



BOARD OF STUDIES  
NEW SOUTH WALES

**2000  
SCHOOL  
CERTIFICATE  
TEST**

**6 November**

**SCIENCE  
SECTION 2**

**CENTRE NUMBER**

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**STUDENT NUMBER**

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**Directions for Section 2**

- 1 Allow about 45 minutes to answer this section
- 2 This section has **THREE** parts

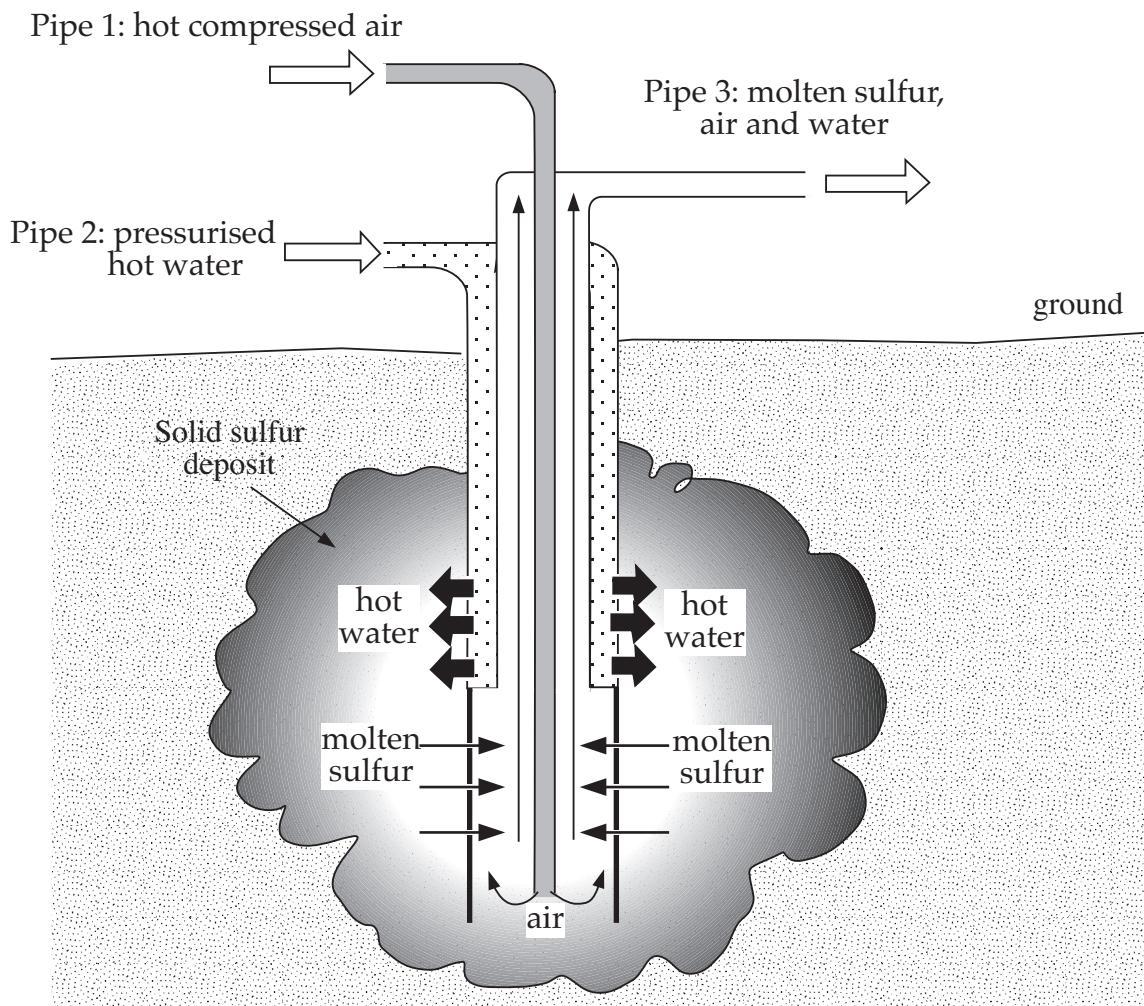
Part C	Questions 26–27	(9 marks)
Part D	Questions 28–29	(8 marks)
Part E	Question 30	(8 marks)
- 3 Complete your answers to Section 2 on the lines or in the spaces provided on pages 26 to 36
- 4 Write your Centre Number and Student Number at the top of this page **AND** at the top of pages 29 and 33

