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Centre Number

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Student Number

2001
HIGHER SCHOOL CERTIFICATE
EXAMINATION

Industrial Technology

Automotive Industries

General Instructions

- Reading time – 5 minutes
- Working time – 1½ hours
- Write using black or blue pen
- Draw diagrams using pencil
- Board-approved calculators may be used
- Write your Centre Number and Student Number at the top of this page and page 13

Total marks – 100

Section I Pages 2–10

60 marks

- Attempt Questions 1–3
- Allow about 55 minutes for this section

Section II Pages 13–22

40 marks

- Attempt Questions 4–5
- Allow about 35 minutes for this section

Section I

60 marks

Attempt Questions 1–3

Allow about 55 minutes for this section

Answer the questions in the spaces provided.

Marks

Use this information to answer Questions 1 and 2.

A company from the automotive industries needs to expand its operations extensively because of increased sales, improved marketing and the introduction of new products.

Question 1 (20 marks)

- (a) Prior to the introduction of new products, the company had limited production capacity. New technologies were examined to overcome this problem.

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Identify and describe a new technology related to this industry. Explain how this technology could improve the production capacity of the company.

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Question 1 continues on page 3

Question 1 (continued)

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(b) Outline how the expansion of the company could impact on its organisation and management. **2**

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(c) Describe TWO marketing features that would support the expansion of the company. **2**

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Question 1 continues on page 4

Question 1 (continued)

(d) Owing to increased sales, mass production and quality control techniques are investigated to meet the demand for the new products and to improve services to the consumer.

(i) What is mass production? Explain how the introduction of mass production could affect the profitability of the company. **4**

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(ii) Describe how quality control could be used to improve BOTH the products and the services provided to the consumer. **4**

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End of Question 1

Question 2 (20 marks)

The same company needs to improve its efficiency in order to expand.

- (a) List the implications for the company of purchasing new equipment to improve its efficiency. **2**

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- (b) The company has decided to multiskill its workforce.
 - (i) Outline how multiskilling could make this company more efficient. **2**

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- (ii) Describe personnel issues other than multiskilling that would directly influence efficient production. **4**

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Question 2 continues on page 6

Question 2 (continued)

- (c) Describe how computer software applications can be used to assist in the effective planning, development and management of production projects. **6**

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- (d) Discuss training methods that the company could use to ensure that staff are competent in their use of its software applications. **6**

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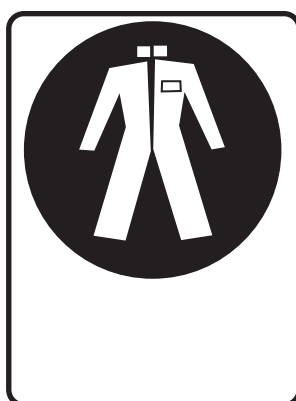
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End of Question 2

Question 3 (20 marks)

- (a) Workplace injuries account for a large amount of lost production time.

In order to address this concern, a company from the automotive industries has decided to display a number of safety signs throughout the workplace. A sample is shown.



- (i) What message does the safety sign convey? **1**

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- (ii) Explain how the features of this sign add to its effectiveness in communicating the intended message. **3**

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Question 3 continues on page 8

Question 3 (continued)

- (iii) Why is it important to carefully consider the placement of this safety sign in the workplace? **2**

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- (iv) Name strategies, other than signage, that this company could use to reduce workplace injuries. **2**

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Question 3 continues on page 9

Question 3 (continued)

- (b) (i) The company has decided to develop a safety manual containing both text and graphics. Outline the range of information-processing skills required to prepare and present this manual. Make reference to appropriate computer software in your answer.

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Question 3 continues on page 10

Question 3 (continued)

- (ii) The company has decided to produce 80 copies of the new safety manual. Each manual contains 15 pages. **3**

Complete the table, indicating the costs of producing these manuals.
All prices are inclusive of GST.

<i>Item</i>	<i>Unit cost</i>	<i>Total cost</i>
Artwork	\$200.00	\$200.00
Printing	50 cents per page	
Reams of paper	\$6.00 per ream (500 sheets)	
Binding for manual	\$4.00 per manual	

End of Question 3

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**Industrial Technology
Automotive Industries**

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Centre Number

Section II

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Student Number

40 marks

Attempt Questions 4–5

Allow about 35 minutes for this section

Answer the questions in the spaces provided.

