

**2012**  
**HIGHER SCHOOL CERTIFICATE  
EXAMINATION**

# Automotive

## General Instructions

- Reading time – 5 minutes
- Working time – 2 hours
- Write using black or blue pen  
Black pen is preferred
- Board-approved calculators may be used
- Write your Centre Number and Student Number at the top of pages 9, 11, 13 and 15

**Total marks – 80**

**Section I** Pages 2–5

**15 marks**

- Attempt Questions 1–15
- Allow about 20 minutes for this section

**Section II** Pages 9–16

**35 marks**

- Attempt Questions 16–21
- Allow about 50 minutes for this section

**Section III** Page 17

**15 marks**

- Attempt Question 22
- Allow about 25 minutes for this section

**Section IV** Page 18

**15 marks**

- Attempt Question 23
- Allow about 25 minutes for this section

## Section I

**15 marks**

**Attempt Questions 1–15**

**Allow about 20 minutes for this section**

Use the multiple-choice answer sheet for Questions 1–15.

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- 1** What is the immediate action to take when a hydraulic jack is found to be leaking?

  - (A) Advise colleagues of its condition
  - (B) Call a repair technician to have it repaired
  - (C) Top it up with hydraulic fluid and continue to use it
  - (D) Tag it and report it to your supervisor or nominated person
  
- 2** Who has the responsibility to ensure that a worker is inducted into an automotive workplace?

  - (A) The employer
  - (B) WorkCover
  - (C) The Motor Traders Association (MTA)
  - (D) The Australian Apprenticeships Centre (AAC)
  
- 3** What are the correct tools to use when tightening a wheel nut in an automotive workshop?

  - (A) Socket, crackbar and wheel brace
  - (B) Impact socket, rattle gun and tension wrench
  - (C) Multi-hex socket, rattle gun and wheel chock
  - (D) Multi-hex socket, rattle gun and tension wrench

- 4 Which acid is combined with water in battery fluid?
- (A) Acetic
  - (B) Hydrochloric
  - (C) Nitric
  - (D) Sulphuric
- 5 Which of the following is the correct operating cycle for a 4-stroke petrol engine?
- (A) Exhaust, intake, compression, power
  - (B) Compression, intake, power, exhaust
  - (C) Exhaust, intake, ignition, compression
  - (D) Compression, ignition, intake, exhaust
- 6 A vehicle has been recalled by the manufacturer for modification.
- In which publication would the rectification for this recall be found?
- (A) Owner's manual
  - (B) Workshop manual
  - (C) Technical bulletin
  - (D) Australian standard
- 7 Which of the following industry bodies regulates automotive licensing in NSW?
- (A) Motor Traders Association
  - (B) Motor Vehicle Repair Industry Authority
  - (C) Society of Automotive Engineers Australasia
  - (D) Institute of Automotive Mechanical Engineers

- 8** Which piece of equipment is required to display a safe working load (SWL)?
- (A) Drill press
  - (B) Vehicle stand
  - (C) Torque wrench
  - (D) Wheel balancer
- 9** What does the term *viscosity* refer to?
- (A) Heat dissipation
  - (B) Lubrication quality
  - (C) Resistance to flow
  - (D) Molecular breakdown
- 10** When refrigerants are released, they are dangerous because they
- (A) are toxic.
  - (B) are unstable.
  - (C) are flammable.
  - (D) cause frostbite.
- 11** What information is found on a vehicle's compliance plate?
- (A) Compliance date, engine number and VIN
  - (B) Make and model, VIN and compliance date
  - (C) Year of manufacture, engine type and colour code
  - (D) Axle type code, compliance date, make and model

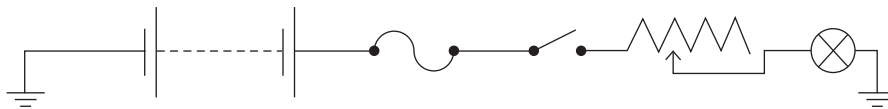
**12** What is the correct tool to use when measuring the state of charge in a vented battery?

- (A) Load tester
- (B) Multimeter
- (C) Hydrometer
- (D) Galvanometer

**13** Which of the following government bodies regulates the operating hours of an automotive workshop?

- (A) WorkCover
- (B) Local council
- (C) NSW Fair Trading
- (D) Environmental Protection Authority

**14** What are the names of the electrical components shown in the diagram?



- (A) Battery, fusible link, switch, diode, bulb
- (B) Battery, fuse, switch, variable resistor, bulb
- (C) Capacitor, fuse, switch, transistor, electric motor
- (D) Capacitor, fusible link, switch, variable resistor, bulb

**15** The ‘check engine’ warning light comes on in a car while it is being driven.

How would an automotive technician find the cause of this warning?

