



FEBRUARY 2020

ALEXANDER ROAD HIGH SCHOOL

TIME: 45 min

Examiner: PE

PHYSICAL SCIENCE CONTROL TEST

TOTAL = 30

**GRADE 10**

Instructions

A periodic table has been provided on page 4 overleaf.

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**QUESTION 1: Multiple choice**

Write just the question number and the letter corresponding to the best answer.

- 1.1 What method would be best to use to separate alcohol from water alcohol solution?
- A. Filtration.
  - B. Evaporation.
  - C. Chromatography.
  - D. Distillation.
- 1.2 Brownian motion refers to
- A. A dance invented by Robert Brown.
  - B. Diffusion of substances.
  - C. Random motion of smoke particles in air.
  - D. Kinetic energy of particles of a substance.
- 1.3 The element **Si** is classified as a:
- A. Metal.
  - B. Non-metal
  - C. Metalloid
  - D. Radioactive substance

[2x3=6]

**QUESTION 2:**

Consider the following substances:

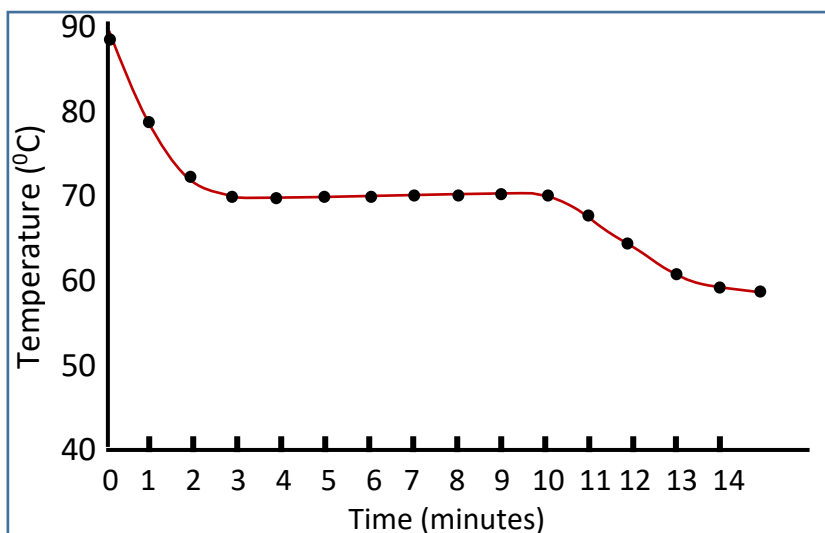
- A Muddy water.
- B Air.
- C Distilled water

For each state whether it is a pure substance or mixture.

If it is a mixture state whether it is a heterogeneous or homogenous mixture. [3]

### QUESTION 3:

In an experiment to investigate the cooling curve of a type of acid, data was collected and plotted on the graph shown.



3.1 Identify each of the following:

3.1.1 Independent variable? (1)

3.1.2 Dependent variable? (1)

3.1.3 Control variable? (1)

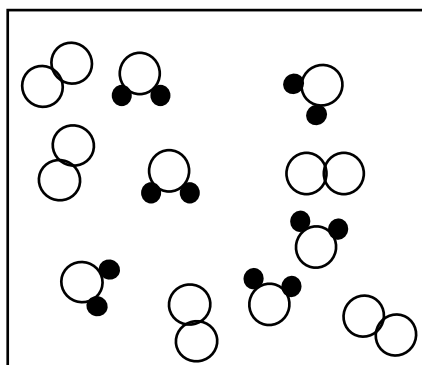
3.2 What is the melting point of this acid? (1)

3.3 How long from the time of the start of the measurement did it take for all the liquid to solidify? (1)

[5]

### QUESTION 4:

Given the diagram of small particles with the KEY alongside of what they represent



Key

Element	Chemical symbol	Picture of its atom
oxygen	O	○
hydrogen	H	●

4.1 Does the diagram represent a pure substance or a mixture? (1)

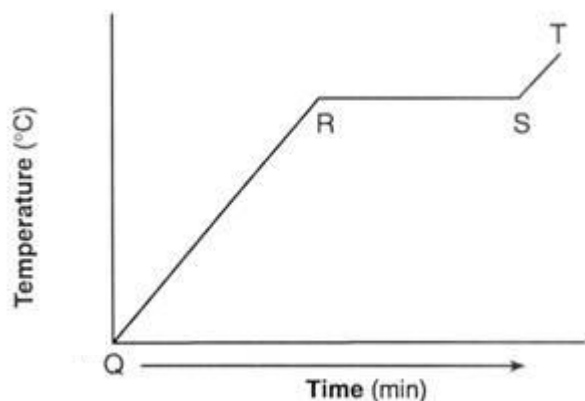
4.2 Is this a homogenous or heterogeneous mixture? (1)

[2]

### QUESTION 5:

Consider a substance like carbon dioxide that can exist in only **solid and gas** phases.

- 5.1 Solid CO<sub>2</sub> is called dry ice. Why does the mobile ice-cream vendor use dry ice and not ordinary ice to keep his ice-creams cold? (2)
- 5.2 What is the name given to the phase change from solid to gas? (1)
- 5.3 The heating curve of carbon dioxide is given below.



Give the phase of the carbon dioxide at QR **AND** ST respectively.

(2)

[5]

### QUESTION 6:

In the laboratory, water can be made to boil at less than 100°C (e.g. at 60°C).

- 6.1 Define the term *boiling point*. (2)
- 6.2 What is the cause of the water boiling at less than 100°C in the laboratory? (1)
- 6.3 At which of the following places will the boiling point be lowest: Port Elizabeth, Johannesburg, Table Mountain, Mt Everest? (1)

[4]

### QUESTION 7:

- 7.1 Define the term *temperature*. (2)
- 7.2 Explain, in terms of the particle model of matter, why evaporation causes cooling. (3)

[5]

[30]

## MEMO

- 1.1 D✓✓
- 1.2 C✓✓
- 1.3 C ✓✓

- 2. A Muddy water – heterogenous mixture✓  
B Air – Homogenous mixture✓  
C Distilled water – pure ✓ substance (compound)

- 3.1.1 Time ✓
- 3.1.2 Temperature ✓
- 3.1.3 Amount/mass of substance ✓
- 3.2 MP = 70°C ✓
- 3.3 10 minutes ✓

- 4.1 Mixture ✓
- 4.2 Homogenous ✓ – they're in the gas phase.

- 5.1 Dry ice sublimates so no liquid ✓ slopping round.  
Water would make the ice-cream soggy ✓.
- 5.2 Sublimation ✓
- 5.3 QR – Solid ✓  
ST – Gas ✓

- 6.1 BP is the temperature✓ at which the vapour pressure of a liquid equals the atmospheric pressure ✓.

- 6.2 Atmospheric pressure is decreased ✓ thus it boils at a lower temp. i.o.w. the vapour pressure reaches the same as the atmospheric pressure at a lower temp.

- 6.3 At high altitude. Mt Everest ✓

- 7.1 Temperature of a substance is a measure✓ of the average kinetic energy✓ of the particles making up the substance.

- 7.2 It takes energy ✓ to evaporate. This energy comes from the liquid particles ✓ remaining behind which are therefore cooler ✓

OR

The fastest✓ moving particles at the surface bump out of the surface (evaporate)✓ and hence the slower moving particles remain behind✓. Since they are slower, they have less kinetic energy & the liquid is cooler.