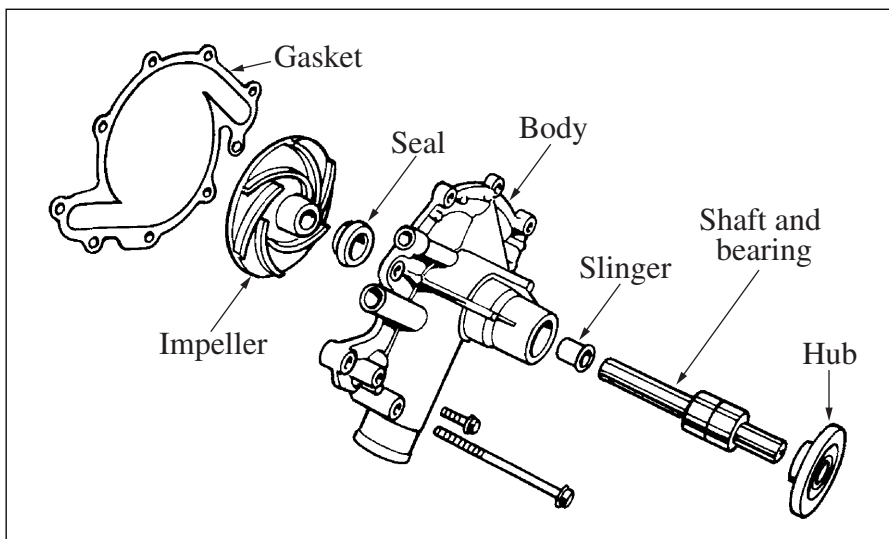
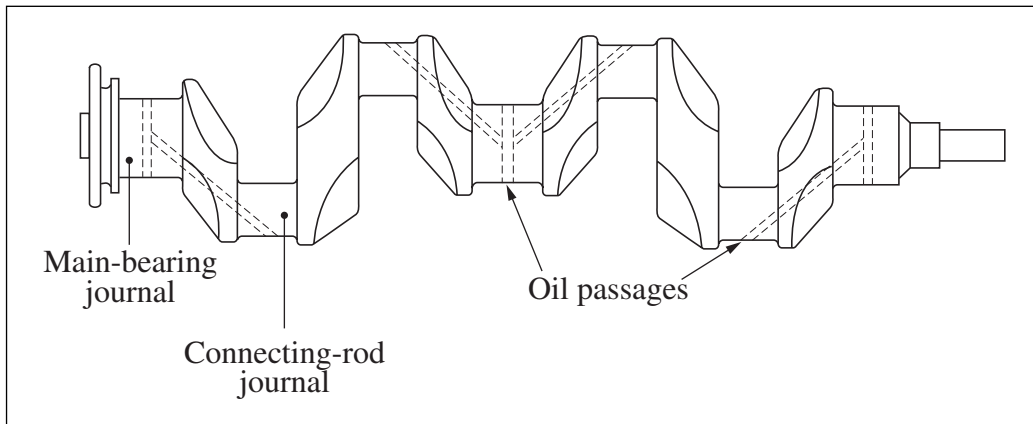
Question 4 (20 marks)

Please turn over

Question 4 (20 marks)

(a) Two different engine components are shown. Identify each component.

2



Question 4 continues on page 15

Question 4 (continued)

(b) Vehicles with carburettor-fed engines, normally aspirated, have a different fuel system to those with fuel-injected engines.

(i) Describe the purpose of the carburettor in a conventional four-stroke engine. **2**

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(ii) Describe how a carburettor system on an engine differs from a fuel-injected system on an engine. **4**

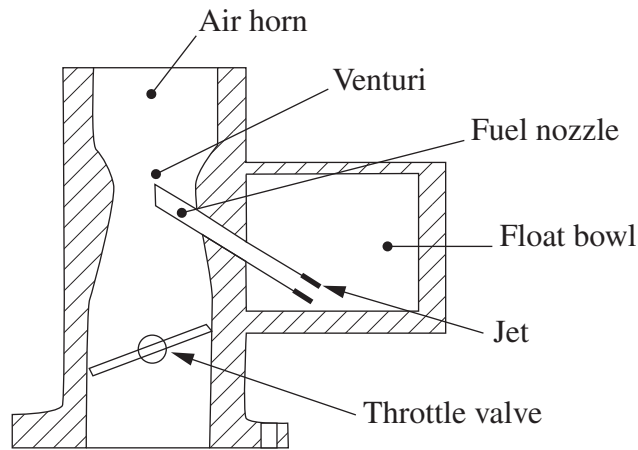
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Question 4 continues on page 16

Question 4 (continued)

- (c) Explain how the carburettor in a conventional four-stroke engine, shown in the diagram, works.

