CHEMISTRY

BOOKS - BRILLIANT PUBLICATION

PURIFICATION AND CHARACTERISATION OF ORGANIC COMPOUNDS

Level I

1. A mixture of iodine and sodium chloride can be easily separated by

A. fractional distillation

B. steam distillation

C. chromatography

D. sublimation

Answer: D

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2. Absolute alcohol cannot be obtained by simple fractional distillation because

A. pure C_2H_5OH is unstable

B. C_2H_5OH forms hydrogen bonds with water

C. boiling point of C_2H_5OH is very close to that of water

D. constant boiling azeotropic mixture is formed with water

Answer: D

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3. Steam distillation is based on the fact tht vaporisation of organic liquid takes place at

A. lower temperature than its boiling point

.

B. higher temperature than its boiling point

C. its boiling point

D. water and organic liquid both undergo distillation

Answer: A

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4. Which of the following statements is not applicable to Beilstein test?

A. Green or bluish green flame is due to the formation of volatile cupric halides

B. It does not tell us to which halogen is present in the organic compound

C. It is a very sensitive test that can be easily performed

D. It is a sure test for the presence of halogen

Answer: D

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5. Tyrosine is one of the amino acids present in protein. Its content in protein is 0.22% and its molecular weight is 181 g mol^{-1}. Lowest molecular mass of protein is:

A. 18100

B. 2200

C. 82273

D. 18132

Answer: C

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6. When thiourea is heated with metallic sodium, the compound which can't be formed is

A. NaCNS

B. NaCN

C. Na_2SO_4

D. Na_2S

Answer: C

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7. The presence of halogen, in an organic compound, is detected by

A. iodoform test

B. silver nitrate test

C. Beilstein's test

D. Millon's test

Answer: C

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8. In Carius method of estimation of halogens, 250 mg of an organic compound gave 141 mg of AgBr. The percentage of bromine in the compound is (at mas Ag = 108, Br = 80)

A. 36

B. 48

C. 60

D. 24

Answer: D

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9. 0.75 g platinic chloride of a mono-acidic base on ignition gave 0.245 g platinum. The molar mass of the base is:

A. 75.0

B. 93.5

C. 100

D. 80.0

Answer: B

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10. 0.156 g of an organic compound on heating with fuming HNO_3 and $AgNO_3$ gives 0.235 g AgI. Calculate the percentage of iodine in the compound.

A. $81.41\ \%$

B. $68.32\ \%$

C. $52.75\ \%$

D. $79.68\ \%$

Answer: A

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11. The silver salt of an monobasic acid on ignition gave 60% of Ag. The molecular weight of the acid is

A. 37

B. 33

C. 73

D. 77

Answer: C

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12. Sodium fusion extract of an organic compound gives a blood red colouration with few drops of $FeCl_3$ solution. This indicates the presence of

A. nitrogen

B. sulphur

C. both nitrogen and sulphur

D. both sulphur and chlorine

Answer: C

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13. For which of the following compound Lassaigne's test will fail?

A. NH_2CONH_2

B. $NH_2CONH_2.HCl$

C. $NH_2NH_2.HCl$

D. $C_6H_5NH_2NH_2.2HCl$

Answer: C

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14. Two solids which are soluble in the same liquid to different extents may be separated by

A. crystallization

B. sublimation

C. evaporation

D. fractional crystallization

Answer: D

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

A. sublimation

B. chromatography

C. crystallisation

D. distillation

Answer: C

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16. Name the method used to separate glycerol from spent lye in soap industry.

A. simple distillation .

B. fractional distillation

C. steam distillation

D. distillation under reduced pressure

Answer: D

17. The steam distillation of toluene, the pressure of toluene in vapour is

A. equal to pressure of barometer

B. less than pressure of barometer

C. equal to vapour pressure of toluene in simple distillation

D. more than the vapour pressure of toluene in simple distillation.

Answer: B

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18. The separation of the constituents of a mixture by column chromatography depends upon their

A. different solubilities

B. different boiling points

C. different refractive indices

D. differential adsorption

Answer: D

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19. An organic compound which produces a bluish green coloured flame on heating in presence of copper is

A. chlorobenzene

B. benzaldehyde

C. aniline

D. benzoic acid

Answer: A

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20. The Lassaigne's extract is boiled with conc. HNO_3 while testing for halogens. By doing so it

A. decomposes Na_2S and $NaCN$, if formed

B. helps in the precipitation of AgCI

C. increases the solubility product of AgC

D. increase the concentration of NO_3^- ions

Answer: A

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21. A certain compound has the molecular formula X_4O_6. If 10g of X_4O_6 has 5.72 g X, the atomic mass of X is

