education

Department of Education
FREE STATE PROVINCE

PROVINCIAL PRACTICAL TASK

GRADE 10

PHYSICAL SCIENCES

MARCH 2017

MARKS: 40

TIME: 1 HOUR

This paper consists of SIX pages.

Name of learner ..... **Grade** .....

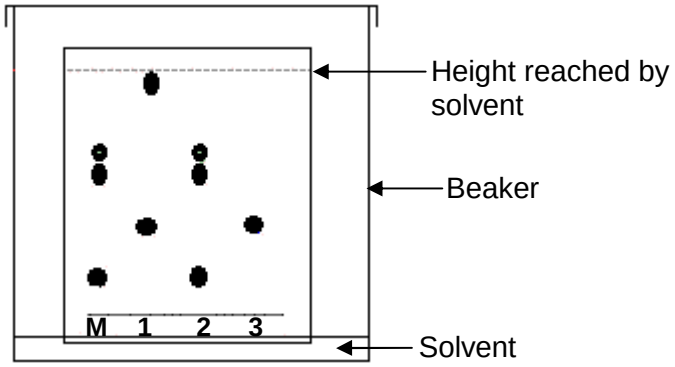
INSTRUCTIONS AND INFORMATION

1. Write your name and grade in the appropriate spaces on the FRONT PAGE of this question paper.
2. Answer ALL questions in the spaces provided in THIS QUESTION PAPER.
3. Non-programmable pocket calculators may be used.
4. Appropriate mathematical instruments may be used.
5. Show the formulae and substitutions in ALL calculations.
6. Round off numerical answers to TWO decimal places where necessary.
7. Give brief motivations, discussions, et cetera where required.

QUESTION 1: PAPER CHROMATOGRAPHY

A forensic scientist uses paper chromatography to determine which one of three water soluble blue pens, labelled **1**, **2** and **3**, was used to write a message **M**.

The results are illustrated in the diagram below.



1.1 Which one of the three pens (**1**, **2** or **3**) was used to write the message **M**? Give a reason for your answer. (2)

_____

_____

1.2 The distance travelled by the solvent and the distance travelled by the third spot (**3**) on the above filter paper was measured and recorded below:

Distance travelled by solvent (cm)	Distance travelled by third spot (cm)
8,0	4,1

Calculate the R_f value of the THIRD (**3**) spot. (3)

_____

_____

_____

1.3 State TWO factors that can influence the R_f factor that is calculated in QUESTION 1.2. (2)

_____

_____

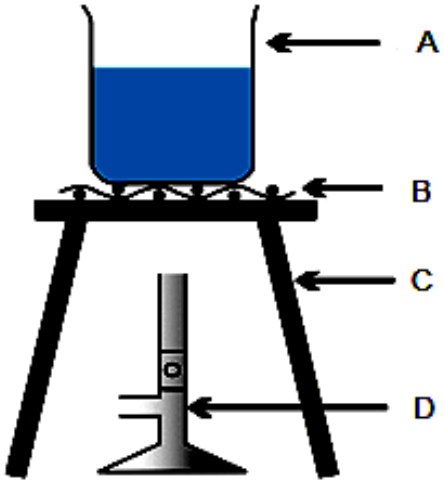
1.4 Name the substance that act as:

1.4.1 Mobile phase _____ (1)

1.4.2 Stationary phase _____ (1)
[9]

QUESTION 2: COOLING CURVE OF WATER

The apparatus shown below is used to determine the cooling curve of water. The water in the beaker is heated until it boils and then allowed to cool down. The temperature is measured every 5 minutes.



2.1 Name ONE item of apparatus, NOT shown in the above diagram, that is also needed for this investigation. Briefly describe the function of this apparatus. (2)

