

Practice Paper

Time : 2 Hour

11th standard (JEE BASED)
GOC - PURIFICATION TECHNIQUES

Total Marks : 200

Chemistry

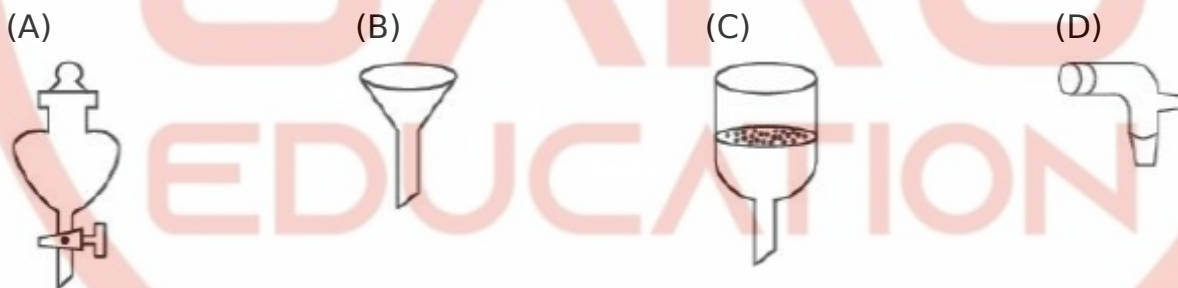
* SECTION - A

[160]

1. The latest technique for the purification of organic compounds is

- (A) Fractional distillation (B) Chromatography
(C) Vacuum distillation (D) Crystallisation

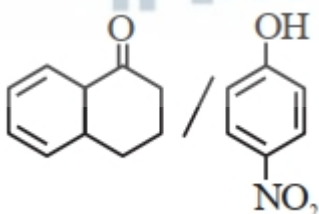
2. Which of the following is structure of a separating funnel?



3. Match items of column I and II

Column I (Mixture of compounds)	Column II (Separation Technique)
A H_2O/CH_2Cl_2	I Crystallization
B Image	II Differential solvent extraction
C Kerosene/Naphthalene	III Column chromatography
D $C_6H_{12}O_6/NaCl$	IV Fractional Distillation

Correct match is :



(A) A – (iii), B – (iv), C – (ii), D – (i)

(B) A – (i), B – (iii), C – (ii), D – (iv)

(C) $A - (ii), B - (iii), C - (iv), D - (i)$

(D) $A - (ii), B - (iv), C - (i), D - (iii)$

4. Which of the following statement is correct for paper chromatography ?
- (A) Water present in the mobile phase gets absorbed by the paper which then forms the stationary phase.
- (B) Water present in the pores of the paper forms the stationary phase.
- (C) Paper sheet forms the stationary phase.
- (D) Paper and water present in its pores together form the stationary phase.
5. Which among the following purification methods is based on the principle of "Solubility" in two different solvents?
- (A) Column Chromatography
- (B) Sublimation
- (C) Distillation
- (D) Differential Extraction
6. Which of the following statements are correct?
- A. Glycerol is purified by vacuum distillation because it decomposes at its normal boiling point.
- B. Aniline can be purified by steam distillation as aniline is miscible in water.
- C. Ethanol can be separated from ethanol water mixture by azeotropic distillation because it forms azeotrope.
- D. An organic compound is pure, if mixed $M.P.$ is remained same.
- Choose the most appropriate answer from the options given below :
- (A) A, B, C only (B) A, C, D only (C) B, C, D only (D) A, B, D only
7. A mixture of sand and iodine can be separated by
- (A) Crystallisation (B) Sublimation
- (C) Distillation (D) Fractional distillation
8. In Aniline & water mixture, Aniline can be separate by
- (A) Steam distillation
- (B) Fractional distillation
- (C) Simple distillation
- (D) Distillation under reduced pressure
9. On heating, some solid substances change from solid to vapour state without passing through liquid state. The technique used for the purification of such solid substances based on the above principle is known as
- (A) Sublimation (B) Distillation (C) (D) Crystallization
- Chromatography