A. 32 amu

B. 37 amu

C. 42 amu

D. 98 amu

Answer: A

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22. In organic layer test, CS_2 or CCl_4 is added to Lassaigne's extract and then excess Cl_2 water is added. This test is used to distinguish between

A. Br^{Θ} and I^{Θ}

B. Cl^{Θ} and Br^{Θ}

C. Cl^{Θ} and I^{Θ}

D. Cl^{Θ} and Br^{Θ} and I^{Θ}

Answer: A

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23. An organic compound containing sulphur is estimated by Carius method in which furning HNO_3 is used to convert S into

A. SO_3^{2-}

B. SO_4^{2-}

C. SO_3

D. SO_2

Answer: B

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24. A compound (60 gm) on analysis gave C = 24 gm, H = 4 gm, and O = 32 gm. Its empirical formula is:

A. C_2H_2O

B. $C_2H_4O_2$

C. CH_2O

D. CH_2O_2

Answer: C

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25. An organic compound contains C = 40%,O = 53.5% and H=6.5%. The empirical formula of the compound is

A. CH_2O

B. C_2H_4O

C. $C_6H_{12}O_6$

D. $C_2H_4O_2$

Answer: A

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26. In Dumas method for the estimation of nitrogen in an organic compound, nitrogen is determined in the form of:

A. Gaseous nitrogen

B. Sodium cyanide

C. Ammonium sulphate

D. Gaseous ammonia

Answer: A

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27. In paper chromatography:

A. mobile phase is liquid and stationary phase is solid

B. mobile phase is solid and stationary phase is liquid

C. both phases are solids

D. both phases are liquids

Answer: A

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28. Molar mass of acetic acid is 60. Its empirical formula is:

A. CH_2O

B. $C_2H_4O_2$

C. $C_3H_6O_3$

D. $C_2H_4O_3$

Answer: A

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29. $ClCH_2COOH$ is heated with fuming HNO_3 in the presence of $AgNO_3$ in Carius tube. After filtration and washing the precipitate obtained is:

A. $AgNO_3$

B. $AgCl$

C. Ag_2SO_4

D. $\mathrm{ClCH_2}COOAg$

Answer: B

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30. A mixture of camphor and benzoic acid can be separated by

A. sublimation

B. chemical methods

C. fractional crystallization

D. extraction with solvent

Answer: B

 Watch Video Solution

31. 15mL of a gaseous hydrocarbon required 45 mL of oxygen for complete combustion. 30 mL of CO_2 is formed. The formula of hydrocarbon is"

A. C_2H_6

B. C_2H_4

C. C_3H_6

D. C_2H_2

Answer: B

Watch Video Solution

32. To determine the mass of halogen in the organic compound, the compound is heated with fuming HNO_3 in presence of

A. C_2H_6

B. C_2H_4

C. C_3H_6

D. C_2H_2

Answer: B

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33. Two substances when separated out on the basis of their extent of adsorption by one material, the phenomenon is

A. chromatography

B. fractional distillation

C. sublimation

D. steam distillation

Answer: A

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34. 0.22 g of organic compound C_xH_yO which occupied 112 mL at NTP and on combustion gave 0.44 g CO_2. If the percentage of oxygen

is 36.45%, then the ratio of x to y in the compound is:

A. $1:1$

B. $1:2$

C. $1:3$

D. $1:4$

Answer: B

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35. CH_3NH_2 is heated with sodium and extracted with water and then $AgNO_3$ is added. The white ppt. obtained is of:

A. AgCN

B. Ag_2SO_4

C. $AgCl$

D. $ClCH_2COOAg$

Answer: A

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36. A mixture contains four solid organic compounds A, B, C, D. On heating only C changes from solid to vapour state. C can be separated from other present in a mixture by :

A. distillation

B. crystallization

C. sublimation

D. fractional distillation

Answer: C

Watch Video Solution

37. 20 mL of CH_4 is burnt with 60 mL of O_2. If all measurement are made at the same P and T, what is the volume of unreacted oxygen?

A. 10 mL

B. 20 mL

C. 30 mL

D. 40 mL

Answer: B

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38. For a compound to be purified by steam distillation.

A. impurities must be non-volatile

B. the liquid must be completely immiscible with water

C. the vapour pressure of the liquid must be sufficiently high

D. all of the above are correct.

Answer: D

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39. Which among the following is not correctly match with their colour?

A.

Compound	Colour
$Na_4\left[Fe(CN)_5NOS\right]$	purple

B.

Compound	Colour
$Fe_4\left[Fe(CN)_6\right]_3$	blue

C.

Compound	Colour
$Fe(CNS)_3$	blood red

D.

