Experimental techniques and chemical anhalysis – 2022J O Level 5070

1. June/2022/Paper_11/No.1

A scientist needs to add approximately 100 cm^3 of water to each of 50 large beakers. The scientist needs to fill the beakers as quickly as possible.

Which method should be used?

A A 50 cm^3 burette should be used twice for each beaker.

B A 100 cm^3 gas syringe should be used once for each beaker.

C A 25 cm^3 graduated pipette should be used four times for each beaker.

D A 100 cm^3 measuring cylinder should be used once for each beaker.

2. June/2022/Paper_11/No.2

Four mixtures, each containing two substances, are shown in the table.

The two substances need to be separated and collected.

Which row is correct?

	mixture	separation method
A	copper(II) sulfate and water	chromatography
B	methanol and ethanol	evaporation
C	oxygen and nitrogen	fractional distillation
D	sand and barium sulfate	filtration

3. June/2022/Paper_12/No.2

Which statement is correct?

A A mixture of liquids with boiling points which differ by 35 °C can be separated by distillation.

B Locating agents are needed to identify the colours present in ink.

C The desalination of sea water to produce pure water is achieved by fractional distillation.

D The R_f value of a dye in a chromatogram can be calculated using the formula:

$$R_f = \frac{\text{distance moved by solvent}}{\text{distance moved by spot}}$$

4. June/2022/Paper_12/No.3

Some reactions of an aqueous solution of compound X are given.

- When a few drops of aqueous sodium hydroxide are added, a white precipitate is formed.
- When dilute nitric acid is added and the mixture is warmed, a gas is formed. The gas decolourises acidified potassium manganate(VII).
- When dilute nitric acid and aqueous barium nitrate are added, no visible reaction occurs.

What can be deduced about the identity of X?

A X contains only aluminium sulfate, $Al_2(SO_4)_3$.

B X contains only calcium sulfite, $CaSO_3$.

C X must contain aluminium sulfite, $Al_2(SO_3)_3$, or zinc sulfite, $ZnSO_3$.

D X must contain aluminium sulfite, $Al_2(SO_3)_3$, calcium sulfite, $CaSO_3$, or zinc sulfite, $ZnSO_3$.

5. June/2022/Paper_12/No.4

Which set of changes to the conditions increases the volume of a gas?

	pressure	temperature
A	decreases	increases
B	increases	decreases
C	increases	unchanged
D	unchanged	decreases

6. June/2022/Paper_22/No.1

Choose from the following compounds to answer the questions.

$AgCl$

$Ba(NO_3)_2$

KI

$KMnO_4$

K_2SO_3

$Mg(NO_3)_2$

Na_2CO_3

Na_3N

NH_4Cl

$ZnSO_4$

Each compound may be used once, more than once or not at all.

State which compound:

(a) is purple in colour

..... [1]

(b) reacts with aqueous sodium sulfate to form a white precipitate

..... [1]

(c) reacts with aqueous chlorine to give a brown solution

..... [1]

(d) is prepared using a precipitation reaction

..... [1]

(e) contains an anion with a charge of –3

..... [1]

(f) is used to test for a reducing agent.

..... [1]

[Total: 6]