10. 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

11. In Lassaigne's test the organic compound is fused with Na followed by extraction with distilled water. Which of the following is not the possible product of this fusion reaction

(A) NaX (B) $NaCN$ (C) NaN_3 (D) Na_2S

12. Lassaigne's test is not used for the detection of which element?

(A) Boron (B) Halogens (C) Nitrogen (D) Sulphur

13. Which of the following compounds is not expected to show Lassaigne's test for nitrogen ?

(A) Propanenitrile
 (B) Hydroxylamine hydrochloride
 (C) Nitromethane
 (D) Ethanamine

14. Match the organic compounds in column –I with the Lassaigne's test results in column –II appropriately

Column –I	Column –II
(A) Aniline	(i) Red colour with $FeCl_3$
(B) Benzene sulfonic acid	(ii) Violet colour with sodium nitroprusside
(C) Thiourea	(iii) Blue colour with hot and acidic solution of $FeSO_4$

(A) A – (ii); B – (iii); C – (i) (B) A – (iii); B – (i); C – (ii)

(C) A – (iii); B – (ii); C – (i) (D) A – (ii); B – (i); C – (iii)

15. Acidic ferric chloride solution on treatment with excess of potassium ferrocyanide gives a Prussian blue coloured colloidal species. It is :

(A) $Fe_4[Fe(CN)_6]_3$ (B) $K_5Fe[Fe(CN)_6]_2$ (C) $HFe[Fe(CN)_6]$ (D) $KFe[Fe(CN)_6]$

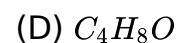
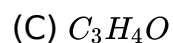
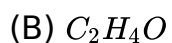
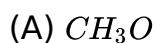
16. Match List–I with List–II

List–I Test/Reagents/Observation(s)	List–II Species detected

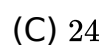
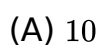
(a) Lassaigne's Test	(i) Carbon
(b) $Cu(II)$ oxide	(ii) Sulphur
(c) Silver nitrate	(iii) N, S, P, and halogen
(d) The sodium fusion extract gives black precipitate with acetic acid and lead acetate	(iv) Halogen Specifically

The correct match is

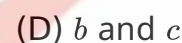
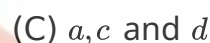
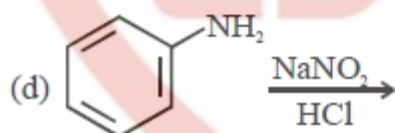
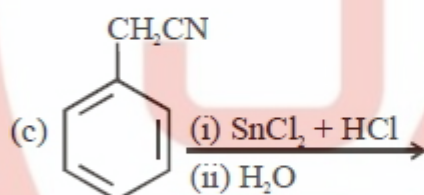
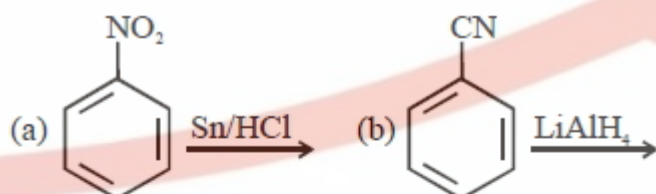
- (A) (a) – (iii), (b) – (i), (c) – (ii), (d) – (iv)
 (B) (a) – (i), (b) – (iv), (c) – (iii), (d) – (ii)
 (C) (a) – (iii), (b) – (i), (c) – (ii), (d) – (ii)
 (D) (a) – (i), (b) – (ii), (c) – (iv), (d) – (iii)
17. In Carius tube, an organic compound 'X' is treated with sodium peroxide to form a mineral acid 'Y'. The solution of $BaCl_2$ is added to 'Y' to form a precipitate 'Z'. 'Z' is used for the quantitative estimation of an extra element. 'X' could be:
 (A) Cytosine (B) Chloroxylene (C) A nucleotide (D) Methionine
18. If on adding $FeCl_3$ solution to acidified Lassaigne solution, of organic compound a blood red colouration is produced, it indicates the presence of
 (A) S (B) N (C) N and S (D) S and Cl
19. In Lassaigne's test the organic compound is fused with Na followed by extraction with distilled water. Which of the following is not the product of this fusion reaction
 (A) NaX (B) $NaCN$ (C) NaN_3 (D) Na_2S
20. An organic compound 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 NH_3 along with a solid residue. The solid residue give violet colour with alkaline copper sulphate solution. the compound is
 (A) CH_3NCO (B) CH_3CONH_2 (C) $(NH_2)_2CO$ (D) $CH_3CH_2CONH_2$
21. An organic compound containing C, H and N gave following analysis : $C = 40\%$, $H = 13.33\%$ and $N = 46.67\%$. Its empirical formula would be
 (A) $C_2H_7N_2$ (B) CH_5N (C) CH_4N (D) C_2H_7N
22. A compound gave 80% carbon and 20% hydrogen on analysis. The compound is possibly
 (A) C_6H_6 (B) C_2H_5OH (C) C_2H_6 (D) $CHCl_3$
23. An organic compound on analysis gave the following results : $C = 54.5\%$, $O = 36.4\%$, $H = 9.1\%$. The Empirical formula of the compound is



