



## Part II

27 marks

Attempt Questions 16-19.

Allow about 35 minutes for this section

### Question 16 (15 marks)

Marks

The paragraph below is a student's write-up of an experiment.

1. I put 100 mL of water in a test tube and measured its temperature. It was 18°C. Then I put some of the crystals in it and stirred the mixture to dissolve the crystals. I kept stirring until some remained on the bottom of the tube no matter how much longer I stirred.
2. I filtered the mixture and then evaporated all the water from the solution. I weighed the amount of solid left behind and found that 6.0 g had been dissolved.
3. Then I did it again but this time I heated the water using a Bunsen burner, gauze mat and tripod while the thermometer was suspended from a retort stand using water at 29°C. I found that 8.0 g dissolved.
4. I repeated it at 40°C and at 47°C and got 10.0 g and 11.2 g as my results

- (a) Write an aim appropriate for the experiment.

1

To see if there is more solid left behind after heating the water.

- (b) Complete the table for the student's results.

2

temperature (°C)	Weight of crystal that dissolved (g)
18	6
29	8
40	10
47	11.2

- (c) Identify the independent and dependent variable for this experiment.

2

The independent variable is ~~what~~ the temperature of the water before putting in the crystal.

The dependent variable is the weight of crystal that dissolved.

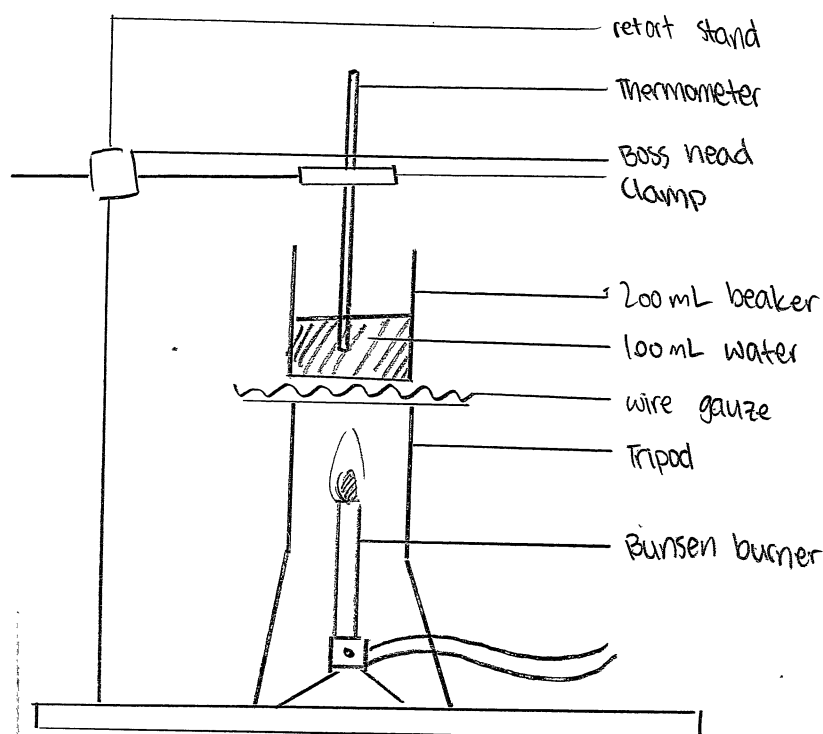
(d) Identify a variable that needs to be controlled during the experiment to make it a fair or valid test.

1

The ~~variable~~ controlled variable must be the water, or else the crystal might dissolve more easily depending on how much water is added.

(e) Draw a labelled scientific diagram showing the equipment set up required to carry out step 3 as described above.

3



(f) Identify two safety issues the student will have to be concerned with through this experiment.

