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4292-522 MARCH 2022

Level 2 Technical Certificate in Automotive

Level 2 Automotive – Theory exam (1)

If provided, stick your candidate barcode label here.

Thursday 24 March 2022
09:30 – 11:30

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 additional answer sheets are used, enter the additional number of pages in this box. 
- Before taking the examination, **all candidates** must check that their barcode label is in the appropriate box. Incorrectly placed barcodes may cause delays in the marking process.
- Please ensure that you staple additional answer sheets to the **back** of this answer booklet, clearly labelling these 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, unless otherwise instructed.
- 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 examination and that I will not divulge to any person any information about the questions.**

You should have the following for this examination

- a pen with blue or black ink

General instructions

- Use black or blue ball-point pen.
- The marks for questions are shown in brackets.
- This examination contains 11 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.



1 a) State **two** reasons why it is important to act responsibly at work. (2 marks)

b) Explain **one** consequence to an employer, if an employee is asked to use a piece of mains pillar drill that has bare wires showing. (2 marks)

2 a) State **two** responsibilities of a master technician in a franchise dealership. (2 marks)

b) Summarise how automotive workshops will have to change the way they operate, to accommodate the repair and maintenance of electric vehicles. (2 marks)

- 3 a) i) Identify the engine component circled in Figure 1. (1 mark)



Image of engine component – Published Anonymously – tomorrowstechnician.com

Figure 1

- ii) State **two** checks that will need to be carried out on the component in Figure 1, during a service. (2 marks)

- b) State **one** source of information that can be used when carrying out vehicle servicing. (1 mark)

- 4 a) Explain how a worm and peg steering box allows the steered wheels to change direction due to driver input. (2 marks)

b) State **two** checks that must be carried out on the suspension component in Figure 2 when inspecting a motorcycle.

(2 marks)



Image of suspension component – Published Anonymously – ohlins.com

Figure 2

5 a) Explain how vented disc brakes help to reduce brake fade. (3 marks)

b) Identify the component in Figure 3. (1 mark)



Image of component – Published Anonymously – plazafleetparts.com

Figure 3

6 a) Explain why some heavy vehicles use a twin steered axle. (2 marks)

b) List **two** reasons why vehicles require a steering caster angle. (2 marks)

c) Identify the steering component circled in Figure 4. (1 mark)

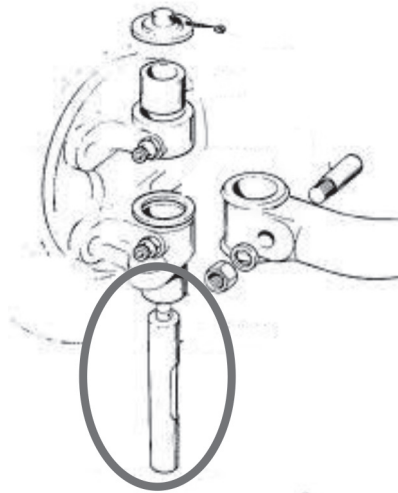


Image of steering component – Published Anonymously – plazafleetparts.com

Figure 4

- 7 a) Compare independent and non-independent suspension systems in relation to vehicle handling. (4 marks)

- b) State the **two** forces that are acting on a coil spring when a vehicle is travelling over an uneven road surface. (2 marks)

- c) Identify the type of rear axle in Figure 5. (1 mark)



Image of rear axle – Published Anonymously – alamy.com

Figure 5

8 a) i) List **two** reasons manufacturers fit engines in different locations on a vehicle. (2 marks)

ii) Explain the **two** effects on traction on the axles of a rear engine rear wheel drive vehicle. (4 marks)

b) State **two** reasons motorcycle manufacturers use spark ignition engines. (2 marks)

c) Explain why exhaust valve lead is used on a compression ignition engine. (2 marks)

d) State **one** statutory requirement that applies to manufacturers, when designing a new engine. (1 mark)

9 a) i) Explain why the correct procedure must be carried out when removing a HID (High Intensity Discharge) lamp. (3 marks)

ii) State **two** reasons why it is important to not touch the glass envelope of a Halogen lamp when it has just been removed, and requires refitting. (2 marks)

b) State how a multi-meter should be connected into the electrical circuit, when checking a window motor for amperage draw. (1 mark)

c) i) Identify the electronic component symbol in Figure 6. (1 mark)



Image of electronic component symbol – Published Anonymously – avnet.com

Figure 6

ii) State the purpose of the electronic component identified in 9c)i). (1 mark)

10 a) Describe the procedure for using the transmission tool in Figure 7. (2 marks)



Image of transmission tool – Published Anonymously – amazon.co.uk

Figure 7

b) Explain how a baulk ring (synchromesh cone) allows for a smooth gear change. (2 marks)

c) State which clutch fault would cause the engine speed to increase without the vehicle gaining road speed. (1 mark)

11 A vehicle has been brought into the workshop and requires a fully electrical power steering rack to be removed and replaced.

Explain how the steering rack replacement should be carried out safely and recommend which checks and adjustments should be completed before road testing the vehicle.

(9 marks)