### PART C

- Complete your answers in this booklet

**Question 26** (6 marks)

Sulfur is found as a yellow solid in volcanic areas around the world. To obtain sulfur from underground deposits, three pipes inside each other are used. These pipes are sunk into the ground. This is illustrated in the following diagram.



Hill, Graham, Chemistry Counts, London, Hodder & Stoughton, 1986, p 171.

- (a) State ONE property of sulfur that makes hot water suitable for this process.

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- (b) What is the main purpose of the hot compressed air in this process?

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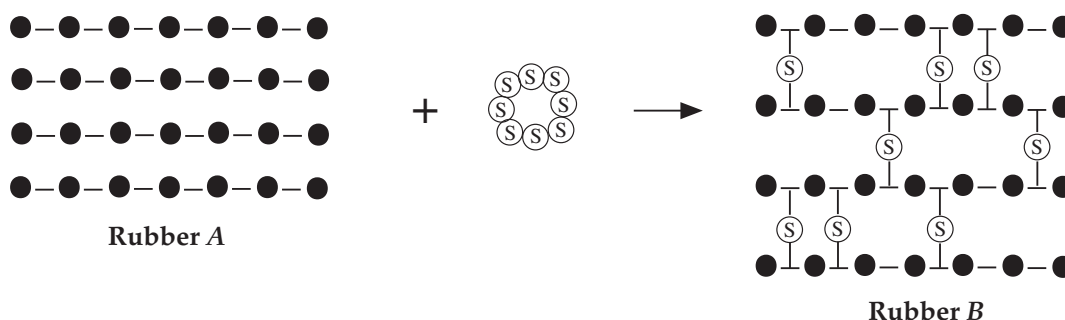
Question 26 (Continued)

- (c) The mixture from Pipe 3 is cooled, and the sulfur, which is now solid, is separated from the water by filtration.

In the space provided on the right, draw a labelled diagram showing how this filtration would be done in a school laboratory.



- (d) Rubber is a widely used material in industry because of its flexible nature. The diagram illustrates one industrial process involving the addition of sulfur to rubber.



Hill, Graham, Chemistry Counts, London, Hodder & Stoughton, 1986, p 170.

- (i) Does the diagram illustrate a physical process or a chemical process?

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- (ii) Justify your answer.

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- (e) Because of the addition of the sulfur, Rubber B is not as flexible as Rubber A. Suggest a reason for this.

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**Question 27** (3 marks)

<b>DRIVING YOUR CAR DAMAGES OUR FORESTS!</b>	
<p>The combustion of fossil fuels, for example, oil or coal in power stations and petrol in cars, releases sulfur oxides and nitrogen oxides into the air. The sulfur and nitrogen oxides dissolve in water droplets in clouds, making the droplets acidic. These droplets fall as acid rain.</p>	<div style="text-align: center;">  </div> <p>Plants may be damaged when acid rain falls on them. Acid rain soaking into the soil dissolves toxic chemicals which wash into streams, rivers and lakes. Fish and other organisms may be killed.</p>
	

Jones, Jones and Marchington, *Balanced Science Book 2*, Cambridge University Press, 1991, p 522. © Geoff Jones

Draw a flow chart to show how acid rain forms from fossil fuels. Your flow chart must show what happens (processes) in diamonds (◊) and what is formed by each process (products) in rectangles (□).

