CHEMISTRY

BOOKS - MODERN PUBLICATION CHEMISTRY (KANNADA ENGLISH)

PURIFICATION AND CHARACTERISATION OF ORGANIC COMPOUNDS

Level I

1. Which of the following is purified by sublimation if the impurities are non-volatile ?

A. Cane sugar

B. Naphthalene

C. Urea

D. Acetic acid

Answer: B

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2. The boiling point of glycerol is $563K$ but it decomposes below $563K$. It is purified by :

A. Sublimation

B. Vacuum distillation

C. Steam distillation

D. Fractional distillation

Answer: B

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3. Chromatographic technique was first introduced by _____.

A. Leibig

B. Tswett

C. Kekule

D. Wohler

Answer: B

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4. Which of the following methods is not used for purification of liquids ?

A. Chromatography

B. Distillation

C. Steam distillation

D. Sublimation

Answer: D

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5. In chromatography, when the fixed phase is solid, the basis of separation is :

A. Adsorption

B. Absorption

C. Solubility

D. Partition

Answer: A

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6. In paper chromatography :

A. both phases are liquids

B. mobile phase is liquid and stationary phase is solid

C. mobile phase is solid and stationary phase is liquid

D. both phases are solids

Answer: B

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7. Turpentine oil can be purified by the process of :

A. Vacuum distillation

B. Fractional distillation

C. Steam distillation

D. Sublimation

Answer: C

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8. A mixture of o-nitrophenol and p-nitrophenol can be separated by

A. Extraction with a solvent

B. Steam distillation

C. Crystallistion

D. Sublimation

Answer: B

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9. Distillation under reduced pressure is used to purify liquids which :

A. are highly volatile

B. have high boiling points

C. decompose below their boiling points

D. are explosives

Answer: C

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10. A mixture of benzoic acid and naphthalene can be separated by crystallization from :

A. hot water

B. cold water

C. ether

D. benzene

Answer: A

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11. In the detection of carbon, lime water turns milky due to the formation of :

A. CaO

B. $Ca(OH)_2$

C. $CaCO_3$

D. $Ca(HCO_3)_2$

Answer: C

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12. In the detection of hydrogen from organic compound , the compound is heated with CuO and the water produced is tested with:

A. lime water

B. anhydrous $CuSO_4$

C. potash solution

D. calcium chloride solution

Answer: B

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13. In Lassagine's test, when both N and S are present, blood red colour is obtained. This is due to the formation of :

A. Ferric ferrocyanide

B. Ferric cyanide

C. Ferric thiocyanate

D. Ferric hydroxide

Answer: C

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14. Lassaigne's solution gives violet colouration with sodium nitroprusside. It indicates the presence of :

A. Nitrogen

B. Sulphur

C. Halogens

D. Both N and S

Answer: B

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15. Belstein's test is used for the detection of :

A. Nitrogen

B. Sulphur

C. Halogens

D. Phosphorus

Answer: C

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16. The prussian blue colour in the test of nitrogen by Lassagine's solution is due to :

A. $Na_4\left[Fe(CN)_6\right]$

B. $Fe(SCN)_3$

C. $Na_4\left[Fe(CN)_5NOS\right]$

D. $Fe_4\left[Fe(CN)_6\right]_3$

Answer: D

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17. For the detection of sulphur by Lassaigne's test, the addition of sodium nitroprusside to the sodium extract gives purple colouration. This is due to the formation of :

A. $Na_3\left[Fe(CN)_6\right]$

B. $Na_4\left[Fe(CN)_5NOS\right]$

C. $Fe(SCN)_3$

D. $Na_4[Fe(CN)_6]$

Answer: B

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18. In case N and S are also present along with halogen in the organic compound, the Lassaigne's solution is heated with :

A. Sodium hydroxide

B. Nitric acid

C. Sulphuric acid

D. Soda lime

Answer: B

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19. In the detection of halogen, nitric acid is added to the Lassaigne's extract. Its main function is to :

A. oxidise the solution

B. destroy NaCN and Na_2S which otherwise interfere in the test

C. make the reaction fast

D. provide a medium for the precipitation

Answer: B

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20. Sodalime test for detection of nitrogen cannot be used for :

A. acetamide

B. urea

C. diazo compounds

D. thiourea

Answer: C

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21. In sodium fusion test of organic compounds, the nitrogen of an organic compound is converted to :

A. Sodium cyanide

B. Sodamide

C. Sodium nitrite

D. Sodium nitrate

Answer: A

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22. Sodalime test is used to detect .....element in an organic compound :

A. C

B. H

C. N

D. S

Answer: C

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23. Which of the following elements forms oxide easily in air?