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Question 4 continues on page 17

Question 4 (continued)

- (d) The design of automobiles for the Australian market is very much determined by government regulation. 7

Analyse the effect that environmental regulation is having on automobile design with reference to power sources, engine systems and pollution control.

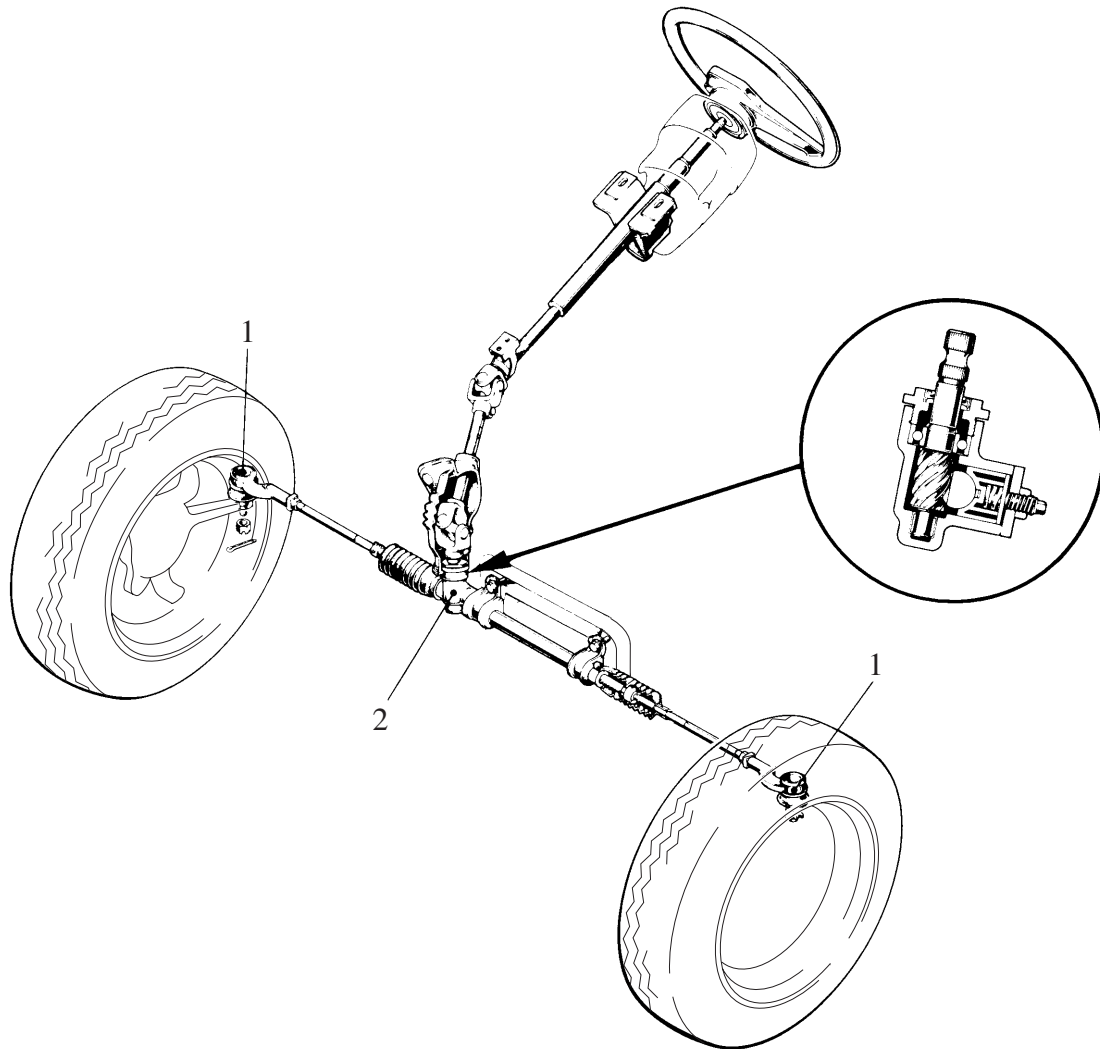
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End of Question 4

Question 5 (20 marks)

(a) One type of steering system in a family sedan is shown.

