4.4 TEST YOURSELF

SECTION A Multiple-choice Questions (Total 8 marks)

Select the correct response and write the corresponding letter (A, B, C or D) in the brackets provided.

1. Evaporation is used to obtain _____.

   A. an insoluble solid from a solution
   B. a soluble solid from a solution
   C. a liquid from a solution
   D. a liquid which mixes with another liquid ( )

2. Purifying water by passing it through sand beds is an example of _____.

A. distillation **B.** evaporation **C.** filtration **D.** sublimation ( )

3. Which of these equations relating separating techniques is correct?

A. Condensation = Evaporation + Distillation
B. Distillation = Evaporation + Condensation
C. Evaporation = Distillation + Condensation
D. Filtration = Distillation + Condensation ( )

4. Which is the correct order to separate a mixture of salt and sand?

	First	Second	Third
A.	Dissolving	Evaporation	Filtration
B.	Dissolving	Filtration	Evaporation
C.	Evaporation	Filtration	Dissolving
D.	Filtration	Dissolving	Evaporation

( )

5. At international athletic meetings, athletes have random blood and urine checks to test for the presence of banned drugs which enhance performance. Which technique is used to identify the presence of such drugs?

A. Chromatography **B.** Crystallisation
C. Distillation **D.** Evaporation ( )

6. Which of the following is **not** a physical method of separation?

A. Distillation **B.** Electrolysis **C.** Filtration **D.** Sublimation ( )

7. When distilling a liquid it is sometimes advisable to place porcelain chips in the distillation flask. The reason for this is the porcelain chips _____.

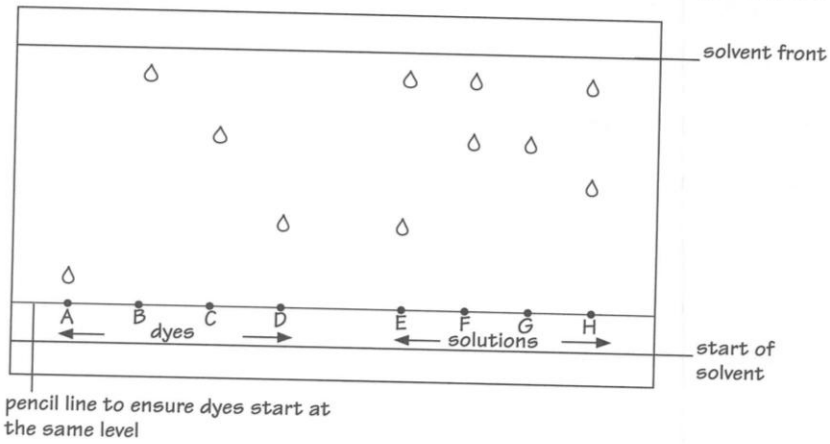
A. can absorb excess heat
B. ensure smooth boiling
C. can remove any impurities present
D. do not allow the liquid to boil dry ( )

8. Which two separation techniques are used to purify sewage?

A. filtration and reverse osmosis
B. distillation and chromatography
C. magnetic separation and evaporation
D. fractional distillation and chromatography ( )

SECTION B **Structured Questions** **(Total 32 marks)**

9. Four different dyes, A, B, C and D, were used to make up four solutions, E, F, G and H. The diagram below shows the chromatogram obtained from the various dyes and solutions.



(a) Why should the solvent level be below the spots of dyes and solutions at the start of the experiment?

_____

(1 mark)

(b) Why should the line drawn, to ensure that the dyes and solution spots all start at the same level, be in pencil not ink?

_____

(1 mark)

(c) Which solution contains

(i) the least number of dyes? _____

(ii) B and D dyes only? _____

(iii) a dye other than A, B, C or D? _____

(3 marks)

10. Arrange the following stages in their correct order to separate salt from a mixture of salt and sand. Put the number of the stage (**1** to **8**) in the box at the side.

- Stir the mixture thoroughly. ☐
- Evaporate the solution slowly to dryness. ☐
- Add water to the mixture. ☐
- Collect the filtrate in the evaporating basin. ☐
- Salt dissolves but the sand does not. ☐
- Filter the mixture. ☐
- Remove the crystals of salt. ☐
- Put on a pair of safety goggles. ☐

(8 marks)

11. Copper metal is extracted from its ore (malachite or copper carbonate) by the following method:

- The ore is ground into powdered rock.
- Sulfuric acid is added to this powdered rock. It dissolves any copper carbonate (ore) by reacting with it to form a solution of copper sulfate. Bubbles are seen at this stage.
- The mixture is filtered to remove insoluble sand and rock to leave a clear blue solution of copper sulfate.
- The copper is removed from this solution by electrolysis.


malachite

In this extraction

(a) Why is the ore ground up?

_____

(1 mark)

(b) What do bubbles indicate in the second stage?

_____

(1 mark)

(c) What in the third stage is the

(i) residue? _____ (ii) filtrate? _____

(2 marks)

(d) In the final stage what source of energy is used?

_____

(1 mark)

12. The table below gives some information about the behaviour of household rubbish after it has been crushed up and has had water added to it.

Refuse	Addition of water
Aluminium objects	Sink slowly
Glass objects	Sink slowly
Paper and cardboard	Sink slowly when thoroughly wet
Iron objects	Sink quickly
Copper objects	Sink quickly
Plastic objects	Float

(a) How could you separate the plastic objects from the refuse?

_____

_____

(2 marks)

(b) How could you separate aluminium objects from other metal objects?

_____

_____

(2 marks)

(c) Iron and copper objects both sink quickly in water. How could you separate these two metals?

_____

_____

(2 marks)

(d) Glass and aluminium objects both sink slowly. How could the glass refuse be distinguished from the metal refuse?

_____

_____

(2 marks)

13. A garden centre sells lawn sand, which is a mixture of sand and a water-soluble fertiliser. Describe how you could separate this mixture.

_____

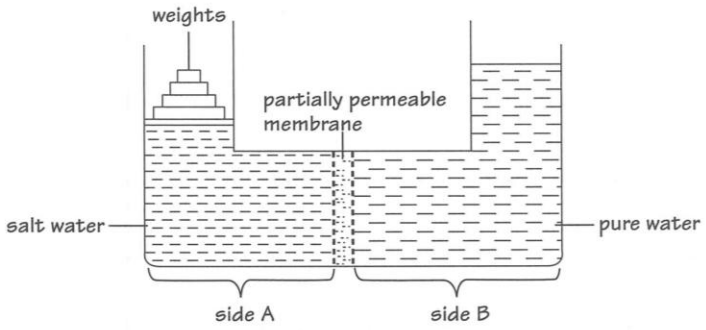
_____

_____

_____

(3 marks)

14. The diagram shows *reverse osmosis,* which is a separation technique to obtain fresh drinking water from seawater.



Using the diagram, explain how it works.

_____

_____

_____

_____

(3 marks)