BOARD OF STUDIES
NEW SOUTH WALES

2013

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, 13 and 15

Total marks – 80

Section I Pages 2–6

15 marks

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

Section II Pages 9–17

35 marks

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

Section III Page 19

15 marks

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

Section IV Page 20

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 In an automotive workshop, how often should a pneumatic rattle gun be oiled when the airline does not have an inline oiler in place?

(A) Hourly

(B) Daily

(C) Weekly

(D) Monthly

2 Which of the following presents a barrier to effective communication in an automotive workshop?

(A) Empathy

(B) Mentoring

(C) Stereotyping

(D) Active listening

3 Which type of fire extinguisher should be used on a Class E electrical wiring fire?

	Contents	*Colour*
(A)	Water	Red
(B)	Foam	Red with a blue band
(C)	Powder	Red with a white band
(D)	Wet chemical	Red with an oatmeal band

4 The diagram shows a tool commonly used in an automotive workshop.

What is the name of the component labelled *Y* in the diagram?

(A) Thread tap

(B) Twist drill

(C) Hand ream

(D) Screw extractor

5 Which type of engine uses a reciprocating motion?

(A) Jet

(B) Orbital

(C) Piston

(D) Rotary

6 Which tool would be used to check the charge rate of a vehicle's alternator?

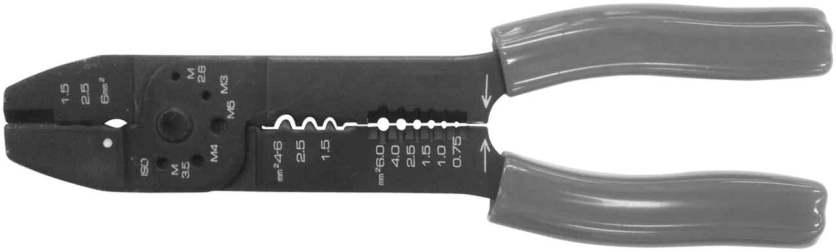
(A) Hydrometer

(B) Micrometer

(C) Ohmmeter

(D) Voltmeter

7 An electrical repair tool is shown.



What is the purpose of the tool?

(A) To strip insulation, cut cable and crimp connectors

(B) To fit heat-shrink, measure cable size and cut cable

(C) To heat sink cable wires when soldering to connectors

(D) To measure crimp connector size and measure cable strands

8 What is the total voltage when two 12 volt batteries are connected in parallel?

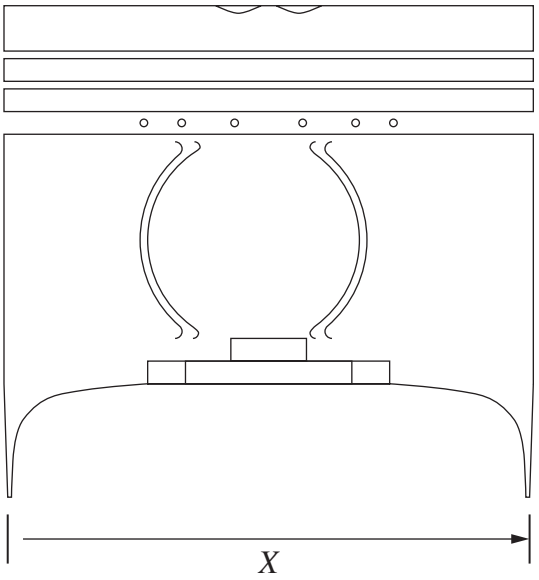
(A) 6 V

(B) 12 V

(C) 18 V

(D) 24 V

9 The diagram shows a piston.



Which tool would most accurately measure the diameter *X* of the piston skirt?