Compound	Colour
$AgCl$	light yellow

Answer: D

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40. The sulphur content of cystine is 26.7%. Give that cystine contains two sulphur atoms, molecular weight of cystine is approximately:

A. 120

B. 240

C. 100

D. 60

Answer: B

Watch Video Solution

Level Ii

1. A certain compound has the molecular formula X_4O_6. If 10g of X_4O_6 has 5.72g X, the atomic mass of X is:

A. 32 amu

B. 37 amu

C. 42 amu

D. 98 amu

Answer: A

Watch Video Solution

2. An organic compound on analysis gave C = 42.8%, H = 7.20%, and N = 50%. Volume of 1g of the compound was found to be 200 ml at STP. Molecular formula of the compound is:

A. $C_4H_8N_4$

B. $C_{16}H_{32}N_{16}$

C. $C_{12}H_{24}N_{12}$

D. $C_2H_4N_2$

Answer: A

Watch Video Solution

3. 0.24 g of a volatile liquid on vapourisation gives 45 ml of vapours at STP. What will be the

vapour density of the substance? (Density of $H_2 = 0.089 gL^{-1}$)

A. 9.539

B. 59.93

C. 5.993

D. 95.39

Answer: B

Watch Video Solution

4. The empirical formula of an acid is CH_2O_2, the probable molecular formula of the acid may be

A. $C_2H_4O_2$

B. $C_3H_6O_4$

C. $C_2H_2O_4$

D. CH_2O_2

Answer: D

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5. 4g of hydrocarbon on complete combustion gave 12.571g of CO_2 and 5.143g of water. What is the empirical formula of the hydrocarbon?

A. CH

B. C_2H_3

C. CH_2

D. CH_3

Answer: C

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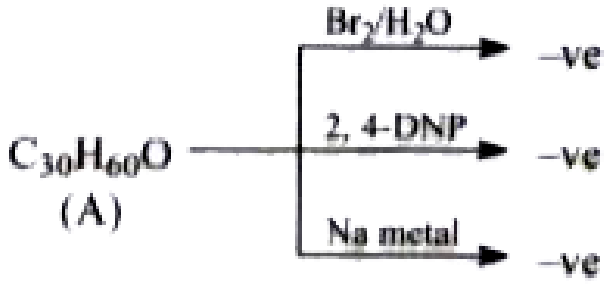
6. In compound $A(C_{30}H_{60}O)$ following tests are observed negatively, A can be



A. an unsaturated ether

B. an epoxide

C. cyclic ketone

D. a cycloalkanol

Answer: B

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7. In Kjeldahl's method, 29.5 mg of an organic compound containing nitrogen was digested and the evolved ammonia was absorbed in 20 mL of 0.1 N HCl solution. The excess of the acid required 15 mL of 0.1 N NaOH solution for complete neutralization. The percentage of nitrogen in the compound is

A. 29.5

B. 59.0

C. 47.4

D. 23.7

Answer: D

Watch Video Solution

8. 1.4 g of an organic compound was digested according to Kjeldahl's method and the ammonia evolved was absorbed in 60 mL of

M/10 H_2SO_4 solution. The excess sulphuric acid required 20 mL of M/10 NaOH solution for neutralization. The percentage of nitrogen in the compound is

A. 3

B. 5

C. 10

D. 24

Answer: C

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9. The ammonia evolved from the treatment of 0.30 g of an organic compound for the estimation of nitrogen was passed in 100 mL of 0.1 M sulphuric acid. The excess of acid required 20 mL of 0.5 M sodium hydroxide solution for complete neutralization. The organic compound is

A. acetamide

B. thiourea

C. urea

D. benzamide

Answer: C

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10. Analysis of organic compound (0.36 g) containing phosphorus gave 0.66 g of $Mg_2P_2O_7$ when treated with concentrated nitric acid followed by magnesia mixture. Calculate the amount of phosphorus present in the compound.

A. $51.20\ \%$

B. $61.20\ \%$

C. $73.5\ \%$

D. $68.3\ \%$

Answer: A

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11. If a compound on analysis was found to contain C = 18.5%, H = 1.55%, Cl = 55.04% and O = 24.81%, then its empirical formula is

A. CHClO

B. CH_2ClO

C. C_2H_2OCl

D. $ClCH_2O$

Answer: A

Watch Video Solution

12. $\frac{5}{19}g$ of an organic compound gave 22.4 cm^3 of moist nitrogen measured at 280 K and 732.7 mm pressure. The percentage of

nitrogen in the substance is approximately

(Aqueous tension at 280 K = 12.7 mm)

A. 9.8

B. 19.6

C. 4.9

D. 9.0

Answer: A

 Watch Video Solution

13. An organic compound contains C, H and S. The minimum molecular weight of the compound containing 8% sulphur is: (atomic weight of S = 32 amu)