2



Identify parts numbered 1 and 2.

1

2

Question 5 continues on page 19

Question 5 (continued)

- (b) The tyres shown in the diagram show serious wear on the outer edges. **3**

Name the cause of this problem, and describe how it would be corrected.

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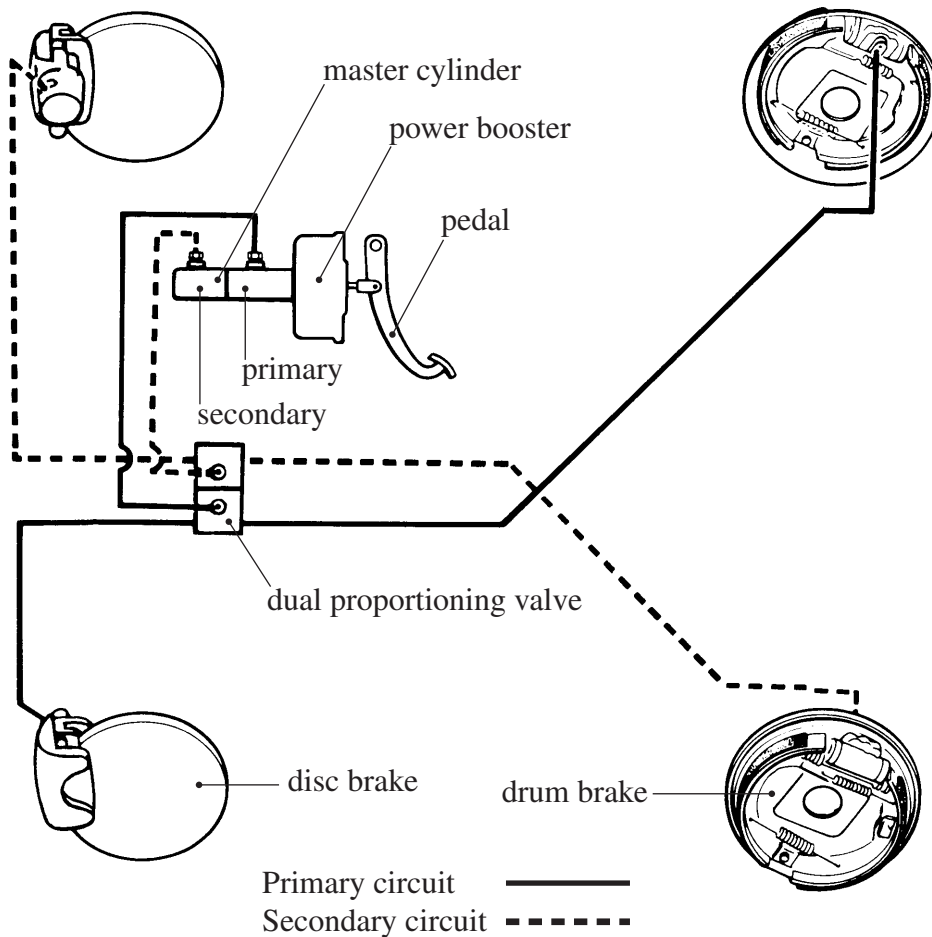
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Question 5 continues on page 20

Question 5 (continued)

(c) A diagonally-split braking system from a modern vehicle is shown.



(i) Explain how this system works, with particular reference to the 'primary' and 'secondary' circuits shown.

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Question 5 continues on page 21

Question 5 (continued)

- (ii) Outline the procedure that you would use to change the brake shoes on the rear wheels of the system shown. Assume the car to be on axle stands, with the wheels removed. Include a consideration of the types of tools used. **4**

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Question 5 continues on page 22

Question 5 (continued)

- (d) The braking systems in modern vehicles provide safe braking from high speeds and in a wide range of road conditions. Compare and contrast the braking effectiveness of drum and disc brakes.

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