NC 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 permangante?

A. CH3 NH2

B. (CH3)2 CH NH2

C. (CH3)2 NH

D. (CH3)3 C-NH2

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, $(CH_3)_3S^+I^-$, $(CH_3)_3CCl$

A. $(CH_3)_4N^+I^-$

B. CH_3OCH_3

C. $(CH_3)_3S^+I^-$

D. $(CH_3)_3CCl$

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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