A. $600 \mathrm{g\ mol}^{-1}$

B. $200 \mathrm{g\ mol}^{-1}$

C. $400 \mathrm{g\ mol}^{-1}$

D. $300 \mathrm{g\ mol}^{-1}$

Answer: C

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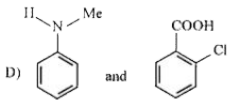
14. Correct pair of compounds which gives blue colouration/precipitate and white precipitate, respectively, when their Lassaigne's test is separately done is

A. NH_2NH_2HCl and $ClCH_2COOH$

B. NH_2CSNH_2 and $PhCH_2Cl$

C. NH_2CH_2COOH and NH_2CONH_2

D. 

Answer: D

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15. In duma's method of estimation of nitrogen, 0.25 g of an organic compound gave 40 mL of nitrogen collected at 300 K temperature and 725 mm pressure. If the aqueous tension at 300 K is 25 mm, the percentage of nitrogen in the compound is

A. 16.76

B. 15.76

C. 17.36

D. 18.20

Answer: A

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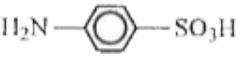
16. Which of the following will give blood red colour while doing Lassaigne's test for nitrogen?

A. 

B. $(NH_2)_2C=0$

C. $C_6H_5SO_3H$

D. $(NH_4)_2SO_4$

Answer: A

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17. A gaseous hydrocarbon gives upon combustion 0.72 g of water and 3.08 g of CO_2. The empirical formula of the hydrocarbon is:

A. C_7H_8

B. C_2H_4

C. C_3H_4

D. C_6H_5

Answer: A

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18. Ten millilitre of a gaseous hydrocarbon was burnt completely in 80 ml of O_2 at STP. The volume of the remaining gas is 70 ml. The

volume became 50 ml on treatment with NaOH. The formula of the hydrocarbon is:

A. C_2H_6

B. C_2H_4

C. C_3H_8

D. C_3H_6

Answer: B

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19. In the estimation of of nitrogen by Kjeldahl's method, 2.8 gm of an organic compound required 20 millimole of H_2SO_4 for the complete neutralisation of NH_3 gas evolved. The percentage of nitrogen in the simple is:

A. $20\ \%$

B. $10\ \%$

C. $40\ \%$

D. $30\ \%$

Answer: A

Watch Video Solution

20. 0.3 gm of platinichloride of an organic diacidic base left 0.09 gm of platinum on ignition. The molecular weight of the organic base is:

A. 120

B. 240

C. 180

D. 60

Answer: B

Watch Video Solution

21. A compound contains 38.8%C, 16%H, and 45.2%N. The formula of the compound would be:

A. CH_3NH_2

B. C_2H_5CN

C. CH_3CN

D. $CH_2(NH_2)_2$

Answer: A

Watch Video Solution

22. An organic compound on analysis gave C = 42.8%, H = 7.2%, and N = 50%. Volume of 1 gm of the compound was found to be 200 ml at STP. Molecular formula of the compound is

A. $C_4H_8N_4$

B. $C_{16}H_{32}N_{16}$

C. $C_{12}H_{24}N_{12}$

D. $C_2H_4N_2$

Answer: A

 Watch Video Solution

23. 0.14 gm of an acid required 12.5 ml of 0.1 N NaOH for complete neutralisation. The equivalent mass of the acid is:

A. 63

B. 56

C. 45

D. 112

Answer: D

 Watch Video Solution

24. 0.24 gm of a volatile liquid upon vaporisation gives 45 ml of vapours at STP.

What will be the vapour density of the substance? (Density of H, =0.089 gm litre^{-1})

A. 9.539

B. 59.7

C. 59.93

D. 95.39

Answer: B

Watch Video Solution

25. Liquid benzene (C_6H_6) burns in oxygen according to

$2C_6H_6(l) + 15O_2(g) \rightarrow 12CO_2(g) + 6H_2O(g)$

How many litres of O_2 at STP are needed for complete combustion of 39 gm of liquid benzene?

