



**4292-530 MARCH 2018**

**Level 3 Advanced Technical Certificate in the Automotive Industry**  
Level 3 Automotive Industry – Theory Exam (1)

If provided, stick your candidate  
barcode label here.

**Friday 16 March 2018**  
**09:30 – 12:00**

Candidate name (first, last)

First

Last

Candidate enrolment number

Date of birth (DDMMYYYY)

Gender (M/F)

Assessment date (DDMMYYYY)

Centre number

Candidate signature and declaration\*

• If any additional answer sheets are used, enter the additional number of pages in this box.

• Please ensure that you **staple** additional answer sheets to the **back** of this answer booklet, clearly labelling them with your full name, enrolment number, centre number and qualification number in BLOCK CAPITALS.

• All candidates need to use a **black/blue pen**. **Do not** use a pencil or gel pen.

• If provided with source documents, these documents **will not** be returned to City & Guilds, and will be shredded. **Do not** write on the source documents.

**\*I declare that I had no prior knowledge of the questions in this assessment and that I will not divulge to any person any information about the questions.**

**You should have the following for this assessment**

- a pen with blue or black ink

**General instructions**

- Use black or blue ball-point pen. Use pencil for drawing only.
- The marks for questions are shown in brackets.
- This examination contains 12 questions. Answer **all** questions.
- Answer the questions in the spaces provided. Answers written in margins or on blank pages will **not** be marked.
- Cross through any work you do not want to be marked.
- Write all your working out and answers in this booklet.



1 a) State **two** non-ferrous metals used in the automotive industry. (2 marks)

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b) Name **two** engine components that use non-ferrous metals in their construction. (2 marks)

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2 a) Explain why manufacturers use non-ferrous metals in vehicle electrical systems. (4 marks)

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b) Explain what is meant by the term 'precipitation hardening'. (2 marks)

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c) i) State where on a vehicle engine, non-threaded mechanical fixings would be found. (2 marks)

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ii) Name **two** different types of adhesive used in the construction or manufacture of vehicles. (2 marks)

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- 3 a) Describe the purpose of the following types of vehicle maintenance procedures. (2 marks)
- i) Safety inspections.

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- ii) Manufacturer servicing. (2 marks)

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- b) Explain the correct method for carrying out a full safety inspection on a rear disc brake assembly to manufacturer's specification. (4 marks)

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- c) State **two** pieces of legislation that is used to protect employees in the work place. (2 marks)

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- 4 State **two** sources of technical information available to technicians when servicing vehicle. (2 marks)

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5 Explain why it is important to follow a manufacturers' servicing schedule on a new vehicle. (2 marks)

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6 Explain the purpose of a beam axle in a vehicle. (2 marks)

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7 a) Explain the potential hazards when working with high voltage electrical circuits on a vehicle. (4 marks)

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b) State the **three** terms relating to engine valve timing during the combustion process. (3 marks)

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- c) i) Identify the parts arrowed 1 and 2 in component in Figure 1. (2 marks)



Source: <http://www.solat.cn>

**Figure 1**

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- ii) Explain the operational principle of how the component in Figure 1 is used in an ignition system to produce a high voltage spark. (4 marks)

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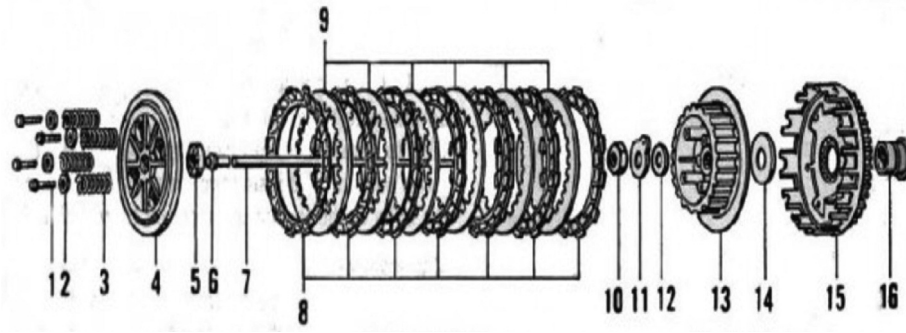
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8 a) Identify the transmission assembly in Figure 2. (1 mark)



Source: <http://bikearama.com>

**Figure 2**

b) Identify the components numbered 8 in Figure 2. (1 mark)

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9 a) Describe what is meant by the electrical term (EMF) electromotive force. (3 marks)

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b) i) State **two** measurements that can be read from an oscilloscope display to diagnose vehicle electrical faults. (2 marks)

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ii) Explain the process of using a multimeter when checking resistance of an engine management coolant sensor. (4 marks)

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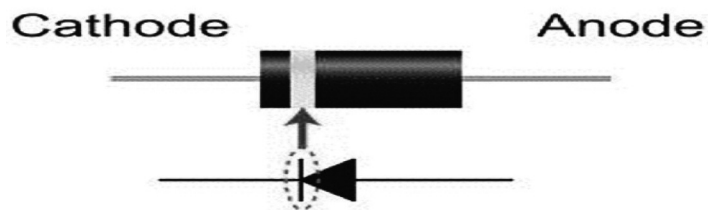
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c) i) Identify the electrical component in Figure 3. (1 mark)



Source: <https://www.khanacademy.org>

Figure 3

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ii) State why the component in Figure 3 is used in an electrical circuit. (2 marks)

10 a) State why manufacturers use a twisted pair in multiplex wiring. (1 mark)

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b) i) State the difference between numeric and alphanumeric coding. (2 marks)

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ii) Describe the purpose of a microprocessor in an engine electronic control unit. (3 marks)

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c) Explain why multiplexing is used in vehicles. (2 marks)

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11 State **three** reasons why compression ignition engines are used in vehicles. (3 marks)

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