

## . Simple classification of substances

1. a) X – melting point  $\sqrt{1/2}$   
Z – Boiling point  $\sqrt{1/2}$

b)

Its melting point is lowered and becomes less sharp due to the introduction of an impurity  $\sqrt{1}$

2. Luminous flame produces soot while non- luminous flame does not  $\sqrt{1}$   
Luminous flame is yellow in colour while non- luminous flame is blue in colour  
OR accept any correct answer

3. b) The luminous flame is moderately hot and is clearly visible hence no danger is posed  
a) X

Gives the greatest number of spots hence the greatest number of pure substances  $\sqrt{1}$

4. b) The ink is made of more than one pure substance hence will also undergo chromatography

4. (a) sublimation  
(b) Bleaching action  
(c) Polymerization

5. Adds excess dilute hydrochloric acid/ sulphuric (vi) acid  
Filter to obtain copper metal  
Wash with distilled water

6. To separate samples of CUO and charcoal in test tubes, dilute mineral acid is added with shaking CUO black dissolves to form blue solution  $\sqrt{1/2}$   
Charcoal does not dissolve in dilute mineral acids

7. a) Is the process for the separation of a mixture of solutes by their different rates of movement over a porous medium caused by moving solvent

- b) - Separation of dyes  
- To analyse and identify mixtures of substances which are difficult to separate by other means  
- Used to analyze dyes in food colouring (Any two each one mark)

- 8 a) Element R – Sulphur

- b) Mix solid P oxide with water

put blue and litmus paper, Blue litmus paper remains blue, red litmus paper changes to blue.

Put blue and red litmus papers in water

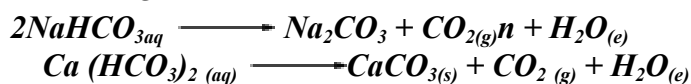
Blue changes to red, red remain red.

9. 5 and 4 BOTH MUST BE CORRECT

10. EITHER

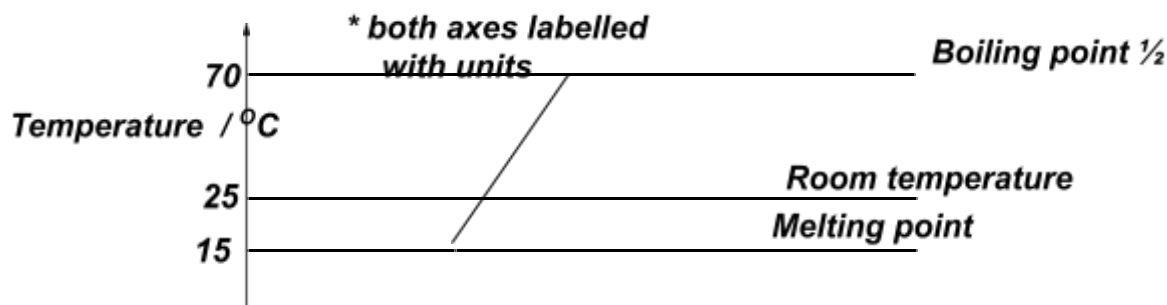
- In separate test tubes, boil about 5cm<sup>3</sup> of each solution.
- Sodium hydrogencarbonate solution remains colourless forms no precipitate
- Calcium hydrogencarbonate solution changes from colourless to white precipitate

OR



HEAT must be mentioned or implied.

11. a)



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**Time (minutes)**

**b) Liquid**

12. (i) Range of boiling points / no sharp boiling points  
(ii) Carry out fractional distillation<sup>1</sup>
13. (i) Evaporation  
(ii) Uses a lot of fuel  
(iii) Any soluble salt and water
14. Melting points is the specific  $\sqrt{\frac{1}{2}}$  constant temperature  $\sqrt{\frac{1}{2}}$  for a particular substance when a solid  $\sqrt{\frac{1}{2}}$  change to a liquid  $\sqrt{\frac{1}{2}}$
16. (a) To cool/condense vapour.  $\sqrt{1}$   
(b) Water.  $\sqrt{1}$   
(c) Blue solid  $\sqrt{1}$  changes to white solid.  $\sqrt{1}$
17. (a) Solvent front  $\sqrt{\phantom{x}}$   
(b) C  $\sqrt{\phantom{x}}$
18. a) Chemical  $\sqrt{\frac{1}{2}}$   
b) Physical  $\sqrt{\frac{1}{2}}$   
c) Physical  $\sqrt{\frac{1}{2}}$   
d) Chemical  $\sqrt{\frac{1}{2}}$
19. - Smoky/ sooty  $\sqrt{\phantom{x}}$   
- Not hot enough  $\sqrt{\phantom{x}}$
20. a) Chemical  $\sqrt{\frac{1}{2}}$   
b) Physical  $\sqrt{\frac{1}{2}}$   
c) Physical  $\sqrt{\frac{1}{2}}$   
d) Chemical  $\sqrt{\frac{1}{2}}$
21. - Smoky/ sooty  $\sqrt{\phantom{x}}$   
- Not hot enough  $\sqrt{\phantom{x}}$
22. - Boiling point  
- Melting point  
- Density  
- Refractive index
23. i) Pass the mixture of gases through concentrated sulphuric (vi) acid  $\sqrt{\frac{1}{2}}$  . Ammonia and ethane will dissolve  $\sqrt{\frac{1}{2}}$   
- Hydrogen  $\sqrt{\frac{1}{2}}$  being insoluble  $\sqrt{\frac{1}{2}}$  is then obtained
24. a) i)  
ii) A and C  
  
