BOARD OF STUDIES
NEW SOUTH WALES

STUDENT NUMBER

CENTRE NUMBER

HIGHER SCHOOL CERTIFICATE EXAMINATION

1999

INDUSTRIAL TECHNOLOGY

2 UNIT
SECTION II
AUTOMOTIVE INDUSTRIES

OPTION—BODY

Total time allowed for Sections I and II—One hour and a half
(Plus 5 minutes reading time)

DIRECTIONS TO CANDIDATES

- Write your Student Number and Centre Number at the top right-hand corner of this page.
- Where appropriate, show all working for solutions neatly and clearly.
- You may use Board-approved drawing instruments and calculators.

Section II—Body (15 marks)

- Question 4 is COMPULSORY.
- Attempt TWO questions from Questions 5, 6 and 7.
- Answer the questions in the spaces provided in this paper.

MARKER'S USE ONLY

Question				
4				
5				
6				
7				

SECTION II—BODY OPTION

(15 Marks)

QUESTION 4 This question is COMPULSORY. (5 marks)

(a) The nearside rear of a small sedan is damaged in an accident. The repairer's quotation is presented below. Assess the total cost of the repair if mechanical labour is charged out at $43/h and the painter is paid at $45/h.

Action	*Hours*	*Costs*
Remove and replace		
Rear bar assembly	1·0	.....
Tail lamp assembly	0·5	.....
Repair		
Nearside guard	3·0	.....
Rear beaver panel	1·0	.....
Rear bar mounting bracket	0·5	.....
Prepare and respray damaged body panels	4·0	.....
Supply new		
Rear bar	.....	$250
Rear tail lamp assembly	.....	$135

Total cost $ .....

QUESTION 4 (Continued)

(b) An exploded pictorial drawing of a brake cable connecting piece is given in Figure 1. Using the information given, draw an assembled view in the direction of the arrow **P** to a scale of 2 : 1.

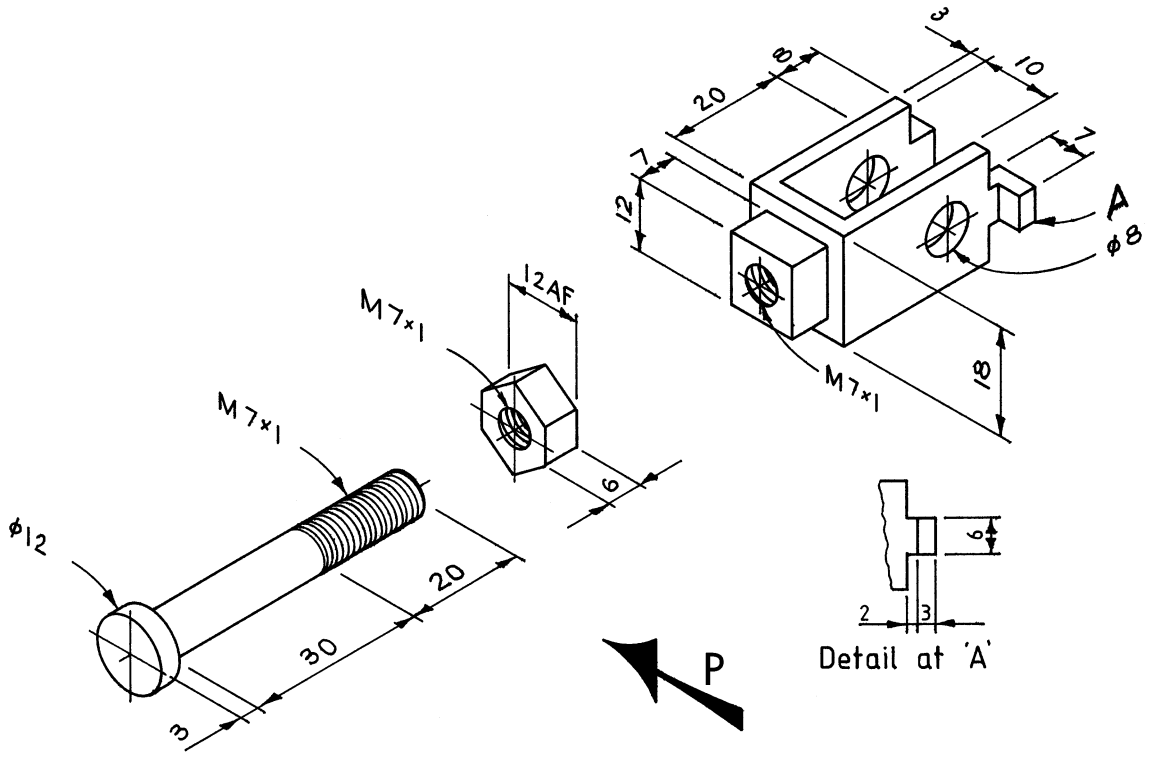

FIG. 1

SCALE 2:1

Question 4 continues on page 4

QUESTION 4 (Continued)

(c) The table below shows a number of standard symbols commonly found in automotive drawings. Give the interpretation of the symbol in the space provided.

Symbol	*Interpretation*
∅	
M20 × 2·5	
∅ 12·5 ± 0·1	

(d) Describe TWO advantages and TWO disadvantages of electric and pneumatic power tools used in automotive workshops.

