CHAPTER - 10

ORGANIC CHEMISTRY - SOME BASIC PRINCIPLES AND TECHNIQUES - PART II

(PURIFICATION AND CHARACTERISATION OF ORGANIC COMPOUNDS)

1. 1 They have large difference in B.P.

2. 4 Steam distillation is useful when the compound to be purified is water-immiscible and steam volatile.

3. 2 Benzoic acid can be solubilised in hot water. Naphthalene is insoluble in water

4. 3 In steam distillation,vapour pressure due to organic liquid + vapour pressure due to water = Atmospheric pressure

5. 3 o-Nitrophenol is both steam volatile and water-immiscible

6. 4 Boiling point of components of mineral oil are close to each other

7. 1 In paper chromatography, separation occurs by differential partitioning of the components in the two liquid phases.

8. 4 In paper chromatography, water trapped on chromatography paper acts as the stationary phase whereas organic solvent acts as the mobile phase

9. 3 Boiling points of acetone (56°C) and methanol (65°C) differ by 9° and hence can be separated only by fractional distillation.

10. 3 Stationary phase in TLC is a solid adsorbent

11. 2 NaCN is formed on sodium fusion of a nitrogen containing organic compound.

12. 3 Sodium thionitroprusside - $Na_4[Fe(CN)_5(NOS)]$

13. 2

Compound	Colour
I	Prussian blue
II	Canary yellow
III	Blood red
IV	Deep yellow

14. 2 Nitrometer contains aq. KOH to absorb CO_2

15. 1 In Kjeldahl's method, nitrogen is estimated as NH_3 or $(NH_4)_2SO_4$

16. 4 The balanced equation is

$$C_2H_7N + 7.5CuO \rightarrow 2CO_2 + 3.5H_2O + 0.5N_2 + 3.5Cu$$

17. 1 Moles of NH_3 produced = $\frac{(0.8 \times 0.42)}{14} = 0.024 \text{ mol}$

Volume of H_2SO_4 required = $\frac{0.024 \text{ mol}}{2 \times 1 \text{ M}} = 0.012 \text{ L or } 12 \text{ mL}$

18. 4 Carius method is used for estimation of halogens, sulphur and phosphorus

19. 2 $\% \text{ of } I = \frac{127}{235} \times \frac{0.94}{2.54} \times 100 = 20\%$

20. 3 Relative no. of atoms = $\frac{9}{12} : \frac{1}{1} : \frac{3.5}{14} = 3:4:1$

E.F = C_3H_4N $\quad n = \frac{108}{54} = 2$ $\quad \therefore MF = C_6H_8N_2$

21. 3 $\%N = \frac{28 \times 46.09 \times 100}{22400 \times 0.35} = 16.46$

22. 3 $\%\text{ of nitrogen} = 1.4 \frac{(N_A V_A - N_B V_B)}{W}$; $V_B = \frac{10}{0.5} = 20$

23. 4 $\%\text{ of oxygen} = \frac{32 \times m_{CO_2}}{88 \times m_{o.c}} \times 100 = \frac{32 \times 0.44}{88 \times 0.2} \times 100 = 80\%$

24. 1 $\text{Nitroprusside} \rightarrow \left[Fe(CN)_5(NO)\right]^{2-}$

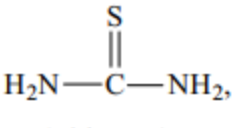
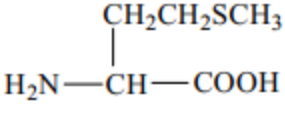
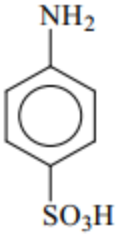
25. 4

Element	Reagent
N	conc. H_2SO_4 + $CuSO_4$
S	Na_2O_2 + $BaCl_2$
O	N_2 + C + I_2O_5

P $\text{Fuming } HNO_3 + \underbrace{MgCl_2 + NH_4Cl + NH_4OH}_{\text{Magnesia mixture}}$

26. 25 'C' is most polar $R_f = \frac{2\text{ cm}}{8\text{ cm}} = 0.25 \text{ or } 25\times10^{-2}$

27. 3 Compounds (III), (V) and (X) do not give Lassaigne's test

28. 3  (Thiourea)  (Methionine) and  (Sulphanilic acid)

can give blood red colour in Lassaigne's test

29. 5 Kjeldahl's method is not applicable to compounds 1, 2, 3, 4 and 6

30. 56 $\%\text{ of nitrogen} = \frac{28}{22400}\times\frac{\text{Volume of } N_2 \text{ at STP}}{\text{wt.of O.C}}\times100$

$$12.5 = \frac{28}{22400}\times\frac{V}{0.56}\times100$$

$$V = 56\,ml$$