4292-530 JUNE 2018

Level 3 Advanced Technical Certificate in the Automotive Industry

Level 3 Automotive Industry – Theory exam (1)

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)

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

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

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

![Figure 1](https://www.otctools.com/products)

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

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

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

c) Summarise the advantages of a garage electronic job recording system compared to a paper one. (2 marks)
5 Explain why it is important for the information entered on job cards to be accurate. (2 marks)

6 Explain what is meant by the term ‘compression ratio’. (2 marks)
7  a)  i)  Identify the **two** engine components arrowed 1 and 2 in Figure 2.  

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

Figure 2

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

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

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(3 marks)

c) Identify the component in Figure 3.  

(1 mark)
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)

c) State two types of wheel construction. (2 marks)
9  a) Name **two** devices used to protect components in an electrical circuit. (2 marks)

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


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

   ii) Software. (1 mark)


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


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)
12 Discuss the differences between single plate and multi-plate friction clutch assemblies. In your answer, consider the different applications, the co-efficient of friction, materials, operating principles and maintenance requirements. (12 marks)