

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

2011

**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 9–15

35 marks

- Attempt Questions 16–20
- Allow about 50 minutes for this section

Section III Page 17

15 marks

- Attempt Question 21
- Allow about 25 minutes for this section

Section IV Page 18

15 marks

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

Section I

15 marks

Attempt Questions 1–15

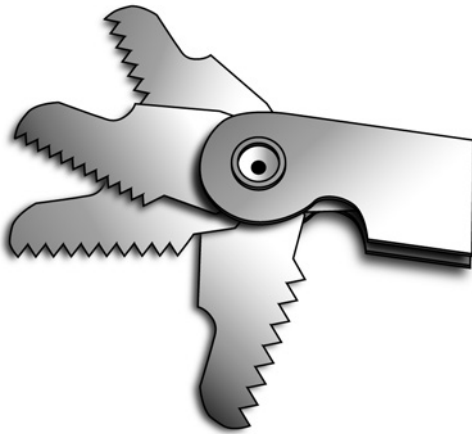
Allow about 20 minutes for this section

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

- 1** Battery acid has come into contact with skin.
- What should be done to the affected area?
- (A) Apply bicarbonate soda to it
 - (B) Pad it down with a sterile rag
 - (C) Immediately apply an ice pack to it
 - (D) Wash it thoroughly with clean water
- 2** The neighbours of an automotive workshop have complained about noise.
- How could the noise from the workshop be minimised without disrupting business operations?
- (A) Relocate to an industrial area
 - (B) Remove the noisy equipment
 - (C) Perform noisy work during office hours
 - (D) Install noise controls around noisy equipment
- 3** Which publication provides details on how a vehicle's in-cabin controls operate?
- (A) General service publication
 - (B) Owner's handbook
 - (C) Service bulletin
 - (D) Workshop manual
- 4** Who develops and distributes Material Safety Data Sheets (MSDS)?
- (A) Employers
 - (B) Manufacturers
 - (C) Trade unions
 - (D) WorkCover

- 5** What initial check should a worker perform when an air tool has a noticeable drop in performance?
- (A) Check the air pressure
 - (B) Check for moisture in the lines
 - (C) Check for lubrication in the air ratchet
 - (D) Check the maintenance schedule of the air compressor
- 6** What is a *diode*?
- (A) An electronic relay
 - (B) A one-way electrical valve
 - (C) A two-way electrical valve
 - (D) An electronic storage device
- 7** What is the most appropriate initial response for dealing with a minor trade liquid spill?
- (A) Mop up the spill and pour it into trade waste storage
 - (B) Notify the Environmental Protection Agency (EPA)
 - (C) Contain the spill with a spill kit before run-off occurs
 - (D) Wipe up the spill with rags and dispose of them in an industrial bin
- 8** Who has the primary responsibility for ensuring a workshop meets statutory requirements regarding safety?
- (A) Employers
 - (B) Employees
 - (C) WorkCover
 - (D) Local council

9 What is the tool shown used for?



- (A) Measuring the size of a bolt
- (B) Cleaning damaged nut and bolt threads
- (C) Measuring the thread pitch for nuts and bolts
- (D) Cleaning the metal chips from threaded blind holes

10 A vehicle has suspected electrical system faults.

What is the best course of action for effective troubleshooting?

- (A) Connect an oscilloscope
- (B) Connect a diagnostic computer
- (C) Sequenced step-by-step testing
- (D) Sequenced component replacement

11 A customer is angry and dissatisfied after inspecting the repair of his vehicle.

Which is the most appropriate strategy for dealing with this issue?

- (A) Refer the customer to another colleague
- (B) Listen to the customer's concerns and alert a supervisor
- (C) Calmly explain that the work is within the industry standard
- (D) Promptly refer to the vehicle service history on past job cards

- 12** What should be tested first to determine why headlights are dim?
- (A) The headlight fuse
 - (B) The battery voltage
 - (C) The headlight combination switch
 - (D) The headlight circuit for voltage drop
- 13** What does the number imprinted on the head of a metric bolt indicate?
- (A) Head size
 - (B) Thread pitch
 - (C) Strength of bolt
 - (D) Nominal character of bolt
- 14** A bolt has a measurement of 8.8, M10 × 1.5 × 20.
- What do these details indicate, in order?
- (A) Length, tensile strength, diameter, thread pitch
 - (B) Length, thread pitch, diameter, tensile strength
 - (C) Tensile strength, diameter, thread pitch, length
 - (D) Thread pitch, diameter, tensile strength, length
- 15** What is the minimum acceptable voltage reading when a battery is undergoing a battery load test?
- (A) 0.5 volts
 - (B) 9.6 volts
 - (C) 12.6 volts
 - (D) 14.1 volts