A. 11.2 litres

B. 74 litres

C. 84 litres

D. 22.4 litres.

Answer: C

Watch Video Solution

26. Some organic compounds are purified by distillation at low pressure because the compound are:

A. low boiling liquids

B. high boiling liquids

C. highly volatile

D. dissociated before reaching their boiling points.

Answer: D

 Watch Video Solution

27. Which is useful for separating benzoic acid from a mixture of benzoic acid and methyl benzoate?

A. $NaHCO_3$ (aq)

B. Dil . HCl

C. Dil. H_2SO_4

D. Dil. HNO_3

Answer: A

Watch Video Solution

28. 500 mL of a hydrocarbon gas burtn in excess of oxygen yielded 2500 mL of CO_2 and 3.0 litre of water vapour (all volumes

measured at the same temperature and pressure). The formula of the hydrocarbon is:

A. C_3H_6

B. C_2H_4

C. C_5H_{12}

D. CH_4

Answer: C

Watch Video Solution

29. Which compound present in sodium extract prepared using thio urea, gives red colour with $FeCl_3$?

A. NaCN

B. Na_2S

C. NaCNS

D. Na_2SO_4

Answer: C

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30. The sodium extract on acidification with acetic acid and then adding lead acetate solution gives a black precipitate. The organic compound contains:

A. nitrogen

B. halogen

C. sulphur

D. phosphorous

Answer: C

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31. An organic compound is fused with fusion mixture and extracted with HNO_3. The extract gives yellow precipitate with ammonium molybdate. It shows the presence of which element?

A. P

B. As

C. S

D. May be P or As or Both

Answer: D

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32. Which one of the following hydrocarbons is burnt in excess of oxygen, the volume of CO_2 evolved is just double to that of hydrocarbon taken. The hydrocarbon is:

A. CH_4

B. C_2H_6

C. C_3H_8

D. C_3H_6

Answer: B

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33. Sodium nitroprusside reacts with sulphide ion to give a purple colour due to the formation of

A. $\left[Fe(CN)_5NO\right]^{-3}$

B. $\left[Fe(CN)_5NO\right]^{+}$

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

D. $\left[Fe(CN)_5NOS\right]^{3-}$

Answer: C

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34. 1.575 g of an organic acid was dissolved in 250 mL of water. 20 mL of this solution required 16 mL of N/8 alkali solution for complete neutralisation. If the basicity of the acid is two, find its molecular mass.

A. 182

B. 136

C. 126

D. 148

Answer: C

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35. In the Kjeldahl's method for estimation of nitrogen in a soil sample, ammonia evolved from 0.75 g of sample neutralised 10 ml of 1 M

H_2SO_4. The percentage of nitrogen in the soil is

A. 37.33

B. 45.33

C. 35.33

D. 43.33

Answer: A

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36. 0.0833 mole of a carbohydrate of empirical formula CH_2O contains 1.00 g of hydrogen. The molecular formula of the carbohydrate is:

A. $C_5H_{10}O_5$

B. $C_3H_4O_3$

C. $C_{12}H_{22}O_{11}$

D. $C_6H_{12}O_6$

Answer: D

Watch Video Solution

37. Analysis of an organic compound gave 74% C, 8.65% H and 17.3% N. What is the empirical formula of the compound.

A. C_5H_8N

B. $C_{10}H_{12}N$

C. C_5H_7N

D. $C_{10}H_{14}N$

Answer: C

Watch Video Solution

38. 0.16 g of a dibasic organic acid required $25cm^3$ of 0.1 M NaOH for complete neutralization. The molecular mass of the acid is:

A. 45

B. 90

C. 64

D. 128

Answer: D

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39. 9.9 g amide with molecular formula $C_4H_5N_xO_y$ on heating with alkali liberated 1.7 g of ammonia. If the percentage of oxygen is 33.33% then the ratio of 'N' and 'O atoms in the compound is:

A. $1:1$

B. $1:2$

C. $2:3$

D. $3:2$

Answer: B

 Watch Video Solution

40. In a compound C, H and N atoms are present in 9 : 1 : 3.5 by weight. Mol wt. of compound is 108, its mol. formula is

A. $C_2H_6N_2$

B. C_3H_4N

C. $C_6H_8N_2$

D. $C_9H_{12}N_3$

Answer: C

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Level Iii Single Correct Answer Type

1. A Duma's bulb full of air weighs 22.567 g at $20^{\circ} C$ and 755 mm pressure. Full of vapours of a substance at $120^{\circ} C$ and the same pressure, it weighs 22.8617 g. The capacity of the bulb is 200 mL. Find out the molecular mass of the

substance. [Density of air=0.00129 g/mL) : 86.69, 80.64, 78.92, 96.75

A. 86.59

B. 80.64

C. 78.92

D. 96.75

Answer: A

 Watch Video Solution

2. An organic compound X having molecular mass 60 is found to contain C = 20%, H = 6.67% and N = 46.67%, while rest is oxygen. On heating, it gives ammonia along with a solid residue. The solid residue gave violet colour with alkaline copper sulphate solution. The compound X is