A. N

B. O

C. H

D. S

Answer: B

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24. On adding $FeCl_3$ to the acidic Lassaigne solution, a blood red colouration is obtained. It indicates the presence of :

A. S

B. N

C. N and S

D. N and halogen

Answer: C

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25. For which of the following compounds, the Lassaigne's test of nitrogen will fall ?

A. $NH_2CONHNH_2HCl$

B. NH_2NH_22HCl

C. H_2NCONH_2

D. $C_6H_5 - N = N - C_6H_5$

Answer: B

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26. Belstein test is used for :

A. N

B. Cl

C. Na

D. CO_2

Answer: B

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27. In Lassaigne's test for N, the blue colour is due to the formation of :

A. Potassium ferricyanide

B. Sodium cyanide

C. Sodium ferrocyanide

D. Ferric ferrocyanide

Answer: D

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28. The compound which does not contain halogen but gives positive Beilstein's test is

A. Hydrazine

B. Aniline

C. Urea

D. Sodium thiosulphate

Answer: C

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29. The formula of the compound which gives violet colour in Lassainge's test for sulphur with sodium nitroprusside is

A. $Na_4\left[Fe(CN)_5NOS\right]$

B. $Na_3\left[Fe(CN)_5NOS\right]$

C. $Na_2\left[Fe(CN)_5S\right]$

D. $Na_4\left[Fe(CN)_4S\right]$

Answer: A

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30. During Lassaigne's test N and S present in an organic compound change into

A. Na_2S and $NaCN$

B. $NaSCN$

C. Na_2SO_4 and $NaCN$

D. Na_2S and $NaSCN$

Answer: A

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31. Leibig method is used for the estimation of

A. Nitrogen

B. Carbon and hydrogen

C. Sulphur

D. Halogens

Answer: B

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32. In the Duma's method for the estimation of nitrogen, the gas collected in nitrometer is

A. N_2

B. NH_3

C. $N_2 + CO_2$

D. CO_2

Answer: A

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33. In the Kjeldahl's method, the nitrogen in the organic compound in Kjeldhal's flask is converted to

A. Ammonium sulphate

B. Ammonia

C. Nitric acid

D. Nitrogen

Answer: A

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34. During the estimation of nitrogen by Kjeldahl's method, copper sulphate is added to :

A. raise the boiling point of H_2SO_4

B. absorb water formed

C. catalyse the reaction

D. form ammonium sulphate

Answer: C

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35. Carius method is used for the estimation of :

A. N

B. C and H

C. P

D. Halogen

Answer: D

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36. In an estimation of sulphur by Carius method, $0.160g$ of the substance gave $0.466g$ of barium sulphate. The percentage of sulphur in the compound is [At mass of $Ba = 137, S = 32, O = 16$] :

A. $25.0\ \%$

B. $4.0\ \%$

C. $54.0\ \%$

D. $40.0\ \%$

Answer: D

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37. $0.4g$ of an organic compound gave $0.188g$ of silver bromide by a halogen estimation method. The percentage of bromine in the compound is : (at.mass of $Ag = 108, Br = 80$) :

A. $39.8\ \%$

B. $46.0\ \%$

C. $20.0\ \%$

D. $40.0\ \%$

Answer: C

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38. In the Duma's method for the estimation of nitrogen , $0.84g$ of an organic compound gave $448ml$ of nitrogen at S.T.P. The percentage of nitrogen in the compound is :

A. $33.3\ \%$

B. $66.7\ \%$

C. $50.0\ \%$

D. $60\ \%$

Answer: B

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39. Molecular mass of a volatile substance may be measured by :

A. Hofmann method

B. Carius method

C. Victor Meyer's method

D. Leibig method

Answer: C

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40. Molecular formula and empirical formula are related as :

A. $\frac{\text{Molecular formula}}{\text{Empirical formula}} = \text{Atomicity}$

B. Molecular formula $= \frac{\text{Empricial formula} \times \text{Molecular mass}}{\text{Empirical formula mass}}$

C. Molecular formula $= \frac{\text{Molecular mass}}{\text{Empirical formula mass}}$

D. $\frac{\text{Molecular formula}}{\text{Empirical formula}} = \frac{\text{Empirical formula mass}}{\text{Molecular mass}}$

Answer: B

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41. The carbon, hydrogen and oxygen in an organic compound have been found to be in the ratio of $3:4:4$

. If the vapour density of the compound is 104, its molecular formula is :

A. $C_{43}H_4O_4$

B. $C_3H_4O_2$

C. $C_9H_{12}O_{12}$

D. $C_6H_8O_8$

Answer: D

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42. In the Victor Meyer's method for the determination of molecular mass of an organic compound, what is

measured ?

