



**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)

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

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

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- 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**

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

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

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6 State what is meant by the following battery terminology.

a) CCA.

(1 mark)

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b) Ah.

(1 mark)

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

(3 marks)

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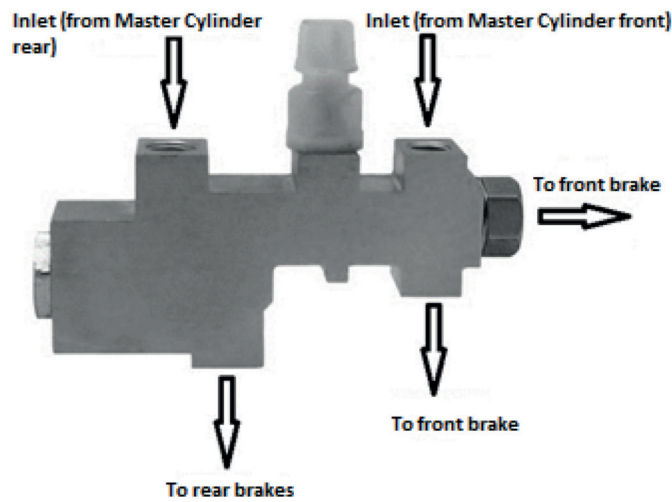
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b) State the purpose of the braking component in Figure 2.

(2 marks)



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

**Figure 2**

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

(3 marks)

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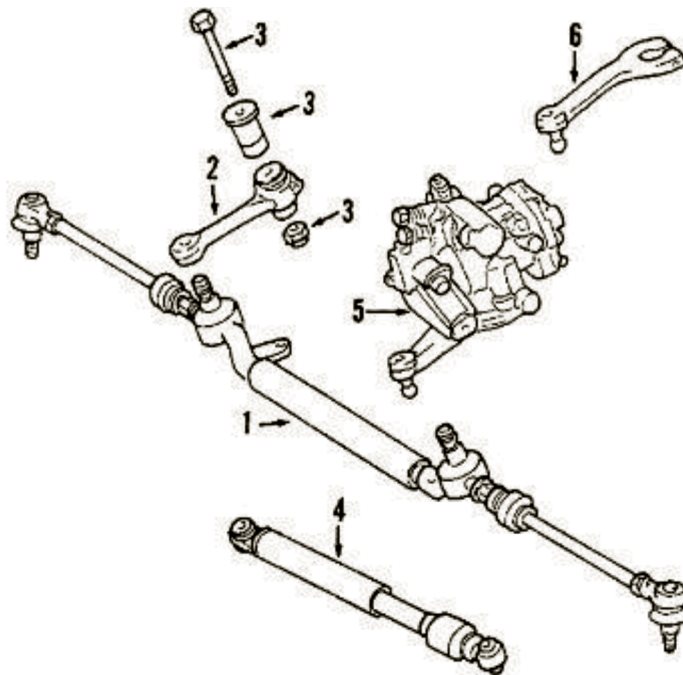
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b) Identify the steering components numbered 2 and 6 in Figure 3.

(2 marks)



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

**Figure 3**

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- 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)

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

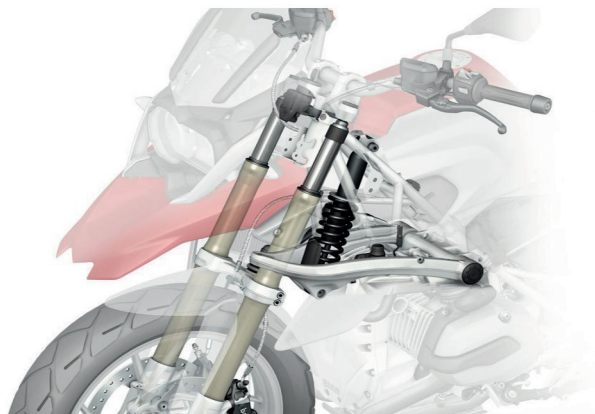
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- c) Identify the type of suspension system fitted to the motorcycle in Figure 4. (1 mark)