A. $CH_3CH_2CONH_2$

B. CH_3NCO

C. CH_3CONH_2

D. $(NH_2)_2CO$

Answer: D

Watch Video Solution

3. In Kjeldahl's method, 29.5 mg of an organic compound containing nitrogen was digested and the evolved ammonia was absorbed in 20 mL of 0.1 N HCl solution. The excess of the acid required 15 mL of 0.1 N NaOH solution for

complete neutralization. The percentage of nitrogen in the compound is

A. 29.5

B. 59.0

C. 47.4

D. 23.7

Answer: D

Watch Video Solution

4. Nine volumes of a gaseous mixture consisting of gaseous organic compound A and just sufficient amount of oxygen required for complete combustion yielded on burning four volumes of CO_2 , six volumes of water vapour, and two volumes of N_2 ,all volumes measured at the same temperature and pressure. If the compound contains C, H, and N only, the molecular formula of the compound A is:

A. $C_2H_3N_2$

B. $C_2H_6N_2$

C. $C_3H_6N_2$

D. C_3H_6N

Answer: B

Watch Video Solution

5. A mixture of ethylene and excess of H_2 had a pressure of 600 mm Hg. The mixture was passed over nickel catalyst to convert ethylene to ethane. The pressure of the resultant

mixture at the similar conditions of temperature and volume dropped to 400 mm Hg. The fraction of C_2H_4 by volume in the original mixture is:

A. 1/3rd of the total volume

B. 1/4th of the total volume

C. 2/3rd of the total volume

D. 1/2 of the total volume

Answer: A

 Watch Video Solution

6. A hydrocarbon contains 10.5 g of carbon for each one gram of hydrogen. The mass of 1 litre of hydrocarbon vapours at $127^{\circ}C$ and 1 atmospheric pressure is 2.8 g. Find out the molecular formula.

A. C_6H_{12}

B. C_4H_8

C. C_7H_8

D. C_4H_{10}

Answer: C

Watch Video Solution

7. A substance on analysis gave the following data: 0.3112 g gave 0.4291 g of CO_2 and 0.0585 g of water. 0.2293 g of the substance when heated with nitric acid and silver nitrate gave 0.3969 g of bromide and chloride of silver. 0.2202 g of this mixture of halides was found to contain 0.1435 g of silver. Find the empirical formula of the original substance.

A. C_6H_4ClBr

B. $C_6H_3Cl_2Br$

C. $C_6H_3ClBr_2$

D. $C_6H_4Cl_2$

Answer: A

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Level Iii Multiple Correct Answer Type

1. Which of the following compouds can be purified by steam distillation?

A. Nitrobenzene

B. Bromobenzene

C. Salicylaldehyde

D. p-hydroxybenzaldehyde

Answer: A::B::C

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2. Which of the following compounds will give Lassaigne's test for nitrogen?

A. NH_2NH_2

B. $C_6H_5NHNH_2$

C. $PhN = NPh$

D. NH_2CONH_2

Answer: B::C::D

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3. Which of the following compounds does not give blood red colouration when its Lassaigne's extract is treated with alkali and ferric chloride?

A. thiourea

B. diphenyl sulphide

C. phenylhydrazine

D. benzamide

Answer: B::C::D

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4. The colour of the solution/precipitate obtained in the elemental analysis of an organic compound and the molecule/ion responsible for the colour are given below. Choose the correctly matched pairs:

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

B. Yellow $-(NH_4)_2MoO_4$

C. Violet colour $-\left[Fe(CN)_5NOS\right]^4$

D. Blood red colour - $[Fe(SCN)]^{2-}$

Answer: A::C::D

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5. Chromatographic techniques of purification can be used for: coloured compounds liquids plant pigments dyestuffs

A. coloured compounds

B. liquids

C. plant pigments

D. dyestuffs

Answer: A::B::C::D

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6. Which method can be used for purification of liquids?

A. crystallisation

B. steam distillation

C. sublimation

D. distillation

Answer: A::B::D

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7. A mixture of iron fillings and sulphur can be separated by:

A. heating

B. magnetism

C. shaking with CS_2

D. washing with H_2O

Answer: B::C::D

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8. Which of the following statements are correct?

A. In Lassaigne's test for halogens, conc. HNO_3 is used to remove HCN and H_2S

B. When an organic compound is heated with dry CuO and the gases evolved are

passed through lime water, which turns milky, the gas may be CO_2 or SO_2

C. In Carius method, sulphur is oxidised to SO_4^{-2} ion with fuming HNO_3

D. In Lassaigne's test, N present in the organic compound is converted into CN^{Θ} ions.

Answer: A::B::C::D

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9. Which of the following statements are correct?