A. Volume of displaced air

B. Volume of vapours of substance produced

C. Volume of water vapours produced

D. None of these

Answer: A

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43. Kjeldahl's method cannot be used for the estimation of nitrogen in

A. nitro compounds

B. azo compounds

C. pyridine

D. All the above

Answer: D

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44. A gaseous hydrocarbon has $85\ \%\ C$ and its vapour density is 28. The possible formula of the compound is

A. C_3H_6

B. C_2H_2

C. C_3H_8

D. C_4H_8

Answer: D

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45. $0.15g$ of an organic compound gave $0.12g$ of silver bromide by the Carius method. The percentage of bromine in the compound is :

A. 42.06

B. 38.96

C. 24.08

D. 34.04

Answer: D

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46. $0.395g$ of an organic compound by Carius method for the estimation of S gave $0.582g$ of $BaSO_4$. The percentage of S in the compound is :

A. $20.24\ \%$

B. $35.62\ \%$

C. $12.24\ \%$

D. $40.65\ \%$

Answer: A

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47. In a Duma's method $0.3g$ of an organic compound gave $50ml$ of nitrogen collected at $27^\circ C$ and $715mm$ pressure . The percentage of N is (aqueous tension at $27^\circ C = 15mm$) :

A. $19.46\ \%$

B. $21.46\ \%$

C. $17.46\ \%$

D. $36.64\ \%$

Answer: C

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48. In organic compound, phosphorus is estimated as :

A. $Mg(NH_4)PO_4$

B. $Mg_3(PO_4)_2$

C. $Mg_2P_2O_7$

D. H_3PO_4

Answer: C

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49. Which of the following is used as desiccant for absorbing water in Liebig's method for estimation of C and H ?

A. $MgSO_4.7H_2O$

B. $CuSO_4.5H_2O$

C. Anhydrous $CaCl_2$

D. KOH

Answer: C

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50. An organic compound contains C = 40%, H = 13.33% and N-46.67%. Its emperical formula is

A. C_2H_7N

B. $C_2H_7N_2$

C. CH_4N

D. CH_3N.

Answer: C

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Level Ii

1. A mixture of acetone and methanol can be separated by :

A. steam distillation

B. vacuum distillation

C. Fractional distillation

D. Sublimation

Answer: C

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2. The mixture of o-nitrophenol and p-nitrophenol can be best seprated by

A. Crystallisation

B. Sublimation

C. Distillation

D. Steam distillation

Answer: D

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3. Which of the following is purified by sublimation ?

A. Naphthalene

B. Benzoic acid

C. Camphor

D. All

Answer: D

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4. Two immiscible liquids can be easily seprated by :

A. Sublimation

B. Separating funnel

C. Chromatography

D. Fractional distillation

Answer: B

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5. The purity of an organic compound is best determined by :

A. Density

B. Molecular weight

C. Colour

D. Melting point

Answer: D

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6. In the detection of phosphours in an organic compound, it is converted to sodium phosphate by fusing it with :

A. Sodium

B. Sodium peroxide

C. Sodium carbonate

D. Soda lime

Answer: B

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7. A mixture of hexane (b.p. $342K$) and toluene (b.p. $384K$) can be seprated by

A. Simple distillation

B. vacuum distillation

C. Sublimation

D. Diiferential extraction

Answer: D

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8. Chromatography technique is used for the separation :

A. Plant pigments

B. Dyestuffs

C. Small samples of mixtures

D. All

Answer: D

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9. Recent method for the charaterisation of an organic compound is :

A. Vacuum distillation

B. Sepectroscopic method

C. Sublimation

D. Fractional crystallisation

Answer: B

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10. The empirical formula of an organic compound is CH_2O. If its vapour density is 30, the molecular formula of the compound is :

A. CH_2O

B. $C_2H_4O_2$

C. $C_3H_6O_3$

D. all the above

Answer: B

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11. During the test of N in an organic compound by Lassaigne's extract, prussian blue colour is obtained. This is due to :

A. $Fe_4\left[Fe(CN)_6\right]_3.xH_2O$

B. $\left[Fe(CN)_5NOS\right]^{4-}$

C. $\left[Fe(SCN)_2\right]^{+}$

D. $[Fe(SCN)]^{2+}$

Answer: A

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12. In chromatographic technique, the relative adsorption of a component in a mixture is expressed in terms of its R_f value . It is defined as :