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Centre Number

Section II

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Student Number

35 marks

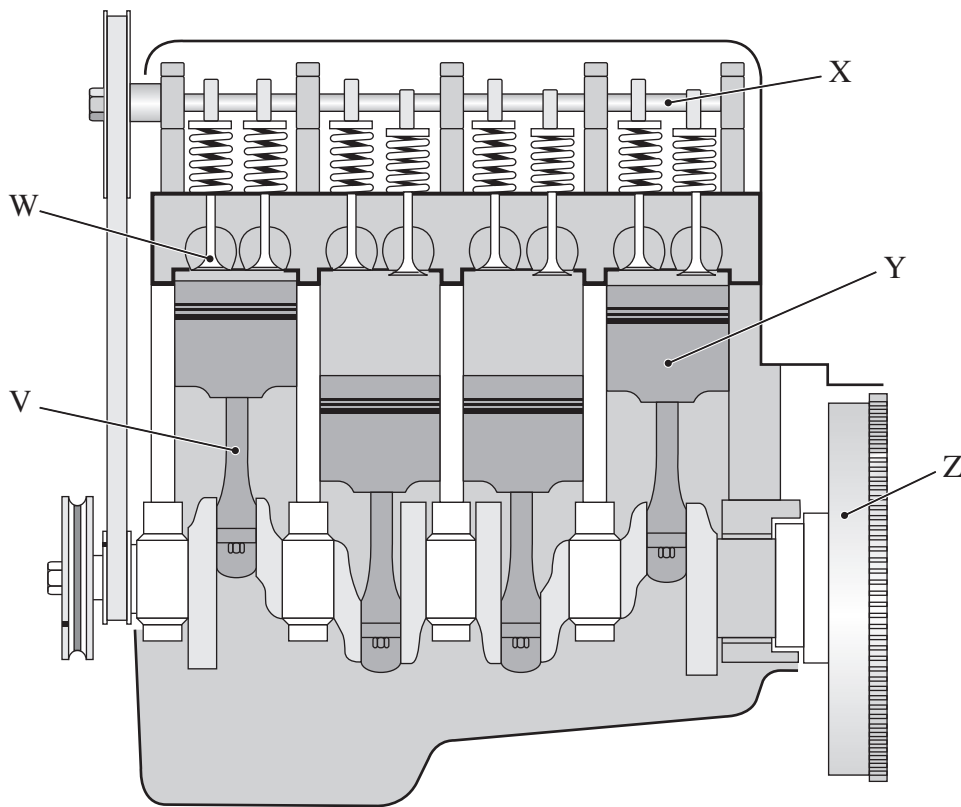
Attempt Questions 16–20

Allow about 50 minutes for this section

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

Question 16 (8 marks)

A diagram of an engine is shown.



(a) Name the components indicated in the engine.

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- V
- W
- X
- Y
- Z

Question 16 continues on page 10

Question 16 (continued)

(b) Explain the operating cycles of a four-stroke engine.

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End of Question 16

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Centre Number

Section II (continued)

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Student Number

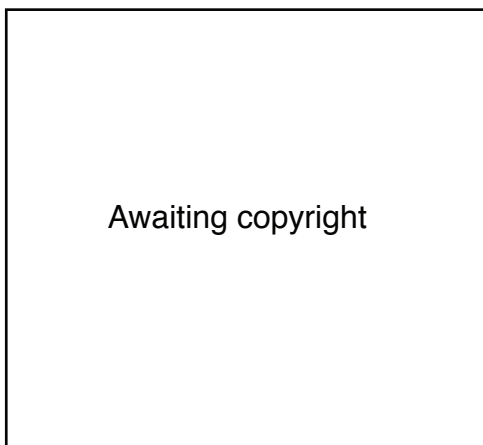
Question 17 (9 marks)

(a)



Place an arrow on the diagram to indicate the direction the teeth on the blade should face. 1

(b) The diagram shows an internal thread that has stripped during a job. 3



Explain how you would restore this thread to the original thread size.