(A) Steel rule

(B) Micrometer

(C) Vernier caliper

(D) Telescopic gauge

10 Which component is most likely to be faulty if a vehicle is pulling to one side when braking?

(A) Disc caliper

(B) Wheel bearing

(C) Master cylinder

(D) Vacuum booster

11 On which document is it mandatory to obtain the customer's signature?

(A) Invoice

(B) Quotation

(C) Repair order

(D) Parts requisition

12 Which organisation should you initially contact when a large chemical spill occurs within a workshop?

(A) WorkCover

(B) Local council

(C) Fire and Rescue NSW

(D) Motor Traders Association

13 When running a vehicle or engine in a confined space, which gas should be removed by exhaust extraction?

(A) Oxygen (O_2)

(B) Nitrogen (N_2)

(C) Carbon dioxide (CO_2)

(D) Carbon monoxide (CO)

14 In which system would a sedimenter/water trap typically be found?

(A) Cooling

(B) Diesel fuel

(C) Petrol fuel

(D) Lubrication

15 The starter motor cranks the engine normally. However, the vehicle will not start.

What would be the correct test sequence?

(A) Coil output, injector operation, battery, fuel supply

(B) Battery, injector operation, coil output, fuel supply

(C) Battery, voltage drop, coil output, injector operation

(D) Fuel supply, ignition supply, coil output, injector operation

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Automotive

Centre Number

Student Number

Section II

35 marks
Attempt Questions 16–21
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) A fluid leak is found during a vehicle inspection.

Outline the procedure for identifying the type of fluid and the source of the leak. **3**

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(b) A vehicle has dull headlights when being driven. **5**

Outline the procedure for identifying the cause of the fault. In your answer, include tools that you would use and name the components you would test.

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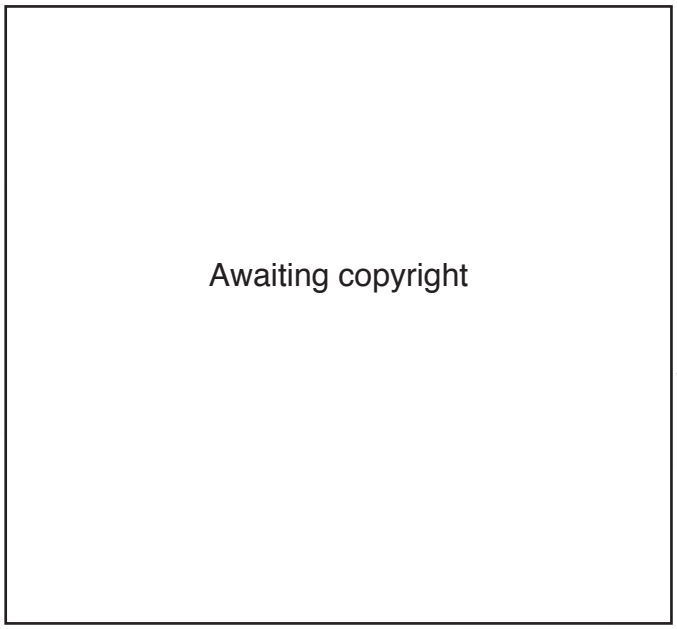
Question 17 (5 marks)

(a) In the spaces provided, name the types of springs shown. **2**



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Question 17 continues on page 11

(b) Describe how a suspension's shock absorber works. **3**

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End of Question 17

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Automotive

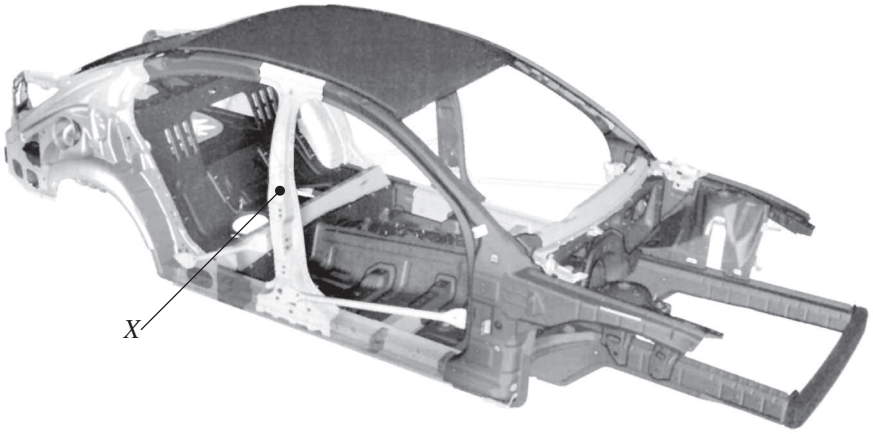
Centre Number

Student Number

Section II (continued)

Question 18 (4 marks)

A vehicle body is shown.