b) Since  $\text{NH}_4\text{Cl}$  sublimes but  $\text{CaCl}_2$  does not, sublimation process would do. Heat the mixture,  $\text{NH}_4\text{Cl}$  sublimates into vapour and condenses on the upper cooler parts of the test tube.  $\text{CaCl}_2$  remains at the bottom of the heating tube  
  
c) i) Fractional distillation  
ii) Separating funnel method 8

(1 mk)  
(1 mk) } 3  
          (1 mk)

*Since the two liquids are immiscible pour the mixture into the separating funnel and allow to settle. The denser liquid will settle down and the less dense one will form the second layer on top. Open the tap and run out the liquid in the bottom layer leaving the second layer in the funnel*

25. (i) Condenser

(ii) To indicate when a liquid is boiling, a thermometer reads a constant temperature

(iii) A

(iv) Ethanol

Reason:- It has a lower boiling of  $78^{\circ}\text{C}$  compared to water with a boiling point of  $100^{\circ}\text{C}$   
or - The liquid with the lower boiling point boils first and its vapours are condensed and the condenser to be collected as the first distillate

(v) Fractional distillation

(vi) - To separate components of crude oil

- To isolate  $\text{O}_2$  and  $\text{N}_2$  from air

- To manufacture spirits

(vii)- They are immiscible liquids

- They have different but close boiling points

26. (a) Wire gauze

(b) Sodium chloride solution (or any named salt solution)

(c) Evaporation

27. a) i) – Colourless liquid is seen on the cooler parts of the test tube.

☞ 1 mk.

- Blue crystals change to a white powder.

☞ 1 mk

ii) Water ☞ 1 which was originally water crystallization.



b)  $\text{NaOH(s)}$  absorbs water from the air and forms a solution. It is a deliquescent substance. ☞ 1  
Anhydrous  $\text{CuSO}_4$  absorbs water from air to form hydrated Copper (II) sulphate which is blue but no solution is formed ☞ 1 it is hygroscopic

28. a)i) Ethanol, acetone (any organic solvent)

ii) Its most soluble in the solvent and less sticky

iii) - Cut out the yellow pigment

- put in organic solvent to dissolve the pigment

- filter and evaporate the filtrate to get the pigment

iv) Above the red pigment and below the edge.

b)-Heat the mixture aluminum chloride sublime and collect be cooler part of the tube and sodium chloride left at bottom of the tube

- Scratch the condense  $\text{AlCl}_3$  place in a beaker

(c) Add cold water to the mixture, and stir to dissolve R. Filter to get solid S and V on residue . Evaporate the filtrate to get R. put S and in no water and stir to dissolve and filter to get S as residue evaporate filtrate to get V

29. Add cold water to the mixture, and stir to dissolve R. Filter to get solid S and V on residue .

Evaporate the filtrate to get R. put S and in no water and stir to dissolve and filter to get S as residue evaporate filtrate to get V

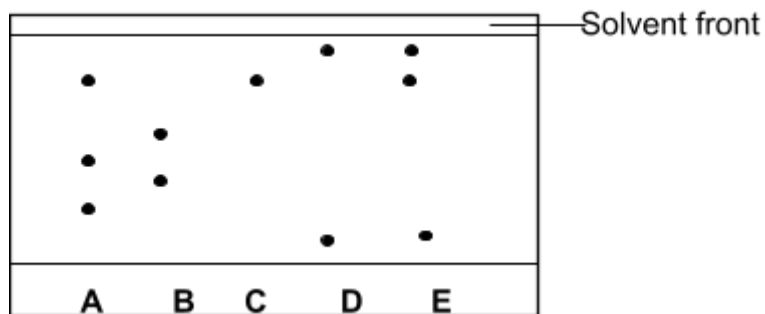
30. Heat the mixture Ammonium chloride sublimes and is collected on the cooler parts. Add water to the remaining mixture, stir and filter. Lead (ii) Oxide remains as residue. Evaporate the

*filtrate to dryness to obtain sodium chloride*

31. a) - Fractionating column must have beads  
- Wrong cold water circulation in the condenser  
b) T
32. a) Sublimation. ☼ 1  
b) Bleaching ☼ 1  
c) Polymerisation ☼ 1

*(3 mks*

33.



(a) See Diagram above

- Solvent front should be slightly above the furthest pigment

(b) C

- It contains only one <sup>1</sup>/<sub>2</sub> pigment

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. - Add either to the mixture. Stir and filter

- Add alcohol to the residue, stir and filter

- Evaporate to filtrate to obtain C

35.

- Black crystals changes directly into purple vapour✓1

- The iodine crystals (sublimes) changed directly into a purple vapour without passing liquid state and changed back to black iodine crystals on the upper cooler parts of boiling tube✓ (Correct colour must be stated 2 mks