4292-530 MARCH 2019
Level 3 Technicals in the Automotive Industry
Level 3 Automotive Industry – Theory Exam (1)

Friday 15 March 2019
09:30 – 12:00

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 19 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.

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ST00055161 A4 PO4500139847 10408153
1. a) Explain the meaning of the term ‘Thermosetting plastic’.  

b) Name two types of thermosetting plastic materials.

2. Describe how a laminated glass screen is constructed.

3. a) Explain the advantages of using carbon fibre in vehicle suspension construction compared to using mild steel.

b) State the melting point of
   i) cast iron 
   ii) mild steel.
4. Name the **two** types of gas shielded arc-welding processes used in vehicle construction or repair. (2 marks)

5. Identify the test equipment in Figure 1. (2 marks)

![Source: www.eurocarparts.com](image)

**Figure 1**

6. State **four** legislative requirements (Regulations) that apply to personal safety when in the workplace. (4 marks)

7. Name **two** UK legal requirements that apply to vehicles operating on the public highway. (2 marks)
8 Explain the method used to carry out systematic inspections on a light vehicle hydraulic steering system and components. (6 marks)
9 a) Identify the component in Figure 2. (1 mark)

b) Name the component parts labelled

i) A (1 mark)

ii) B (1 mark)

iii) C. (1 mark)
10  a) Explain the term ‘Compression ratio’. (3 marks)

b) Calculate the compression ratio using the following data: swept volume 450 cm$^3$ and a clearance volume of 55 cm$^3$.

Show working out and formula. Give answer to 2 decimal points. (3 marks)
11 Identify and explain the purpose of items labelled A-D in Figure 3. (8 marks)

Source: www.superformance.co.uk

Figure 3
12 Identify the component in Figure 4 and state its purpose. (2 marks)

Source: www.rimmerbros.co.uk

Figure 4
13  

a) Name the component represented by the symbol in Figure 5.  

(1 mark)

Source: http://ecetutorials.com

Figure 5

b) Explain the **main** functions of the component named in 13a.  

(2 marks)

c) Identify the component represented by the symbol in Figure 6 and state its function.  

(2 marks)

Source: https://commons.wikimedia.org

Figure 6
14 Differentiate between ‘RAM’ and ‘ROM’ in regards to computers. (5 marks)

15 a) State the formula for calculating Current flow using Ohms Law. (1 mark)

b) State the formula for calculating Watts using Ohms Law. (1 mark)

16 Name **three** different types of circuit protection used in vehicle electrical systems. (3 marks)

17 Resistances of the following values are connected in Series – 2 Ohms, 3 Ohms and 6 Ohms.

Calculate the total resistance in a 12 Volt circuit. (Show the formula used) (2 marks)

18 Name **three** different types of computer programming language. (3 marks)
19 Discuss the differences between manual and automatic selection gearboxes. In your answer, consider the different applications, operating principles, design and maintenance requirements. (12 marks)