

B O A R D O F S T U D I E S
NEW SOUTH WALES

2010

**HIGHER SCHOOL CERTIFICATE
EXAMINATION**

Industrial Technology

Automotive Technologies

General Instructions

- Reading time – 5 minutes
- Working time – 1 $\frac{1}{2}$ 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 page 5

Total marks – 40

Section I Pages 2–4

10 marks

- Attempt Questions 1–10
- Allow about 20 minutes for this section

Section II Pages 5–8

15 marks

- Attempt Questions 11–16
- Allow about 35 minutes for this section

Section III Page 9

15 marks

- Attempt Question 17
- Allow about 35 minutes for this section

Section I

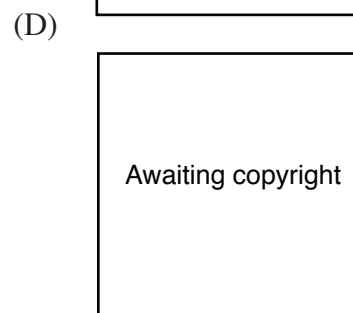
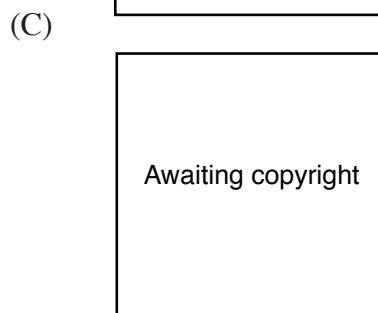
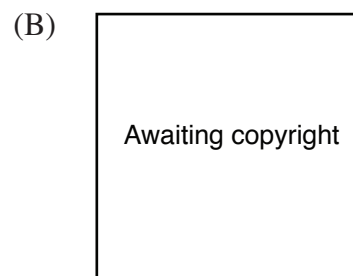
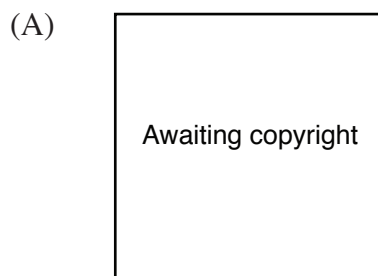
10 marks

Attempt Questions 1–10

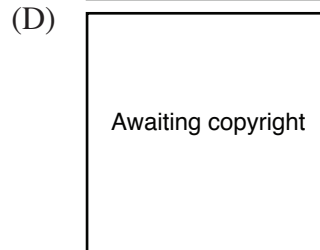
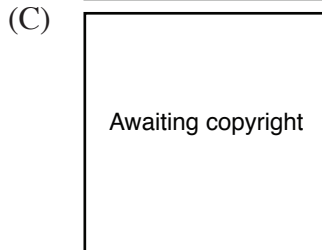
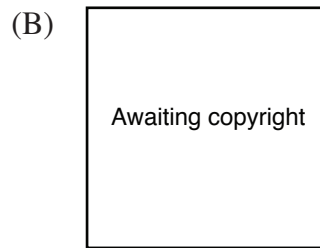
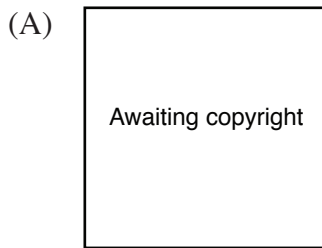
Allow about 20 minutes for this section

Use the multiple-choice answer sheet for Questions 1–10.

- 1 What does compulsory third party insurance cover?
- (A) Property damage in a car accident
 - (B) All people injured in a car accident
 - (C) The driver at fault injured in a car accident
 - (D) People injured in a car accident other than the at-fault driver
- 2 The ‘needle and seat’ is a part of which system?
- (A) Brake
 - (B) Carburettor
 - (C) Emission control
 - (D) Fuel injection
- 3 Which of the following illustrates a universal joint?



4 Which of the following illustrates wear caused by under inflation on a car tyre?



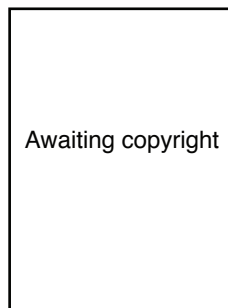
5 Which of the following is NOT checked during car registration inspections?

- (A) Wipers
- (B) Air bags
- (C) Seat belts
- (D) Car numberplates

6 What is the purpose of coolant additives in a vehicle's cooling system?

- (A) To lower the water temperature
- (B) To lower the boiling temperature
- (C) To raise the boiling temperature
- (D) To raise the freezing temperature

7 What is the component labelled X in the diagram?



- (A) A crank pin
- (B) A piston pin
- (C) A crank shaft
- (D) A connecting rod

- 8 When TWO gears are in mesh, the gear ratio is given by $\frac{\text{teeth in driven gear}}{\text{teeth in driving gear}}$.
A particular gear ratio is 7:1.

Which of the following is correct for this gear ratio?

	<i>Driven gear</i>	<i>Driving gear</i>
(A)	1	7
(B)	119	18
(C)	147	21
(D)	181	26

- 9 Why are there government regulations dealing with automotive emission control?
- (A) To prevent vehicles from being modified
 - (B) To reduce the use of vehicles for heavy transportation
 - (C) To increase government revenue from defective vehicles
 - (D) To fulfil the government's responsibility with regards to atmospheric pollution
- 10 A vehicle petrol tank has a maximum volume of 49 litres. The vehicle uses 9 litres per 100 km.

What is the maximum distance the vehicle can travel if the tank is 45% full?

- (A) 199 km
- (B) 245 km
- (C) 441 km
- (D) 544 km

Industrial Technology
Automotive Technologies

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Centre Number

Section II

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Student Number

15 marks

Attempt Questions 11–16

Allow about 35 minutes for this section

Answer the questions in the spaces provided. These spaces provide guidance for the expected length of response.

Question 11 (1 mark)

What is the name of the part labelled **X** in the diagram of a transmission system?

1

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Question 12 (2 marks)

Why are mechanical gauges in vehicles being replaced by digital electronic instruments? **2**

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Question 13 (2 marks)

What are the advantages and disadvantages of using composite materials in new vehicles? **2**

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Question 14 (3 marks)

Describe how a torque wrench is used. Include a sketch in your answer.

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Question 15 (3 marks)

Explain how the operation of a wheel cylinder produces a braking effect in a drum brake system. Include a sketch in your answer.

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Industrial Technology Automotive Technologies

Section III

15 marks

Attempt Question 17

Allow about 35 minutes for this section

Answer the question in a writing booklet provided. Extra writing booklets are available.

Question 17 (15 marks)

A small family-owned company is operating successfully in a local market. The company is assessing the feasibility of relocating to a larger facility in order to expand production.

- (a) Outline environmental considerations that may affect the expansion of the company. **3**

- (b) Analyse the structural, technical and personnel issues to be considered prior to relocating and expanding. **12**

End of paper

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