



**4292-530 JUNE 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 15 June 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) i) State **two** types of composite materials used in vehicle manufacturing. (2 marks)

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ii) State **two** types of metals that are classed as a 'hard metal'. (2 marks)

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b) Explain how and why elements are used to produce stainless steel. (4 marks)

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2 Describe what is meant by the following terms.

a) Annealing.

(2 marks)

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b) Quenching.

(2 marks)

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c) Explain why MIG welding is used in vehicle construction and repair.

(2 marks)

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3 a) i) State **two** different types of vehicle inspections. (2 marks)

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ii) Identify the equipment in Figure 1. (1 mark)



Source: <https://www.otctools.com/products>

Figure 1

b) Explain how beam setting equipment is used to check headlight alignment. (2 marks)

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4 a) State **three** health and safety legislations relating to vehicle inspections and servicing. (3 marks)

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b) State **two** types of information that can be downloaded from a manufacturers' website. (2 marks)

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c) Summarise the advantages of a garage electronic job recording system compared to a paper one. (2 marks)

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5 Explain why it is important for the information entered on job cards to be accurate. (2 marks)

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6 Explain what is meant by the term 'compression ratio'. (2 marks)

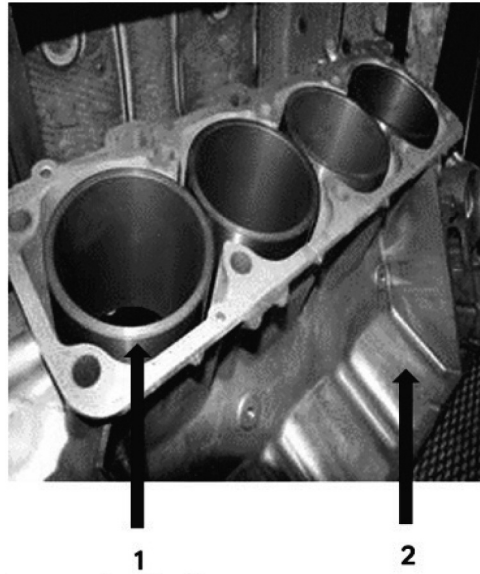
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7 a) i) Identify the **two** engine components arrowed 1 and 2 in Figure 2. (2 marks)



Source: <https://www.indiamart.com/proddetail/>

**Figure 2**

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ii) Explain why the component labelled 1, is used in an engine. (4 marks)

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b) State **three** reasons why a vehicle requires a transmission system.

(3 marks)

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c) Identify the component in Figure 3.

(1 mark)



Source: <http://pandnmotorrepairs.co.uk>

**Figure 3**

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8 a) Identify the braking component circled in Figure 4.

(2 marks)



Source: <https://www.smartdrivetest.com>

Figure 4

b) Explain what is meant by 'trail', with reference to steering, and how it effects the handling of a motorcycle.

(4 marks)

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c) State **two** types of wheel construction.

(2 marks)

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9 a) Name **two** devices used to protect components in an electrical circuit. (2 marks)

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b) Identify the electrical component in Figure 5. (2 marks)



Source: <http://cfnewsads.thomasnet.com>

**Figure 5**

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c) Explain the principles of how a capacitor operates in an electrical circuit. (3 marks)

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10 a) Explain why a gateway is used in a multiplexed vehicle system. (4 marks)

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b) State what is meant by a 'part multiplexed' vehicle. (2 marks)

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c) Define the following terms in computing. (1 mark)  
i) Hardware.

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ii) Software. (1 mark)

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d) Describe how a video card works in satellite navigation. (2 marks)

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11 State **three** pieces of equipment that are used to carry out electrical measurements on a coolant sensor in an engine management system. (3 marks)

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