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

**Figure 4**

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

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

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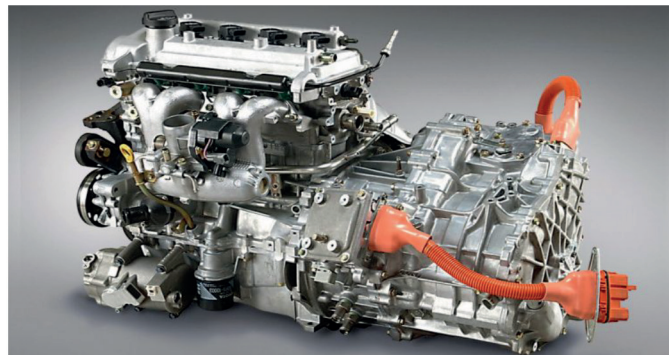
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c) Identify the type of light vehicle the engine configuration in Figure 5 is used in. (1 mark)



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

**Figure 5**

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

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

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

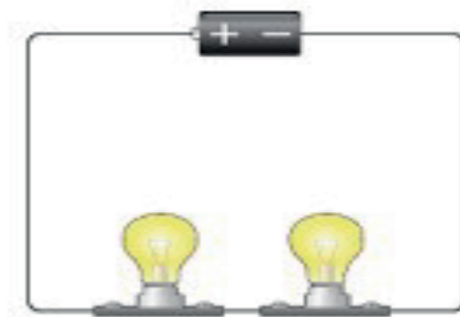
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b) Figure 7 shows a circuit with two bulbs. One bulb has failed and as a result of this, the second will not light up. Explain the reason why. (2 marks)



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

**Figure 7**

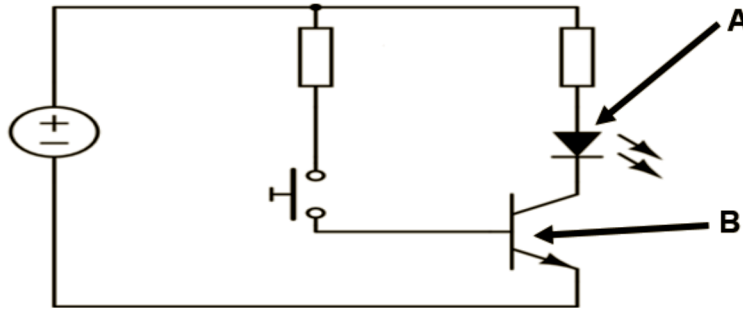
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- c) Identify the **two** electrical circuit symbols arrowed A and B in Figure 8. (2 marks)



Source: www.pinterest.co.uk

**Figure 8**

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- 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)

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- 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**

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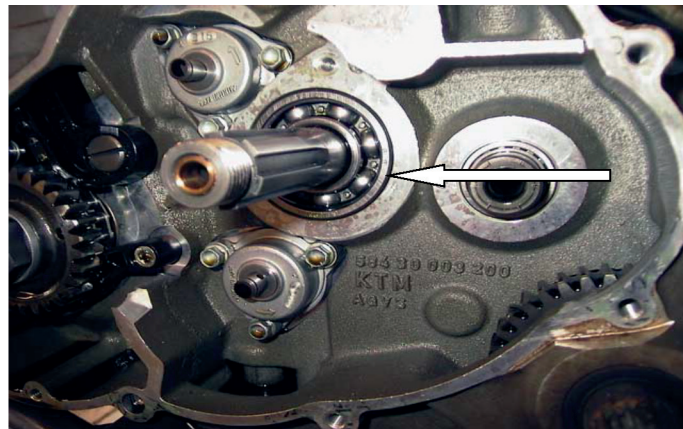
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- b) Identify the bearing type as indicated by the arrow in Figure 10 and state why it is used in this application. (2 marks)



Source: www.ktmlc4transmissionbearingupgrade

**Figure 10**

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