- (A) Remove the engine oil dipstick and check the oil level
- (B) Test the engine’s oil pressure using an oil pressure gauge
- (C) Check the vehicle’s engine management system using a scan tool
- (D) Examine the engine cooling system for overheating or coolant loss

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Centre Number

## Section II

35 marks

Attempt Questions 16–21

Allow about 50 minutes for this section

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Student Number

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

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## Question 16 (4 marks)

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The diagram shows tools used in the automotive trade.

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Complete the table by naming the tools labelled A and B. Provide an example of how each of these tools would be used.

<i>Tool</i>	<i>Tool name</i>	<i>Example of use</i>
A		..... ..... .....
B		..... ..... .....

**Question 17 (5 marks)**

A 12-volt vented lead acid cell battery is constantly going flat.

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Explain how you would test the battery out of the car. In your response, name all of the tools you would use. Provide typical readings that would assist you in making your diagnosis to determine whether the battery needs to be recharged or replaced.

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Section II (continued)

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**Question 18** (10 marks)

- (a) Name the labelled components in the diagram shown. **2**

- (i) .....
- (ii) .....
- (iii) .....
- (iv) .....
- (v) .....



- (b) Explain how the clutch system disengages and engages the engine and the gearbox. **3**

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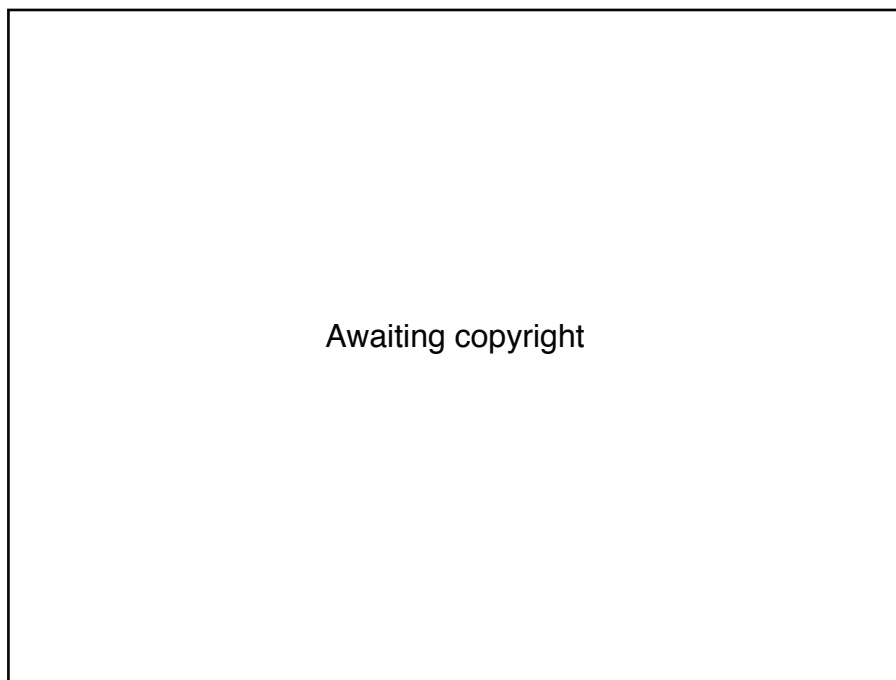
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**Question 18 continues on page 12**

Question 18 (continued)

- (c) Identify the components in the system shown and explain how the system operates.

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**End of Question 18**

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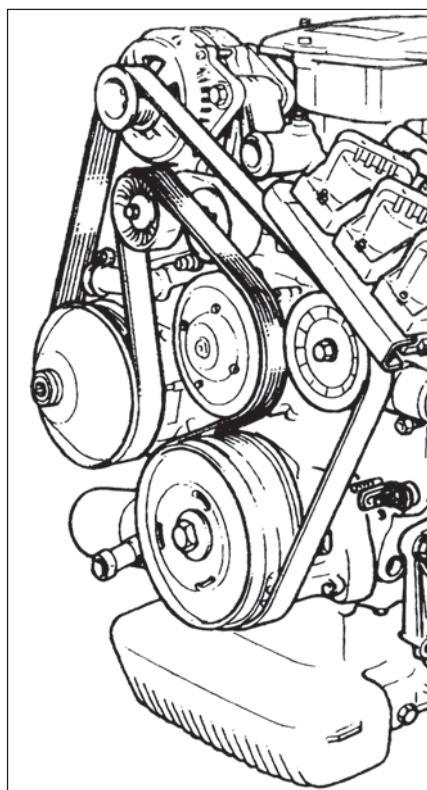
**Section II (continued)**

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**Question 19 (7 marks)**

The diagram shows a drive belt.