A.

$$\frac{\text{Distance moved by solvent form base line}}{\text{Distance moved by the substance from base line}}$$

B. $\frac{\text{Amount adsorbed by a pure solvent}}{\text{Amount adsorbed by the mixture}}$

C.

$$\frac{\text{Distance moved by the substance from base line}}{\text{Distance moved by solvent from base line}}$$

D. Amount adsorbed per gram of stationary phase.

Answer: C

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13. Impure glycerine is purified by :

A. steam distillation

B. simple distillation

C. vacuum distillation

D. none of these

Answer: C

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14. Absolute alcohol is prepared by :

A. fractional distillation

B. Kolbe's method

C. azeotropic distillation

D. vacuum distillation

Answer: C

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15. A mixture of camphor and calcium sulphate can be separated by :

A. Crystallisation

B. Steam distillation

C. Solvent extraction

D. Sublimation

Answer: D

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16. Two substances having slightly different solubility can be separated by

A. Distillation

B. Crystallisation

C. Fractional distillation

D. Fractional crystallisation

Answer: D

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17. In Carius method for estimation of halogen, $0.99g$ of an organic compound gave $0.287gAgCl$. The percentage of chlorine in the compound is

A. 63.2

B. 71.7

C. 35.4

D. 42.8

Answer: B

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18. Chromatographic technique was intoduced by

A. Duma

B. Kjeldahl

C. Lavosier

D. Tswett.

Answer: D

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19. Chromatography technique is used for the separation :

A. all volatile liquids

B. azeotropes

C. amino acids

D. all organic compounds.

Answer: C

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20. The best method for the separation of naphthalene and benzoic acid from their mixture is :

A. Distillation

B. Sublimation

C. Chromatography

D. Crystallisation

Answer: B

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21. Which of the following compounds gives blood red colouration when its Lassaigne's extract is treated with alkali and ferric chloride ?

A. Thiourea

B. Diphenyl sulphide

C. Phenyl hydrazine

D. Benzamide

Answer: A

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22. $0.25g$ of an organic compound on Kjeldahl's analysis gave enough ammonia to just neutralise $10cm^3$ of $0.5MH_2SO_4$. The percentage of nitrogen in the compound is

A. 28

B. 56

C. 14

D. 112

Answer: B

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23. The fragrance of flowers is due to the presence of some steam volatile organic compounds called essential oils. These are generally insoluble in water at room temperature but are miscible with water vapour in vapour phase. A suitable method for the extraction of these oils from the flowers is

A. Distillation

B. Crystallisation

C. Distillation under reduced pressure

D. Steam distillation

Answer: D

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24. During hearing of a court case, the judge suspected that some changes in the documents had been carried out. He asked the forensic department to check the ink used at two different places. According to you which technique can given the best results ?

A. coloumn chromatography

B. Solvent extraction

C. Distillation

D. Thin layer chromatography

Answer: D

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25. The boiling point of glycerol is $563K$ but it decomposes below $563K$. It is purified by :

A. sublimation

B. vacuum distillation

C. steam distillation

D. fractional distillation

Answer: B

Watch Video Solution

26. $0.4g$ of an organic compound gave $0.188g$ of silver bromide by a halogen estimation method. The percentage of bromine in the compound is : (at.mass of $Ag = 108, Br = 80$) :

A. $39.8\ \%$

B. $46.0\ \%$

C. $20.0\ \%$

D. $40.0\ \%$

Answer: C

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27. In steam distillation of toluene, the pressure of toluene vapour is

A. equal to pressure of barometer

B. less than pressure of barometer

C. equal to vapour pressure of toluene simple distillation

D. more than the vapour pressure of toulene in sample distillation

Answer: B

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28. $0.25g$ of an organic compound on Kjeldahl's analysis gave enough ammonia to just neutralise $10cm^3$ of $0.5MH_2SO_4$. The percentage of nitrogen in the compound is

A. 28

B. 56

C. 14

D. 112

Answer: B

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29. Which of the following compounds will not gave Lassaigne's test for nitrogen ?