A. Nitroprusside ion is $\left[Fe(CN)_5NO\right]^{2-}$

B. Nitroprusside ion is $\left[Fe(CN)_5NOS\right]^{2-}$

C. Prussian blue and Turnbull's blue, respectively, are $Fe_3\left[Fe(CN)_6\right]_2$ and $Fe_4\left[Fe(CN)_6\right]_3$

D. Prussian blue and Tumbull's blue, respectively, are $Fe_4\left[Fe(CN)_6\right]_3$ and $Fe_3\left[Fe(CN)_6\right]_2$

Answer: A::C

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Level Iii Numerical Type

1. 0.2475 gm of an organic substance gave on combustion 0.495 gm of CO_2 and 0.2025 gm of H_2O Calculate the percentage of hydrogen in it.

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2. 0.4 gm of an organic compound was treated according to Kjeldahl's method. The ammonia evolved was absorbed in 50 ml of $0.5MH_3PO_3$. The residual acid required 30 ml of 0.5 M $Ca(OH)_2$ Find the percentage of N_2 in the compound. (answer is divided by 10)

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3. 0.76 gm of the silver salt of a dibasic acid was ignited. It gave 0.54 gm of pure silver.

Determine the molecular mass of the acid.

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4. An acid of molecular mass 104 contains 34.6% carbon and 3.85% hydrogen. 3.812 mg of the acid required 7.33 ml of 0.01 N NaOH for neutralisation. Calculate the basicity of the acid.

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5. Nine millilitre of a mixture of methane and ethylene was exploded with 30 ml (excess) of oxygen. After cooling, the volume was 21.0 ml. Further treatment with caustic potash solution reduced the volume to 7.0 ml. Determine the volume of CH_4 in the mixture.

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Level Iii Matching Column Type

1. match the following

	Column I Characteristics	Column II Methods
A)	Quantitative estimation of C and H in an organic compound	p) Kjeldahl's method
B)	Equivalent mass of an organic acid	q) Carius method
C)	Quantitative estimation of halogens in organic compound	r) Liebig's method
D)	Quantitative estimation of N in nitrobenzene	s) Silver salt method

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2. Match the following columns

	Column I Compounds		Column II Methods of separation
A)	Toluene and aniline	p)	Separated by treatment with dil. NaOH
B)	Toluene and phenol	q)	Extraction with dil. HCl, a compound passes into the aqueous layer in the form of hydrochloride salt and recovered by neutralization
C)	Diethyl ether and chlorobenzene	r)	Separated by $NaHCO_3$ solution, a compound forms salt and is recovered after acidification
D)	o-Cresol and benzoic acid	s)	Separated by conc. H_2SO_4, which dissolves a compound and recovered from solution by dilution with H_2O

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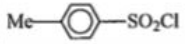
3. match the following

Column I Compounds		Column II Reagent for separation	
A)	1° and 2° amines	p)	$NaHSO_3$
B)	Ethanal and ethanol	q)	Hinsberg reagent $(PhSO_2Cl)$ or 
C)	$(C_2H_5)_2NH$ and butanol	r)	Dil. NaOH and distillation
D)	$(C_2H_5)_2C=O$ and CH_3COOH	s)	Dil. H_2SO_4 and steam distillation

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4. match the following

Column I		Column II	
A)	Two solids which have different solubilities in a solvent and which do not undergo reaction when dissolve in it	p)	Steam distillation
B)	Liquid that decomposes at its boiling point	q)	Fractional distillation
C)	Steam volatile liquid	r)	Simple distillation
D)	Two liquids which have boiling points close to each other	s)	Distillation under reduced pressure
E)	Two liquids with large difference in boiling points	t)	Crystallisation

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5. Match the following

Column I		Column II	
A)	Nitrogen of the organic compound is converted into $(NH_4)_2SO_4$	p)	$Fe(CNS)_3$
B)	The compound responsible for blue or green colouration during Lassaigne's test for nitrogen	q)	Dumas method
C)	Compound sometimes formed in Lassaigne's test for N if S is also present	r)	$Fe_4[Fe(CN)_6]_3$
D)	Compound responsible for violet colouration in Lassaigne's test for S	s)	Kjeldahl's method
E)	Nitrogen of the organic compound is set free as N_2 gas	t)	$Na_4[Fe(CN)_5NOS]$

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Level Iii Statement Type

1. Assertion : Sulphur present in an organic compound can be estimated quantitatively by

Carius method.

Resaon : Sulphur is separated easily from other atoms in the molecule and gets precipitated as light yellow solid.

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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2. Assertion : Simple distillation can help in separating a mixture of propan-1-ol (boiling piont $97^\circ C$) and propanone (boiling point $56^\circ C$)

Reason : Liquids with a difference of more

than $25^{\circ}C$ in their boiling points can be separately by simple distillation.