Acknowledgement: Automotive Mechanics, Ed May and Les Simpson  
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- (a) Name the type of drive belt shown in the diagram.

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**Question 19 continues on page 14**

Question 19 (continued)

- (b) Name the components that are usually driven by this belt. **3**

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- (c) A whining noise is heard when the engine is running. You suspect a faulty bearing in one of the driven components. **3**

Outline the procedure that should be carried out to isolate which component is at fault.

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**End of Question 19**



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Centre Number

Section II (continued)

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**Question 20** (5 marks)

Explain in detail how hazardous materials and waste products in an automotive workshop should be sorted, stored and disposed of.

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**Question 21** (4 marks)

Describe how workers in the automotive service and repair industry could develop skills to expand their career pathways.

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## Automotive

### Section III

**15 marks**

**Attempt Question 22**

**Allow about 25 minutes for this section**

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

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In your answer you will be assessed on how well you:

- demonstrate knowledge and understanding relevant to the question
  - communicate ideas and information using relevant workplace examples and industry terminology
  - present a logical and cohesive response
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#### **Question 22 (15 marks)**

Identify automotive safety systems and describe how they are used in modern motor vehicles to improve driver control and driver awareness and to reduce risk of injury in the event of a collision.

**Please turn over**

## Section IV

**15 marks**

**Attempt Question 23**

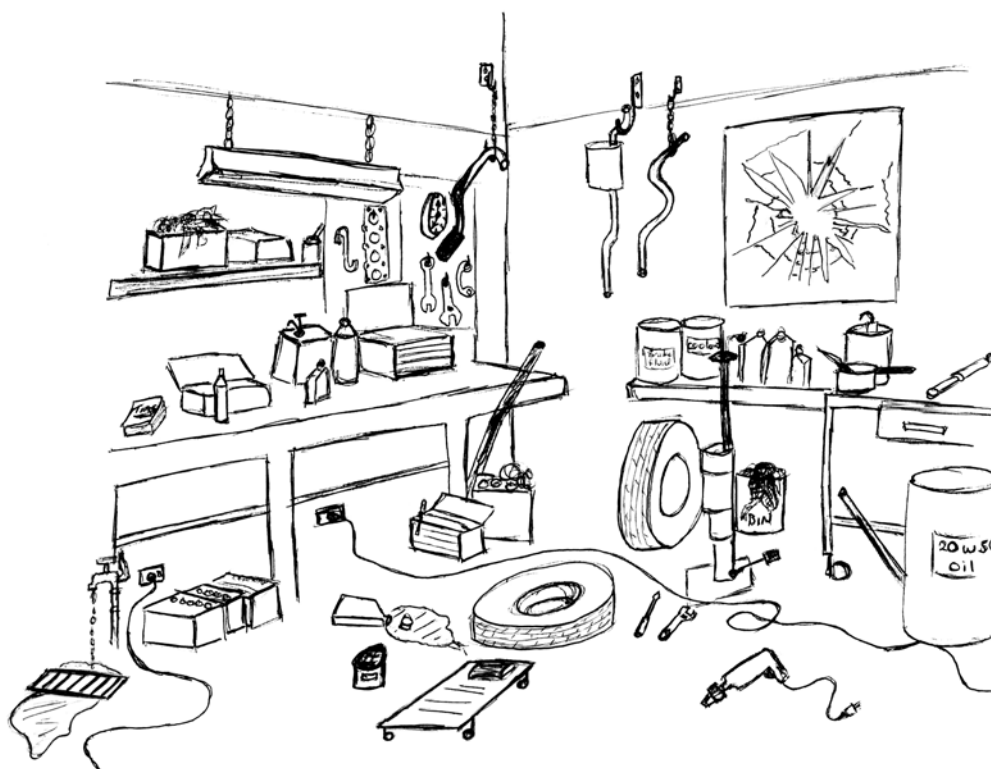
**Allow about 25 minutes for this section**

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

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### Question 23 (15 marks)

The diagram shows an automotive workshop.



- (a) Propose a range of work practices that will need to be improved in the workshop shown in the diagram in order to provide a safe working environment. **5**
- (b) Explain how best work practices affect both a business's profitability and service to clients, and the environment. **10**

**End of paper**