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1145-520 MARCH 2022
Level 2 Technical Certificate in Engineering
Level 2 Engineering – Theory exam

If provided, stick your candidate barcode label here.

Wednesday 2 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. ➡ 0 0
- 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 non-programmable scientific calculator

General instructions
- Use black or blue ballpoint pen. Use pencil for drawing only.
- Any pencil drawings **must** be bold and clear for scanning purposes.
- The marks for questions are shown in brackets.
- Answer **all** questions.
- Write **all** of your working out and answers in this booklet.
- Answer the questions in the spaces provided.
- Answers written in margins or on blank pages **cannot** be marked.
- Cross through any work you do **not** want to be marked.

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1 State the meaning of **each** of the following colours of safety sign:

a) blue (1 mark)

b) green (1 mark)

c) yellow/amber. (1 mark)

2 a) Quality checks can be carried out for a number of different purposes, such as checking functionality.
State **two** purposes for carrying out quality checks other than checking functionality. (2 marks)

b) Describe what is meant by the 'visual inspection' of a component. (2 marks)

See next page

3 Describe **one** method of desoldering a component from an electrical circuit board. (3 marks)

4 a) State the meaning of the mechanical symbol shown in Figure 1. (1 mark)

Figure 1

b) Identify the electrical components represented by the symbols in Figure 2 and Figure 3.

i) (1 mark)

Figure 2

ii) (1 mark)

Figure 3

See next page

5 a) State **two** types of standards. (2 marks)

b) Explain why standards are used by engineering businesses. (3 marks)

6 Explain **two** characteristics of 'just in time' manufacturing. (4 marks)

7 A company needs to manufacture a one-off template, as shown in Figure 4.
The template will be used for accurately drilling holes in car parts on a factory production line.

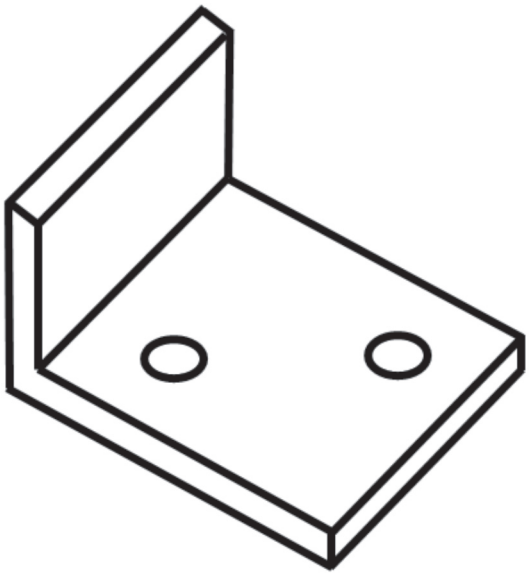


Figure 4

Suggest a suitable named material to make the template, giving reasons for your suggestions. Describe how the template will be made. (6 marks)

8 a) Describe what is meant by the term 'latent heat'. (2 marks)

b) Describe **one** example of a class three lever. You may use notes and sketches in your answer. (4 marks)

c) Define Ohm's law. (1 mark)

See next page

9 a) Describe the difference between ferrous and a non-ferrous metal. (2 marks)

b) Explain how tempering affects the properties of a metal. (4 marks)

10 a) Solve the following equation:
$2x + 6 = 12$

Show your method. (2 marks)

b) Figure 5 shows a shape that has been marked onto a piece of material for cutting.
Calculate the area of the shape. (5 marks)

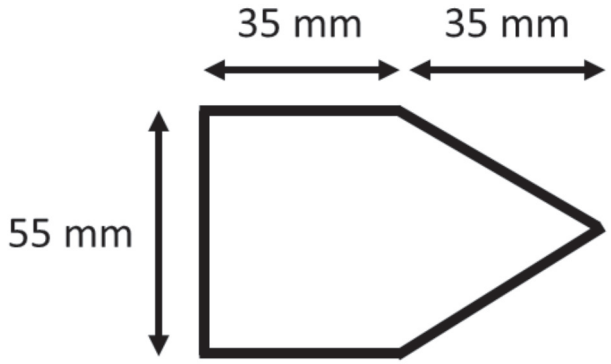
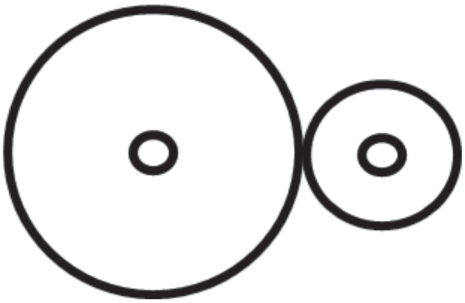


Figure 5 – NOT TO SCALE

See next page

11 a) Figure 6 shows a gear train.



Driver gear
60 teeth

Driven gear
20 teeth

Figure 6

Calculate the gear ratio of the gear train. (2 marks)

b) State **one** reason for using a gear train. (1 mark)

12 One example of how safety influences the activities of an engineering business is the use of signage.

Other than signage, discuss how safety influences the activities of an engineering business. (9 marks)

End of examination