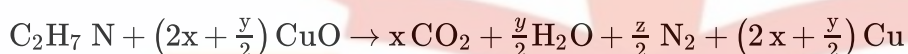
24. 1.4 kg of an organic compound was digested according to Kjeldahl's method and the ammonia evolved was absorbed in 60 mL of $M/10$ H_2SO_4 solution. The excess sulphuric acid required 20 mL of $M/10$ $NaOH$ solution for neutralization. The percentage of nitrogen in the compound is



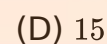
25. The Kjeldahl method of Nitrogen estimation fails for which of the following reaction products ?



26. The transformation occurring in Duma's method is given below :

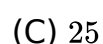


The value of y is (Integer answer)



27. An organic compound is subjected to chlorination to get compound A using 5.0 g of chlorine. When 0.5 g of compound A is reacted with $AgNO_3$ [Carius Method], the percentage of chlorine in compound A is when it forms 0.3849 g of $AgCl$. (Round off to the Nearest Integer)

(Atomic masses of Ag and Cl are 107.87 and 35.5 respectively)



28. Complete combustion of 750 g of an organic compound provides 420 g of CO_2 and 210 g of H_2O . The percentage composition of carbon and hydrogen in organic compound is 15.3 and respectively. (Round off to the Nearest Integer)

(A) 1 (B) 6 (C) 3 (D) 8

29. While estimating the nitrogen present in an organic compound by Kjeldahl's method, the ammonia evolved from 0.25 g of the compound neutralized 2.5 mL of 2 M H_2SO_4 . The percentage of nitrogen present in organic compound is

(A) 55 (B) 56 (C) 54 (D) 53

30. In Carius method of estimation of halogen. 0.45 g of an organic compound gave 0.36 g of $AgBr$. Find out the percentage of bromine in the compound. Molar masses : $AgBr = 188 g mol^{-1}$; $Br = 80 g mol^{-1}$)

(A) 34.04% (B) 40.04% (C) 36.03% (D) 38.04%

31. 0.5 g of an organic compound (X) with 60% carbon will produce $\times 10^{-1}$ g of CO_2 on complete combustion.

(A) 10 (B) 11 (C) 12 (D) 13

32. Given below are two statements :

Statement (I) : Kjeldahl method is applicable to estimate nitrogen in pyridine.

Statement (II) : The nitrogen present in pyridine can easily be converted into ammonium sulphate in Kjeldahl method.

In the light of the above statements, choose the correct answer from the options given below.

(A) Both Statement I and Statement II is false

(B) Statement I is false but Statement II is true

(C) Both Statement I and Statement II is true

(D) Statement I is true but Statement II is false

33. A compound contains $C = 90\%$ and $H = 10\%$. Empirical formula of the compound is

(A) C_3H_{10} (B) CH_2 (C) C_3H_2 (D) C_3H_4

34. An organic compound gave $C = 92.31\%$ and $H = 7.69\%$. If molecular weight of the compound is 78, its molecular formula is

(A) C_6H_6 (B) C_7H_7 (C) C_6H_{18} (D) C_8H_{20}

35. An organic compound gave the following results $C = 53.3\%$, $H = 15.6\%$, $N = 31.1\%$, mol. wt. = 45, What is molecular formula of the compound ?