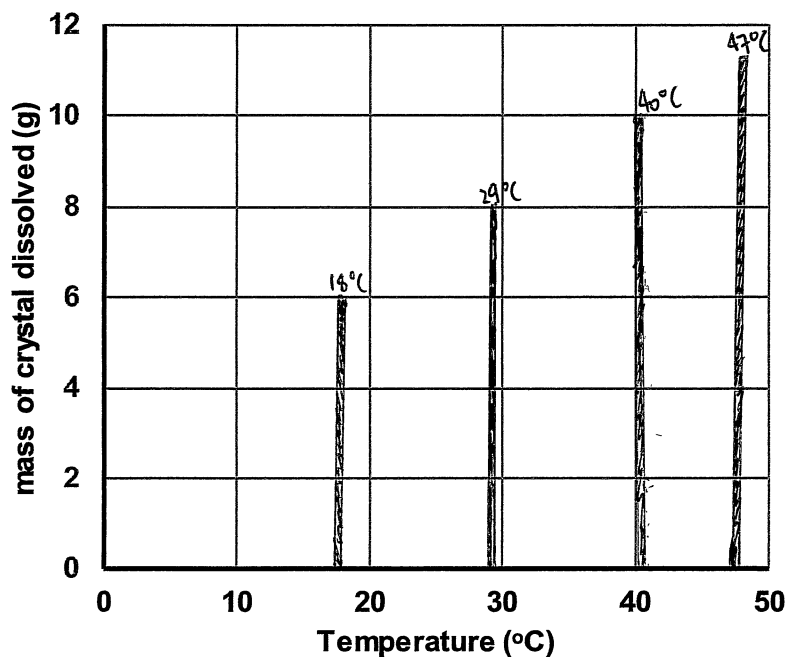
2

The first issue would be the flame of the bunsen burner that could potentially burn the student.

The second issue is the solution that the water and crystal make. It could be harmful to the student.

(g) Graph the students results on the axes provided.

3



(h) Write a conclusion for the experiment.

1

As the temperature of the water got higher, the more grams of crystal dissolved in the water.

#### Question 17 (4 marks)

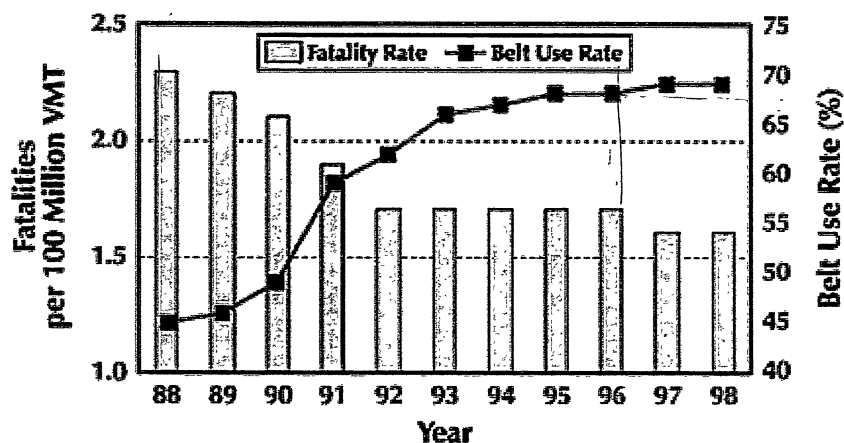
The following scientists are working in different branches or disciplines of science. Identify which branch each is working in:

4

Activity	Branch of Science
Paris is studying the crystals embedded in a rock.	Geology
Beau is developing a new type of plastic	
Shaun is investigating the eating habits of insects	Entomology
Angus is monitoring the movement of an asteroid	Astrology

**Question 18. (4 marks).**

The graph shows information about road fatalities and the use of seat belts in cars.



- (a) According to this data what is the trend shown in the number of fatalities between 1988 and 1996? Provide data to support your answer. 2

The use of ~~see~~ seatbelts increased throughout this period. As a result, there were less fatalities. In the graph, there were around 2.35 million fatalities and only a 44% belt use rate. In 1996, there were significantly less fatalities with a 67% belt use rate.

- (b) Analyse the data presented and provide reasons for the conclusion you made. 2

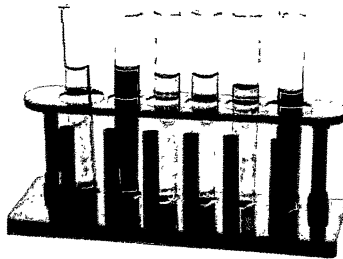
Throughout the decade, more seatbelts were being used, and as ~~as~~ a result, ~~there~~ there were less fatalities. ~~As~~ The black line with black squares (belt use rate) kept on rising - with a drastic increase in 1991. However, there was still a considerable amount of deaths, so these fatalities may not have been from seatbelt usage.

**Question 19. (4 marks).**

The drawing made by a scientist was twice as big as the real size of the object.

Determine the actual length of the whole piece of equipment. *Show your working.*

2



$$\begin{array}{l} \text{width} \qquad \qquad \text{height} \\ 4.3 \text{ cm} \times 2 = 8.6 \text{ cm} \quad 3 \times 2 = 6 \text{ cm} \end{array}$$

$\therefore$  The actual length of the equipment is ~~8.6~~ 8.6 cm.

b) There are some problems with the equipment diagram above. Identify two things that the scientist needs to change to accurately represent the equipment above. 2

The first thing the scientist needs to do is make it bigger, closer to the actual size.

The second thing is that ~~he should~~ they should turn it around so ~~that~~ the viewer can easily see the liquid and should make it ~~a~~ two-dimensional instead of three-dimensional.

**END OF EXAM**