	Electric power tools	*Pneumatic power tools*
Advantage 1		
Advantage 2		
Disadvantage 1		
Disadvantage 2		

(e) Describe the purpose of the Australian Design Rules for the automotive industry.

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Attempt TWO questions from Questions 5, 6 and 7.

QUESTION 5 (5 marks)

(a) (i) Every automobile manufacturer specifies a routine maintenance schedule for new vehicles. Explain why the maintenance schedule is more frequent while the vehicle is new.

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(ii) List the FOUR stages of the four-stroke internal combustion engine cycle.

1 .....

2 .....

3 .....

4 .....

Question 5 continues on page 6

QUESTION 5 (Continued)

(b) The diagram below shows the cross-section of a rotary engine.

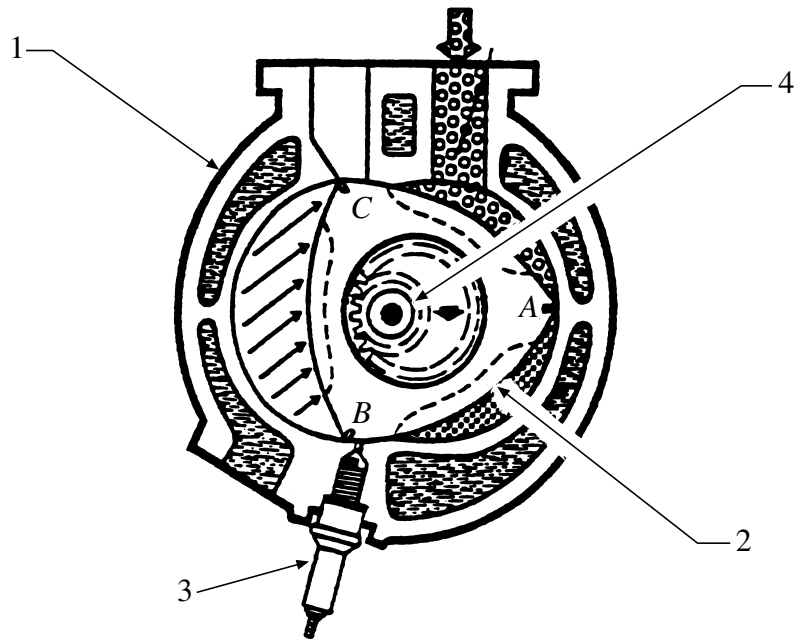

FIG. 2

Explain the function of component *B* and the components labelled 1–4 in Figure 2.

Component *B* .....

.....

Component 1 .....

.....

Component 2 .....

.....

Component 3 .....

.....

Component 4 .....

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QUESTION 5 (Continued)

(c) (i) Explain the process of fitting a windscreen to a car.

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(ii) Why is soap used on the seal when fitting the windscreen?

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(iii) List TWO reasons why laminated glass is used in the front windscreen of most vehicles.

Reason 1 .....

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Reason 2 .....

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QUESTION 6 (5 marks)

(a) Oils are used in vehicles to reduce friction and reduce corrosion.

(i) What is meant by the term *viscosity*?

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(ii) Why do manufacturers recommend differing viscosities for summer and winter use?

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(b) (i) Why is synthetic oil recommended for high performance engines?

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(ii) What is meant by the terms:

1 *friction modified*?

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2 *detergents*?

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QUESTION 6 (Continued)

(c) The design of vehicle bodies has changed over time from those based on a chassis to monocoque construction. Give TWO reasons for this.

(i) .....

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(ii) .....

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(d) Polymers continue to replace metals in some vehicle body components. Name TWO components that are now made from polymers. Give ONE advantage of using a polymer instead of metal for each body component.

Body component 1 .....

Advantage .....

.....

Body component 2 .....

Advantage .....

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(e) (i) What is meant by the term *corrosion*?

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(ii) Discuss THREE methods that are used by manufacturers to prevent corrosion in vehicles.

Method 1 .....

.....

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Method 2 .....

.....

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Method 3 .....

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Question 6 continues on page 10

QUESTION 6 (Continued)

(f) Why is aerodynamics so important in vehicle design? Discuss this in terms of cost, economy and aesthetics.

Cost .....

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Economy .....

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Aesthetics .....

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(g) Discuss the effect that the use of solar energy in vehicles will have on their design.

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QUESTION 7 (5 marks)

(a) (i) Name and describe THREE areas of regular preventative maintenance on a vehicle.

Name 1 .....

Description .....

.....

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Name 2 .....

Description .....

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Name 3 .....

Description .....

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(ii) Select ONE of these areas and describe in detail the program of maintenance that would be necessary to keep the vehicle in running order.

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Question 7 continues on page 12

QUESTION 7 (Continued)

(b) (i) With the aid of sketches, describe the process of repairing damage to the lower half of a front door skin.

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QUESTION 7 (Continued)

(ii) Describe the process of preparing the newly repaired door skin for spray painting.

The following list of technical terms is given to assist you in your answer.

- body filler
- fill
- sand
- wet and dry abrasive

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(iii) Describe how an MTA approved repairer would perform the spray painting process.

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