

Industrial Technology

Automotive Technologies

General Instructions

- Reading time – 5 minutes
- Working time – 1½ hours
- Write using black 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 5–7

15 marks

- Attempt Questions 11–15
- Allow about 35 minutes for this section

Section III Page 9

15 marks

- Attempt Question 16
- Allow about 35 minutes for this section

Section I

10 marks

Attempt Questions 1–10

Allow about 20 minutes for this section

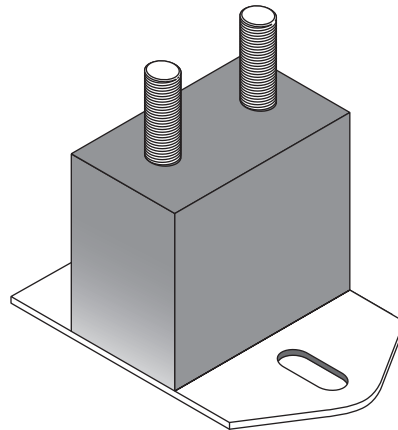
Use the multiple-choice answer sheet for Questions 1–10.

1 A brake light on a vehicle is not operating.

Which of the following is a possible cause of the malfunction?

- (A) Cracked lens
- (B) Worn brake pads
- (C) Low brake fluid level
- (D) Poor earth connection

2 What is the purpose of the rubber block in the engine mount shown?

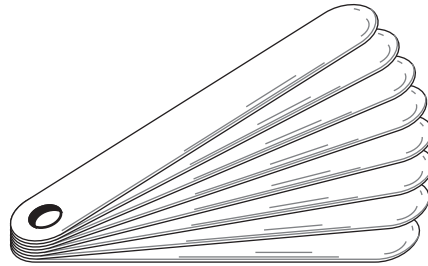


- (A) To prevent vibration in the steering
- (B) To connect the engine to the chassis
- (C) To dampen the engine vibrations into the chassis
- (D) To prevent corrosion between the engine and the chassis

3 Which of the following is an indication of a blown head gasket?

- (A) A rattling noise from the sump
- (B) Air bubbles or oil in the cooling fluid
- (C) A rattling noise from the upper engine
- (D) Smoke emitted from the breather pipe

4 What is the purpose of the tool shown?

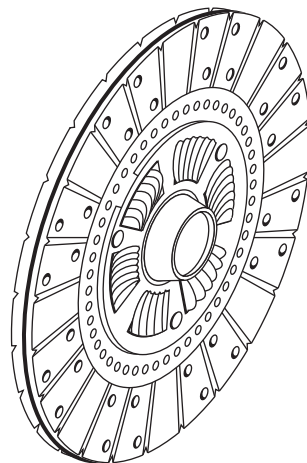


- (A) To measure the gap in a spark plug
- (B) To adjust the air fuel mixture screw
- (C) To measure the depth of the tyre tread
- (D) To remove carbon deposits from the spark plug terminals

5 Why is laminated glass preferred over tempered glass in motor vehicle windscreens?

- (A) It is much cheaper to replace.
- (B) It remains intact if it is cracked.
- (C) It shatters into very small pieces.
- (D) It is easier to break if a person is trapped in the vehicle.

6 What is the function of the component shown?



- (A) To provide smooth engagement of a lower gear
- (B) To act as a disc for the handbrake in large vehicles
- (C) To allow for gradual engagement of the flywheel and transmission
- (D) To provide the force to keep the pressure plate in contact with the flywheel

- 7** What is the main purpose of a shock absorber?
- (A) To prevent excessive body roll when cornering
 - (B) To prevent the tyres from bursting when a vehicle hits a bump
 - (C) To keep the vehicle level during heavy accelerating or braking
 - (D) To dampen the up and down movement when a vehicle hits a bump
- 8** What is the purpose of a catalytic converter used in modern vehicles?
- (A) To remove water vapour from the carburettor
 - (B) To remove carbon monoxide from the exhaust
 - (C) To convert water vapour to carbon monoxide in the exhaust
 - (D) To convert water to oxygen and hydrogen in a hybrid engine
- 9** What is the purpose of the 15° offset on an open-ended spanner?
- (A) To provide a more comfortable grip
 - (B) To add greater strength to a spanner
 - (C) To increase safety when using the spanner
 - (D) To allow for easier access to a nut in a confined space
- 10** What is the function of the transfer port in a two stroke, air cooled engine?
- (A) To provide cooling for the engine
 - (B) To remove exhaust gases from the cylinder
 - (C) To transfer fuel from the fuel tank to the engine
 - (D) To transfer the fuel mixture from the crankcase to the combustion chamber

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Centre Number

Section II

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Student Number

15 marks

Attempt Questions 11–15

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 purpose of synchromesh in a manual transmission?

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Question 12 (3 marks)

Why do exhaust valves generally require more maintenance than inlet valves in a four stroke engine?

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Question 13 (3 marks)

Outline the procedure to bleed a hydraulic brake system.

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Question 14 (3 marks)

Describe how the internal combustion engine and electric motor in a hybrid vehicle work together to provide efficient motoring.

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Question 15 (5 marks)

Explain the interaction between the camshaft, crankshaft and timing belt in a car engine to ensure correct operation.

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Section III

15 marks

Attempt Question 16

Allow about 35 minutes for this section

Answer part (a) of the question in a writing booklet. Answer part (b) of the question in a SEPARATE writing booklet. Extra writing booklets are available.

Question 16 (15 marks)

Answer part (a) of the question in a writing booklet.

- (a) Explain how restructuring a business can affect quality control. **5**

Answer part (b) of the question in a SEPARATE writing booklet.

- (b) Assess the effect of new technology on production and efficiency in the automotive industry. **10**

End of paper

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