A. NH_2NH_2

B. $C_6H_5NHNH_2$

C. $PhN = NPh$

D. NH_2CONH_2

Answer: A

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30. In Lassaigne's test for the detection of halogens, the sodium fusion extract is first boiled with concentrated nitric acid. This is

A. to remove silver halides

B. to decompose Na_2S and $NaCN$, if present

C. to dissolve Ag_2S

D. to dissolve $AgCN$, if formed

Answer: B

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31. $29.5mg$ of an organic compound containing nitrogen was digested according to Kjeldahl's method and the evolved ammonia was absorbed in $20mL$ of $0.1MHCl$ solution. The excess of for complete neutralization. The percentage of nitrogen in the compound is

A. 23.7

B. 29.5

C. 59.0

D. 47.4

Answer: A

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32. In the estimation of sulphur by Carius method, $0.480g$ of an organic compound gives $0.699g$ of barium sulphate. The percentage of sulphur in this compound is

[Atomic masses : $Ba = 137, S = 32, O = 16$]

A. $20\ \%$

B. $15\ \%$

C. $35\ \%$

D. $30\ \%$

Answer: A

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33. In a compound C, H and N atoms are present in the ratio of $9:1:3.5$ by weight . If molecular weight of the compound is 108, then the molecular formula of the compound is

A. $C_2H_6N_2$

B. C_3H_4N

C. $C_6H_8N_2$

D. $C_9H_{12}N_2$

Answer: C

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34. The compound formed in the positive test for nitrogen with Lassaigne's solution of an organic compound is

A. $Na_4\left[Fe(CN)_5NOS\right]$

B. $Na_3\left[Fe(CN)_6\right]$

C. $Fe(CN)_3$

D. $Fe_4\left[Fe(CN)_6\right]_3$

Answer: D

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35. The ammonia evolved from the treatment of $0.30g$ of an organic compound for the estimation of nitrogen was passed in $100ml$ of $0.1MH_2SO_4$. The excess acid required $20ml$ of $0.5MNaOH$ solution for complete neutralisation . The organic compound is:

A. Thiourea

B. Benzamide

C. Urea

D. Acetamide

Answer: C

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36. An organic compound having molecular mass 60 is fond to contain $C = 20\,\%$, $H = 6.67\,\%$ and $N = 46.67\,\%$ while rest is oxygen. On heating it gives NH_3 alongwith a solid residue. The solid residue gives violet colour with alkaline copper sulphate solution. the compound is

A. CH_3NCO

B. CH_3CONH_2

C. $(NH_2)_2CO$

D. $CH_3CH_2CONH_2$

Answer: C

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Level Iii

1. $29.5mg$ of an organic compound containing nitrogen was digested according to Kjeldahl's method and the evolved ammonia was absorbed in $20mL$ of $0.1MHCl$ solution. The excess of for complete neutralization. The percentage of nitrogen in the compound is

A. 23.7

B. 29.5

C. 59.0

D. 47.4

Answer: A

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2. For the estimation of nitrogen $1.4g$ of an organic compound was digested by Kjeldahl method and the evaloed ammonia was absorbed in $60mL$ of $\frac{M}{10}$ sulphuric acid. The unreacted acid required $20mL$ of $\frac{M}{10}$ sodium hydroxide for complete neutralisation . The percentage of nitrogen in the compound is

A. $6\ \%$

B. $10\ \%$

C. $3\ \%$

D. $5\ \%$

Answer: B

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3. In Carius method of estimation of halogens, $250mg$ of an organic compound gave $141mg$ of $AgBr$. The percentage of bromine in the compound is :

(at mass $Ag = 108$, $Br = 80$)

A. 24

B. 36

C. 48

D. 60

Answer: A

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Recent Examination Question

1. In Kjeldahl's method, ammonia from $5g$ of food neutralizes $30cm^3$ of $0.1N$ acid. The percentage of

nitrogen in the food is

A. 0.84

B. 8.4

C. 16.8

D. 1.68

Answer: A

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2. $1.2g$ of an organic compound on Kjeldahlization liberates ammonia which consumes $30cm^3$ of $1NHCl$.

The percentage of nitrogen in the organic compound is

A. 30

B. 35

C. 46.67

D. 20.8

Answer: B

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3. $0.30g$ of an organic compound containing C, H and Oxygen on combustion yields $0.44gCO_2$ and

$0.18gH_2O$. If one mole of compound weighs 60, then molecular formula of the compound is

A. C_4H_6O

B. CH_2O

C. $C_2H_4O_2$

D. C_3H_8O

Answer: C

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4. An organic comound weighing $0.15g$ on Carius estimation gave $0.12g$ of $AgBr$. The percentage of Br

in the compound will be close to (At. Mass $Ag = 108$, $Br = 80$)

A. $46\ \%$

B. $34.04\ \%$

C. $3.41\ \%$

D. 4.6%`

Answer: B

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