**End of Section 2 Part C**

CENTRE NUMBER

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STUDENT NUMBER

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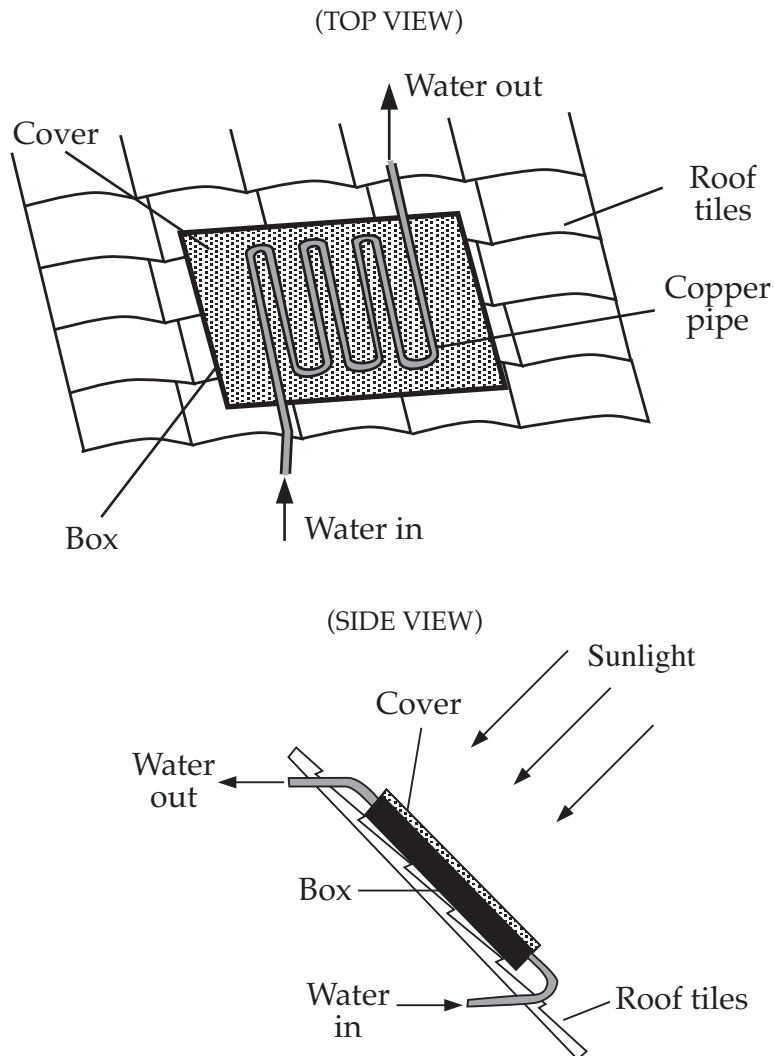
**PART D**

- Write your Centre Number and Student Number at the top of this page
- Complete your answers in this booklet

**Question 28** (3 marks)

The diagram shows a solar panel on a roof, facing the Sun. A solar panel consists of a pipe and box, with or without a cover. A pump circulates water through the pipe in the box. The solar panel absorbs some of the Sun's radiation and heats the water.