(a) What is the correct name of the pillar indicated by *X*? **1**

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(b) Outline the benefits of this monocoque/uni-body design. **3**

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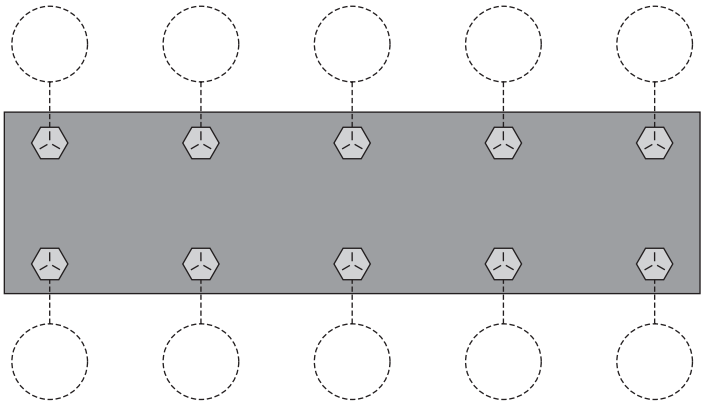
Question 19 (7 marks)

(a) A cylinder head that requires tightening is illustrated in the diagram.

Number the circles from 1–10 to indicate a sequence for correctly tightening the cylinder head bolts. **1**



(b) Identify the tool shown and state its purpose. **2**

Acknowledgement: Automotive Mechanics Vol. 2, Ed May Les Simpson, 8th Edition © McGraw-Hill Education Australia, 2010

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(c) Describe the procedure for installing a cylinder head. **4**

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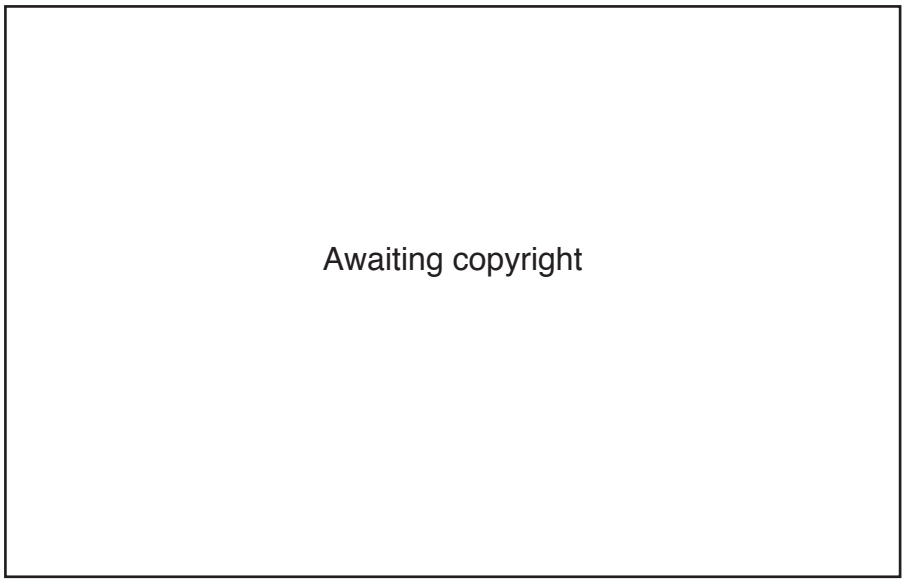
Question 20 (7 marks)

Please turn over

Question 20 (7 marks)

A cooling system is shown.



(a) Name the labelled components. **3**

A .....

B .....

C .....

D .....

E .....

(b) Explain the operation of this cooling system. **4**

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Question 21 (4 marks)

Why must vehicles in an automotive workshop be washed in an approved wash bay? In your answer, include a description of the design of the wash bay. **4**

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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.

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

Question 22 (15 marks)

Manufacturers use a variety of driveline configurations to transfer drive from the engine to the wheels.

Compare different driveline configurations to explain how they can contribute to overall vehicle efficiency.