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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3. Statement 1 : Nitrogen is detected in nitro and diazo compounds by soda lime test.

Statement 2 : Organic compounds containing nitrogen when heated with soda lime (NaOH+CaO) usually give smell of ammonia.

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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4. Assertion : In organic layer test, Cl_2 water is added to the sodium extract, which oxidises which oxidises Br^{Θ} and I^{Θ} ions to Br_2 and I_2, respectively.

Reason : Reduction potential of Cl_2 is greater than that of Br_2 and I_2.

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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5. Assertion : Impure glycerine is purified by vacuum distillation.

Reason : Glycerine is soluble in water.

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: B

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6. Assertion : Paper chromatography is a type of partition chromatography.

Reason : Moving phase is liquid and stationary phase is solid.

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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Level Iii Linked Comprehension Tyne Paragraph I

1. Which species is not present in the Lassaigne's extract? N O 3- C N- C N S Θ S 2 –

A. NO_3^{Θ}

B. $C\overset{\Theta}{N}$

C. CNS^{Θ}

D. S^{2-}

Answer: A

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2. Black precipitate in the detection of sulphur with lead acetate and acetic acid is due to the formation of: P b 2 S PbS P b S 2 P b S O 4

A. Pb_2S

B. PbS

C. PbS_2

D. $PbSO_4$

Answer: B

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3. Yellow precipitate in the detection of phosphorous when an organic compound is heated with Na_2O_2 and then boiled with conc. HNO_3 followed by the addition of ammonium molybdate is due to the formation of:

A. $(NH_4)_3PO_4.12MoO_3$

B. $(NH_4)_3PO_4.6MoO_3$

C. $(NH_4)_3PO_4.12MoO_2$

D. $(NH_4)_3PO_4.6MoO_2$

Answer: A

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4. What is the molecular formula of a compound, its empirical formula is CH_2O and its molecular weight is 90?

A. $C_3H_6O_3$

B. $C_6H_6O_3$

C. $C_4H_8O_4$

D. $C_2H_6O_2$

Answer: A

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5. An orgainc compound contains C =40% , H = 13.33% and N = 46.67% . Its empirical formula would be

A. CHN

B. C_2H_2N

C. C_3H_7N

D. CH_4N

Answer: D

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6. The empirical formula of a compound is CH_2 One mole of this compound has a mass of 42 g. Its molecular formula is

A. C_2H_2

B. C_3H_6

C. C_3H_8

D. CH_4

Answer: B

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7. Twenty millilitres of a gaseous hydrocarbon required 400 ml of air for complete combustion. The air contains 20% by volume

of oxygen. The volume of gaseous mixture after explosion and cooling was found to be 380ml.

Volume of residual nitrogen is:

A. 300 ml

B. 310 ml

C. 320 ml

D. 330 ml

Answer: C

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8. Twenty millilitres of a gaseous hydrocarbon required 400 ml ofair for complete combustion. The air contains 20% by volume of oxygen. The volume of gaseous mixture after explosion and cooling was found to be 380ml.

Volume of CO_2 is:

A. 40 ml

B. 60 ml

C. 80 ml

D. 100 ml

Answer: B

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9. Twenty millilitres of a gaseous hydrocarbon required 400 ml ofair for complete combustion. The air contains 20% by volume of oxygen. The volume of gaseous mixture after explosion and cooling was found to be

380ml.

Formala of the hydrocarbon is:

A. C_3H_8

B. C_3H_6

C. C_3H_4

D. C_2H_6

Answer: C

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10. 0.246 gm of an organic compound gave 0.198 gm of carbon dioxide and 0.1014 gm of water on complete combustion. 0.37 gm of the compound gave 0.638 gm of silver bromide. [Vapour density of the compound is 54.4]

What is the percentage composition of bromine in the compound?

A. $21.95\ \%$

B. $4.58\ \%$

C. $73.37\ \%$

D. $52.32\ \%$

Answer: C

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11. 0.246 gm of an organic compound gave 0.198 gm of carbon dioxide and 0.1014 gm of water on complete combustion. 0.37 gm of the compound gave 0.638 gm of silver bromide. [Vapour density of the compound is 54.4]

The compound has empirical formula.

A. C_2H_5Br

B. $C_2H_4Br_2$

C. CH_3Br

D. CH_2Br_2

Answer: A

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12. 0.246 gm of an organic compound gave 0.198 gm of carbon dioxide and 0.1014 gm of water on complete combustion. 0.37 gm of the

compound gave 0.638 gm of silver bromide. [Vapour density of the compound is 54.4]

What is the value of 'n' For the given compound?

A. 3

B. 2

C. 4

D. 1

Answer: D

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