**A SOLAR PANEL**

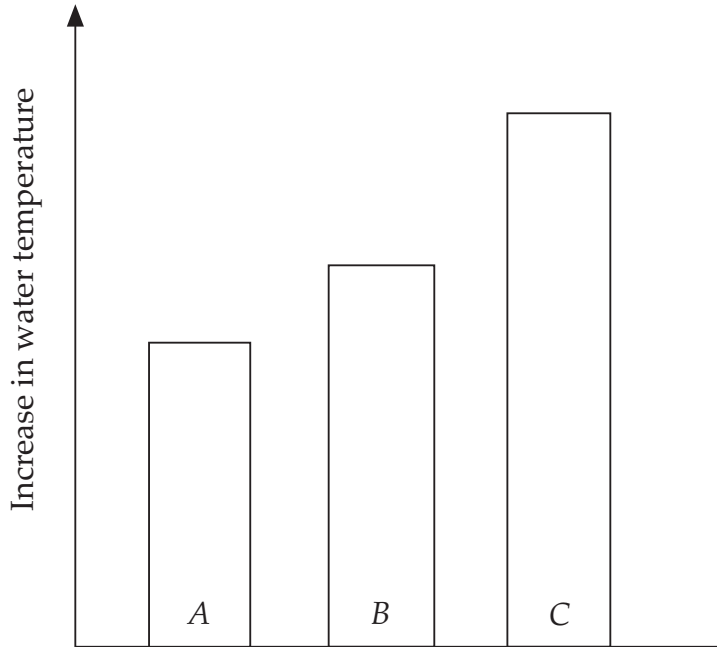


Jones, Jones and Marchington, *Balanced Science Book 2*, Cambridge University Press, 1991, p 522. © Geoff Jones

Question 28 continues on page 30

Question 28 (Continued)

The histogram shows increases in the temperature of water after it has passed through the pipe, for three different conditions.



KEY

A — open box, copper pipe

B — box with cover, copper pipe

C — box with cover, blackened copper pipe

(a) Why is the water temperature highest when the blackened copper pipe is used?

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(b) The temperature of the water coming out of the solar panel will be even higher if the water flow through the pipe is reduced. Explain why.

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(c) Why are solar hot water systems considered to be 'environmentally friendly'?

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Question 29 (Continued)

- (b) Imagine you have carried out this experiment. Your results supported the idea you tested.

Design and complete a table to show the results you obtained.

**End of Section 2 Part D**

**Go on to Part E**

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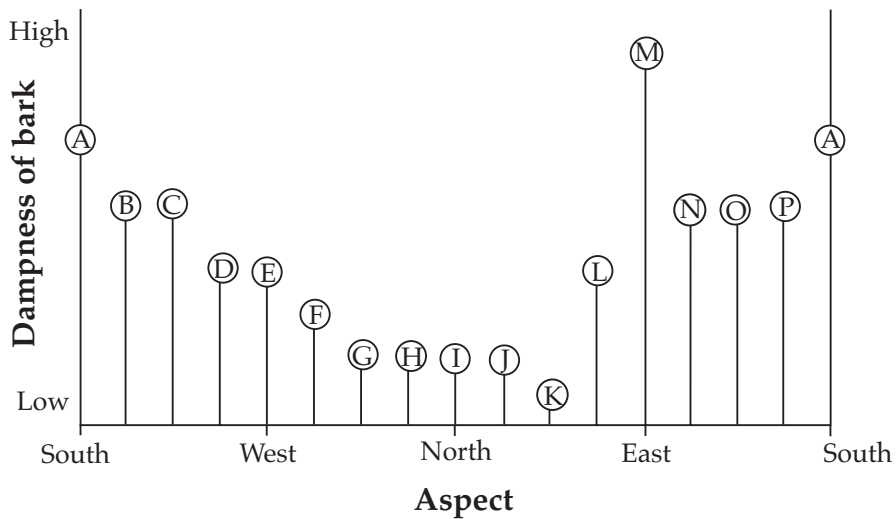
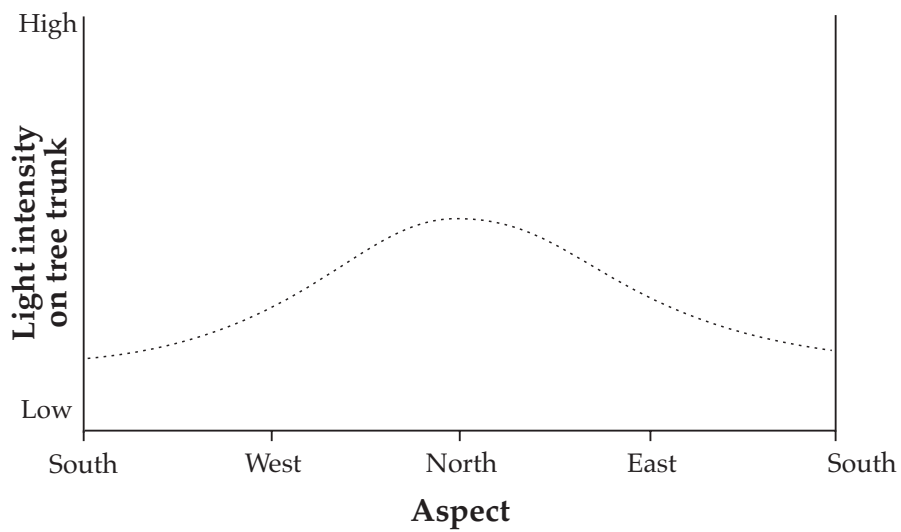
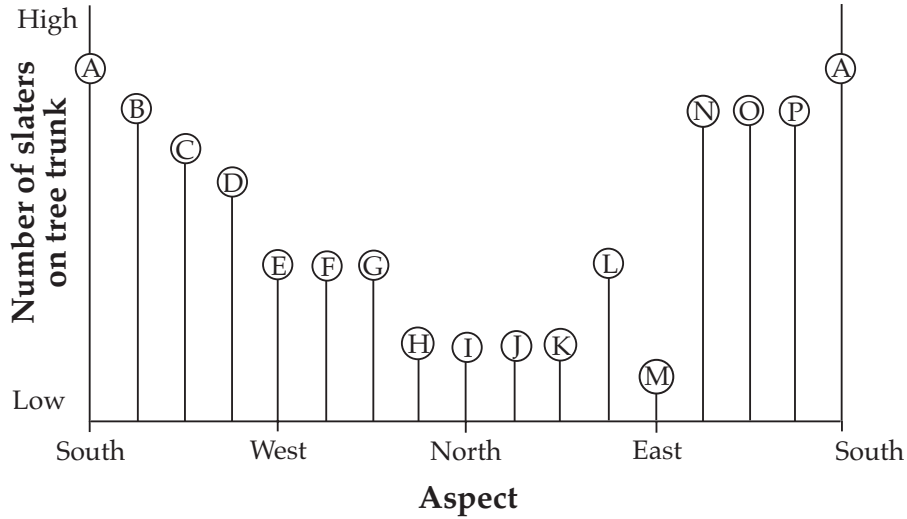
**PART E**

