



4292-522 MARCH 2019
Level 2 Technical Certificate in Automotive
 Level 2 Automotive – Theory Exam (1)

If provided, stick your candidate barcode label here.

Thursday 14 March 2019
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
- a non-programmable calculator

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 13 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** ways to reduce accidents in the workplace. (2 marks)

b) Explain the **main** safety precautions that should be taken when working on a high voltage hybrid vehicle electrical system. (4 marks)

2 State **two** reasons why an employer may terminate an employee's contract of employment. (2 marks)

- 3 Describe the function and state the advantage of using the measuring equipment shown in Figure 1. (2 marks)



Source: <http://www.lasertools.co.uk>

Figure 1

- 4 Name **two** sources of vehicle information which could be used when carrying out a vehicle service. (2 marks)

- 5 Compare the different processes between static and dynamic wheel balancing. (2 marks)

6 State what is meant by the following battery terminology.

a) CCA.

(1 mark)

b) Ah.

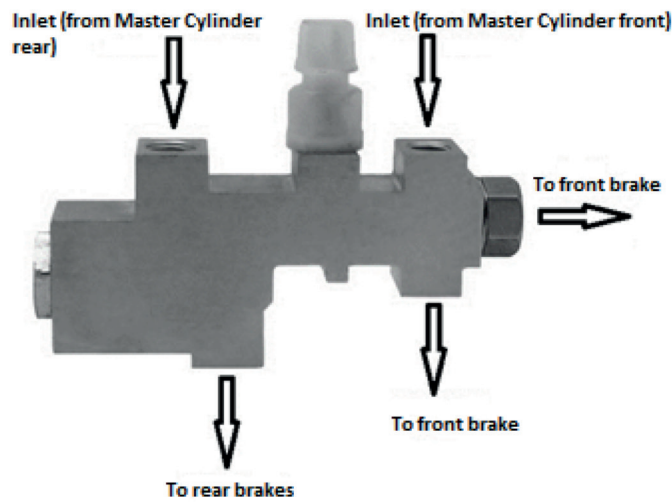
(1 mark)

7 a) Explain how wheel lock up on an electronically controlled ABS system is prevented to maintain vehicle control when braking quickly.

(3 marks)

b) State the purpose of the braking component in Figure 2.

(2 marks)



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

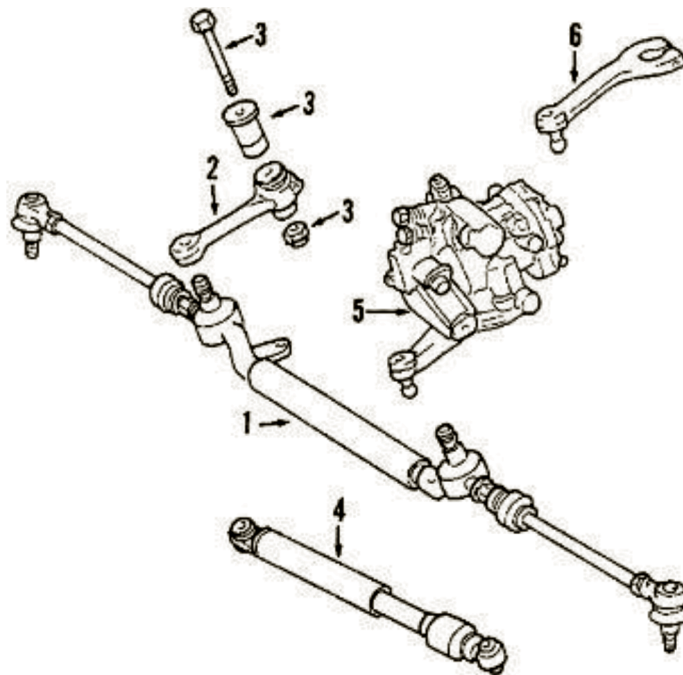
Figure 2

8 a) Compare the difference in the design characteristics between a single and a divided track rod steering system.

(3 marks)

b) Identify the steering components numbered 2 and 6 in Figure 3.

(2 marks)



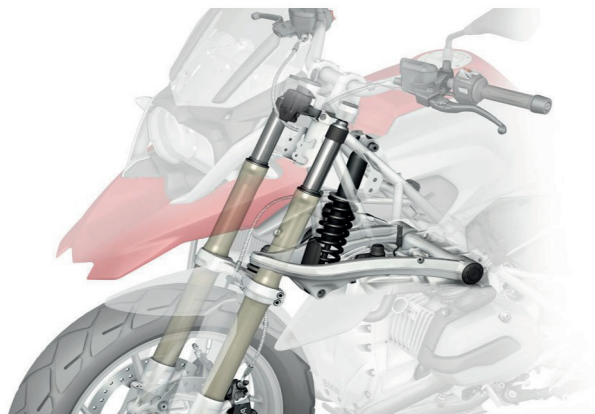
Source: <http://www.benzworld.org>

Figure 3

- 9 a) A vehicle with a mass of 1000 kg produces a total brake force of 250 kN. Calculate the overall braking efficiency. Show formula and working out. (3 marks)