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Question 17 continues on page 12

Question 17 (continued)

(c) (i)



Name the tool shown in the above diagram.

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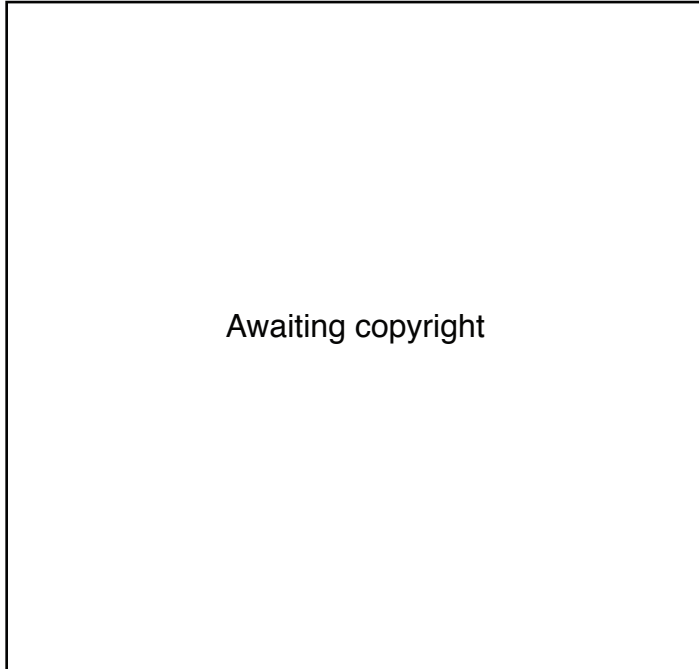
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(ii) What are **THREE** dimensions that can be measured with this tool?

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(iii)



What is the reading on the tool measurement scale above?

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End of Question 17

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Centre Number

Section II (continued)

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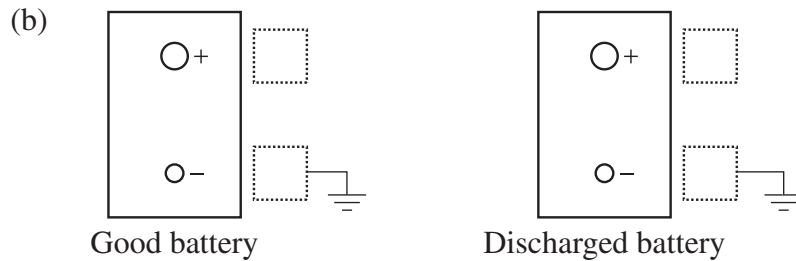
Student Number

Question 18 (7 marks)

- (a) While charging, a battery emits a dangerous gas. 2

What precautions should be taken in this situation? In your response, name the gas emitted.

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Place the numbers 1 to 4 in the dotted boxes of the diagram above to indicate the correct sequence in which the jumper leads should be progressively connected to the batteries to perform a jump start. 2

- (c) A vehicle has sustained damage to a wiring harness. You notice the insulation has been damaged and some wires are completely broken. 3

Describe the steps needed to bring the wiring harness back to manufacturer's specifications.

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Question 19 (5 marks)

- (a) What are the mandatory design features for a bunded area in an automotive workshop? **2**

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- (b) Explain how hazardous chemicals can be stored safely in a bunded area. **3**

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Centre Number

Section II (continued)

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Student Number

Question 20 (6 marks)

- (a) Where would you find information on how to safely use specialised machinery in a workshop? **1**

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- (b) What is the correct procedure to follow if you discover an electric tool with a frayed cord? **1**

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- (c) Explain the procedure for raising a vehicle on a two-post hoist so that you can work below it safely. **4**

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Automotive

Section III

15 marks

Attempt Question 21

Allow about 25 minutes for this section

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

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 21 (15 marks)

Explain how the troubleshooting process can be used to determine the cause of a vehicle fault.

Please turn over

Section IV

15 marks

Attempt Question 22

Allow about 25 minutes for this section

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

Question 22 (15 marks)

- (a) What are the advantages and disadvantages of a front wheel drive (FWD) vehicle compared to a rear wheel drive (RWD) vehicle? **5**
- (b) Describe the features of hybrid vehicles that make them less harmful to the environment than traditional vehicles. **10**

End of paper