- Write your Centre Number and Student Number at the top of this page
- Complete your answers in this booklet

**Please turn over**

**Question 30** (8 marks)

The graphs show average values for data collected by a group of students studying slaters living on trees in a forest. The students collected data from 16 positions (labelled A to P) around each tree trunk. They recorded the data according to the direction the position faced (the **aspect**).



Question 30 (Continued)

(a) What was the purpose of collecting the data shown in the three graphs?

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(b) What are TWO conclusions that could be drawn from this data?

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(c) (i) The data from one POSITION on the tree trunks does not follow the general patterns. What position is this?

Position .....

(ii) Given that ALL the data is correct, suggest a reason for the data at this position NOT following the general pattern.

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**Question 30 continues on page 36**

Question 30 (Continued)

The table shows the number of slaters living on a particular tree. Use this information together with the information in the graphs on page 34 to answer questions (d) and (e).

<i>Height above ground (m)</i>	ASPECT				<i>Deep crack in bark</i>
	<i>South</i>	<i>West</i>	<i>North</i>	<i>East</i>	
1.2–2.0	1	1	0	0	4
0.6–1.2	2	0	0	0	6
0.3–0.6	4	2	0	3	10
0.0–0.3	8	5	3	6	18
TOTAL	15	8	3	9	38

- (d) Consider where the slaters live on the tree. What conclusion can you make about their environmental living conditions at the base of the tree?

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- (e) The students took some slaters back to the laboratory and weighed them. The students then placed the slaters in a dry container and reweighed them after an hour. The results are shown.

<i>Average mass at start (g)</i>	1.5
<i>Average mass after 1 hour (g)</i>	1.1

How do THESE results help explain the distribution of the slaters on the tree?

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**End of test**