_____

_____

2.2 Write down the names of the apparatus labelled as **C** and **D** on the spaces below. (2)

C: _____

D: _____

2.3 For this investigation, identify the:

2.3.1 Independent variable (1)

_____

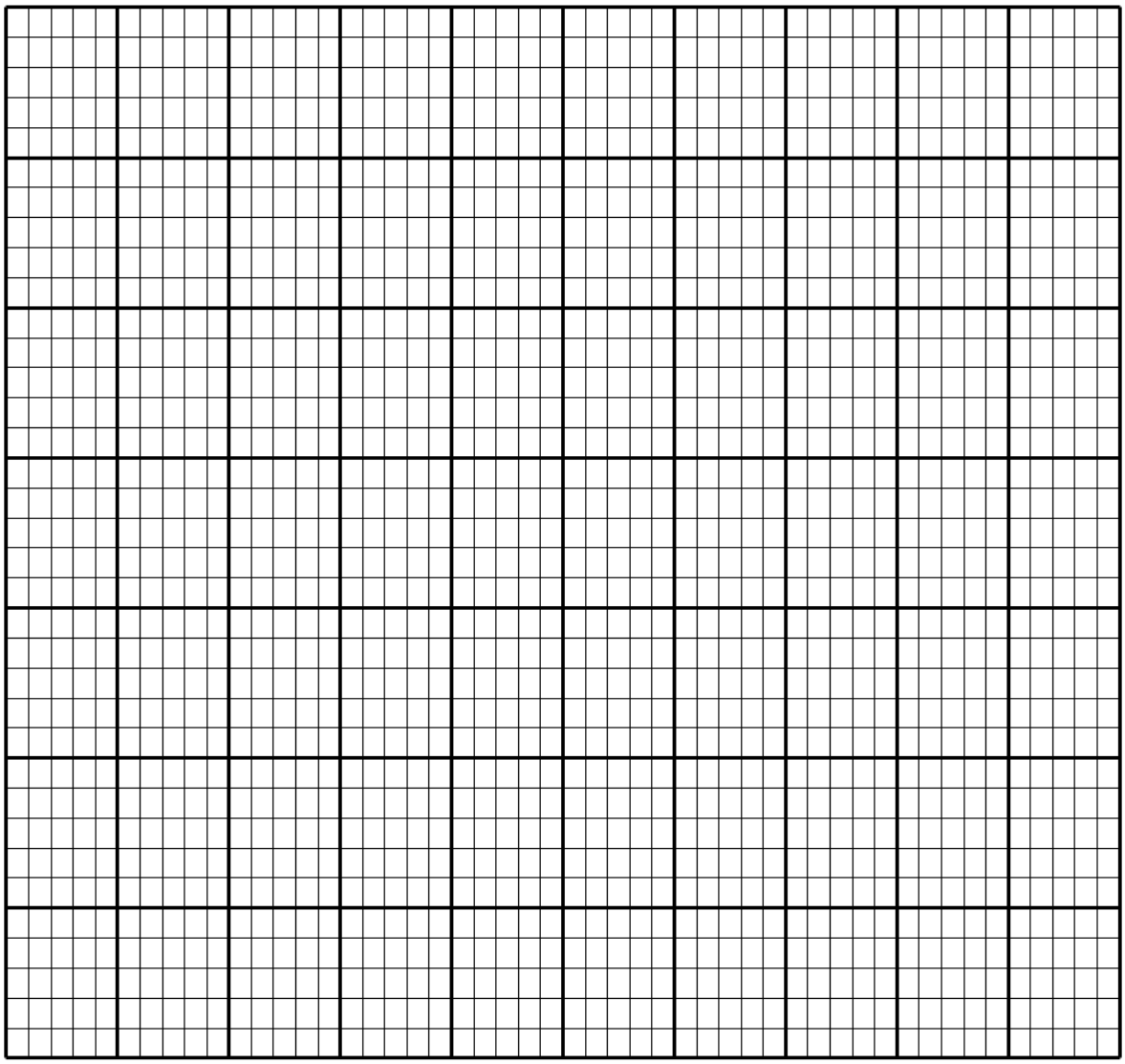
2.3.2 Dependent variable (1)

_____

2.4 The learners are supplied with the following results.

Time (minutes)	0	5	10	15	20	25	30	35	40	45
Temperature (°C)	105	100	96	96	68	30	0	0	-5	-10

Use the above results and draw an accurate cooling curve for water on the graph paper below. LABEL THE AXES, choose an appropriate SCALE, PLOT the points and DRAW the graph. Supply the graph with a SUITABLE HEADING. (6)



2.5 How does the temperature measured change in each of the following time intervals?

2.5.1 t = 20 minutes to t = 25 minutes (1)

_____

2.5.2 t = 30 minutes to t = 35 minutes (1)

_____

2.5.3 Explain the observation made in QUESTION 2.5.2. (2)

_____

_____

2.6 Write down the temperature at which the contents of the beaker boils. (1)

_____

2.7 The temperature of the contents of the beaker is a measure of the

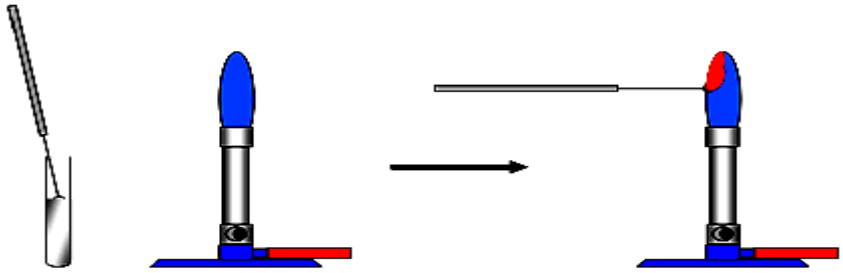
_____

_____ energy of the molecules. (2)

[19]

QUESTION 3: FLAME TEST

A grade 10 teacher uses the apparatus illustrated below to demonstrate a flame test. He uses powdered salts of potassium chloride, sodium chloride and an unknown chloride.



3.1 Firstly the teacher dips a platinum wire in CONCENTRATED ACID and then holds it in the flame.What is the purpose of the concentrated acid? (1)

_____

3.2 He then dips the wire into a small amount of one of the powdered salts and hold the wire in the flame. He repeats the procedure with the other two salts. The learners observe the flame colours for the three salts.

3.2.1 Complete the table below by writing the chemical formula and the flame colour for each of the two salts. (4)

Salt	Chemical formula	Flame colour
Potassium chloride		
Sodium chloride		

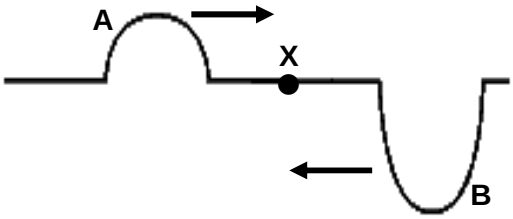
3.2.2 An apple green colour is observed for the unknown chloride. Write down the CHEMICAL NAME and FORMULA of the unknown chloride. (2)

_____

[7]

QUESTION 4: PULSES

Two pulses, **A** and **B**, approach each other in a uniform medium as illustrated below.
A has an amplitude of 1 cm and **B** has an amplitude of 2 cm.



Pulses **A** and **B** meet at point **X**.

4.1 Sketch the pulse(s) that will be observed at point **X** the moment when the two pulses meet. Indicate the amplitude(s) on the sketch. (2)

4.2 Sketch the pulse(es) that will be observed a while after the two pulses met at point **X**. Indicate the amplitude(s) on the sketch. (3)

[5]

GRAND TOTAL: 40