(A) $C_2H_5N_2$ (B) C_2H_5N (C) C_2H_7N (D) C_2H_6N

36. Percentage composition of an organic compounds is as follows: $C = 10.06$, $H = 0.84$, $Cl = 89.10$. Which of the following corresponds to its molecular formula if the vapour density is 60.0

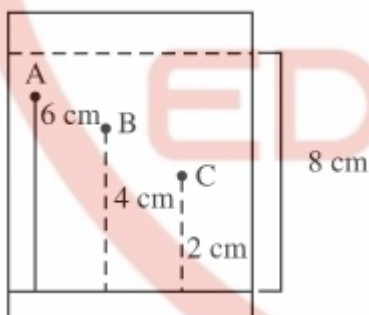
(A) CH_2Cl_2 (B) $CHCl_3$ (C) CH_3Cl (D) None of these

37. A compound has an empirical formula C_2H_4O . An independent analysis gave a value of 132.16 for its molecular mass. What is the correct molecular formula
 (A) $C_4H_4O_5$ (B) $C_{10}H_{12}$ (C) C_7O_3 (D) $C_6H_{12}O_3$
38. In Kjeldahl's method of estimation of N , $CuSO_4$ acts as
 (A) Oxidising agent (B) Reducing agent (C) Catalytic agent (D) Hydrolysis agent
39. When 32.25 gm ethyl chloride dehydro halogenated, it gives 50% Alkene, what is the mass of product.....gm (atomic mass of chlorine = 35.5)
 (A) 14 (B) 28 (C) 64.5 (D) 7
40. In the Kjeldahl's method for estimation of nitrogen present in a soil sample, ammonia evolved from 0.75 g of sample neutralized 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

*** SECTION - B**

[40]

41. Three organic compounds A, B and C were allowed to run in thin layer chromatography using hexane and gave the following result (see figure). The R_f value of the most polar compound is $\times 10^{-2}$



42. In sulphur estimation, 0.471 g of an organic compound gave 1.4439 g of barium sulphate. The percentage of sulphur in the compound is (Nearest Integer) (Given: Atomic mass Ba: 137u, S: 32u, O: 16u)
43. On complete combustion 0.30 g of an organic compound gave 0.20 g of carbon dioxide and 0.10 g of water. The percentage of carbon in the given organic compound is (Nearest Integer)
44. Kjeldahl's method was used for the estimation of nitrogen in an organic compound. The ammonia evolved from 0.55 g of the compound neutralised 12.5 mL of 1 M H_2SO_4 solution. The percentage of nitrogen in the compound is (Nearest integer)
45. In the sulphur estimation, 0.471 g of an organic compound gave 1.44 g of barium sulphate. The percentage of sulphur in the compound is%. (Nearest integer)
 (Atomic Mass of Ba = 137 u)

46. When 0.15 g of an organic compound was analyzed using Carius method for estimation of bromine, 0.2397 g of $AgBr$ was obtained. The percentage of bromine in the organic compound is (Nearest integer)
[Atomic mass : Silver = 108, Bromine = 80]
47. The transformation occurring in Duma's method is given below :
$$C_2H_7N + (2x + \frac{y}{2}) CuO \rightarrow x CO_2 + \frac{y}{2} H_2O + \frac{z}{2} N_2 + (2x + \frac{y}{2}) Cu$$

The value of y is (Integer answer)
48. An organic compound contains C , H and S . The minimum molecular weight of the compound containing 8% sulphur is..... $g\ mol^{-1}$ (atomic weight of $S = 32\ amu$)
49. The vapour density of the methyl ester of an organic monocarboxylic acid is 37. What is the molecular weight of the acid
50. In Victor Mayer's method 0.2 gm of an organic substance displaced 56 ml of air at STP the molecular weight of the compound
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