Please turn over

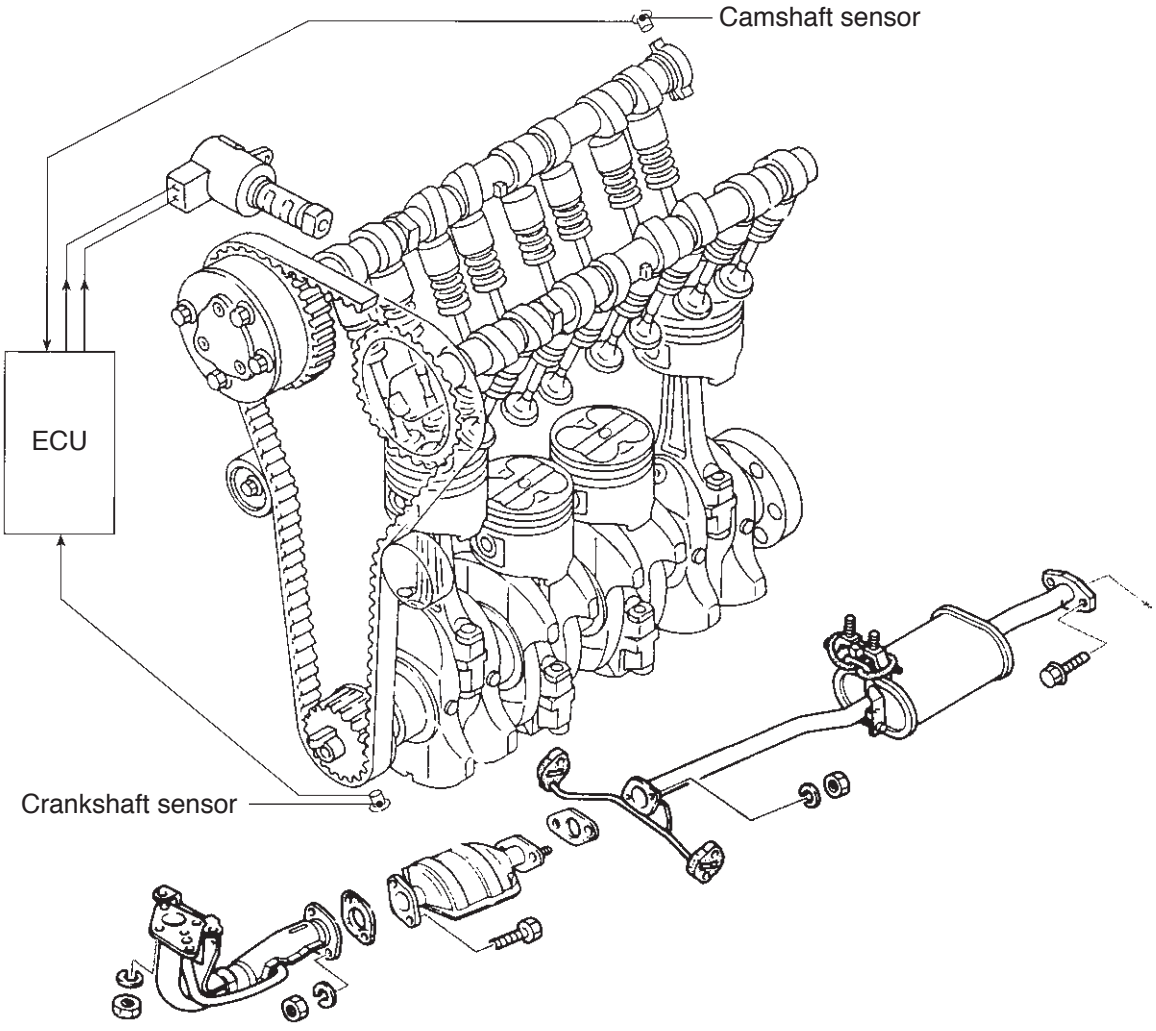
Section IV

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.

Question 23 (15 marks)

(a) Describe the features of the systems shown that contribute to improved fuel efficiency and a reduction in emissions. **5**



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(b) Explain how manufacturers have used technology in modern non-hybrid petrol and diesel engines, and in body design, to achieve fuel efficiency and reduction in harmful emissions. In your answer provide examples. **10**

End of paper