- b) State **two** functions of a vehicles suspension system. (2 marks)

- c) Identify the type of suspension system fitted to the motorcycle in Figure 4. (1 mark)



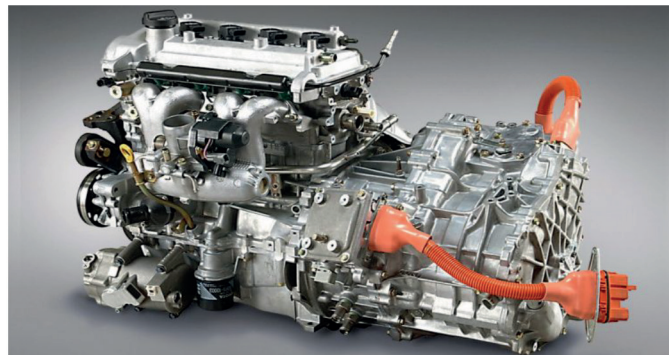
Source: <http://blog.motorcycle.com>

Figure 4

10 a) State **two** reasons why engines are fitted in different locations. (2 marks)

b) Explain why a manufacturer would use an underslung engine on a motorcycle. (3 marks)

c) Identify the type of light vehicle the engine configuration in Figure 5 is used in. (1 mark)



Source: <http://blog.toyota.co.uk>

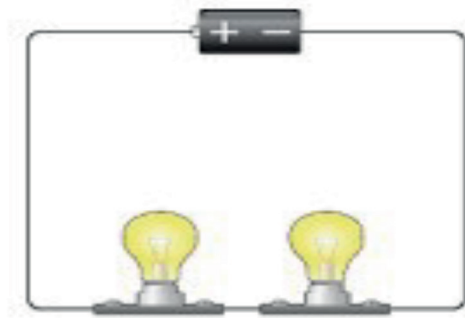
Figure 5

d) Explain the operation of a turbocharger. (3 marks)

e) State **two** statutory requirements that apply to engine design or operation. (2 marks)

11 a) State **two** precautions to be aware of when working with vehicle electrical circuits. (2 marks)

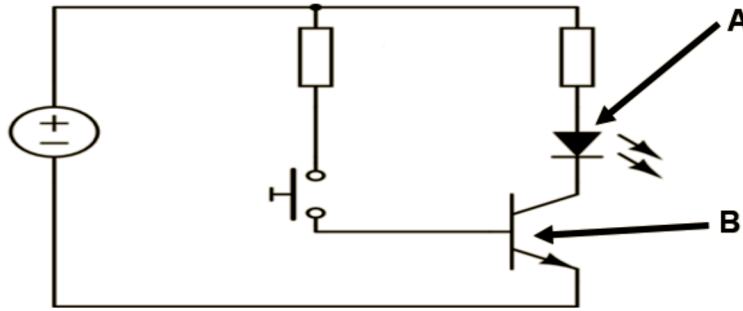
b) Figure 7 shows a circuit with two bulbs. One bulb has failed and as a result of this, the second will not light up. Explain the reason why. (2 marks)



Source: <http://www.bbc.co.uk/bitesize/ks3/science>

Figure 7

- c) Identify the **two** electrical circuit symbols arrowed A and B in Figure 8. (2 marks)



Source: www.pinterest.co.uk

Figure 8

- d) Using Ohms Law, calculate and identify the missing value of an electrical circuit, of a 24 volt system, with a resistance of 10 ohms. (2 marks)

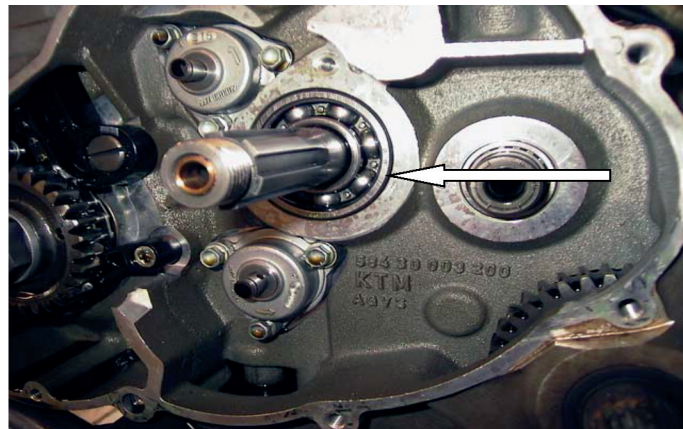
- 12 a) Explain how the measuring equipment in Figure 9 is used to check a gearbox input shaft run out, when removed from a gearbox. (3 marks)



Source: www.ebay.co.uk

Figure 9

- b) Identify the bearing type as indicated by the arrow in Figure 10 and state why it is used in this application. (2 marks)



Source: www.ktmlc4transmissionbearingupgrade

Figure 10
