4292-530 MARCH 2018
Level 3 Advanced Technical Certificate in the Automotive Industry
Level 3 Automotive Industry – Theory Exam (1)

If provided, stick your candidate barcode label here.

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) State two non-ferrous metals used in the automotive industry.  

b) Name two engine components that use non-ferrous metals in their construction.  

2 a) Explain why manufacturers use non-ferrous metals in vehicle electrical systems.  

c) i) State where on a vehicle engine, non-threaded mechanical fixings would be found.  

ii) Name two different types of adhesive used in the construction or manufacture of vehicles.
3 a) Describe the purpose of the following types of vehicle maintenance procedures.
  i) Safety inspections.  (2 marks)

  ii) Manufacturer servicing.  (2 marks)

b) Explain the correct method for carrying out a full safety inspection on a rear disc brake assembly to manufacturer's specification.  (4 marks)

c) State two pieces of legislation that is used to protect employees in the work place.  (2 marks)

4 State two sources of technical information available to technicians when servicing vehicle.  (2 marks)
5. Explain why it is important to follow a manufacturer’s servicing schedule on a new vehicle. (2 marks)

6. Explain the purpose of a beam axle in a vehicle. (2 marks)

7. a) Explain the potential hazards when working with high voltage electrical circuits on a vehicle. (4 marks)

    b) State the three terms relating to engine valve timing during the combustion process. (3 marks)
c) i) Identify the parts arrowed 1 and 2 in component in Figure 1. (2 marks)

Source: http://www.solat.cn

![Figure 1](http://www.solat.cn)

ii) Explain the operational principle of how the component in Figure 1 is used in an ignition system to produce a high voltage spark. (4 marks)
8  a) Identify the transmission assembly in Figure 2.  (1 mark)

b) Identify the components numbered 8 in Figure 2.  (1 mark)
9  

a) Describe what is meant by the electrical term (EMF) electromotive force.  

b)  

i) State two measurements that can be read from an oscilloscope display to diagnose vehicle electrical faults.  

ii) Explain the process of using a multimeter when checking resistance of an engine management coolant sensor.  


c)  

i) Identify the electrical component in Figure 3.  

ii) State why the component in Figure 3 is used in an electrical circuit.
10  a) State why manufacturers use a twisted pair in multiplex wiring.  

b) i) State the difference between numeric and alphanumeric coding.  

ii) Describe the purpose of a microprocessor in an engine electronic control unit.  

c) Explain why multiplexing is used in vehicles.  

11 State three reasons why compression ignition engines are used in vehicles.
12 Analyse the design considerations in a 2 stroke naturally aspirated spark ignition engine compared to a similar 4 stroke engine. Take materials, operating principles, emission regulations and servicing requirements into account in your answer. (12 marks)