



1145-520 MARCH 2018

Level 2 Technical Certificate in Engineering (360)

If provided, stick your candidate barcode label here.

**Friday 2 March 2018
13:30 – 15:30**

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 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 examination

- non-programmable scientific calculator



1 a) Name **two** pieces of health and safety legislation that apply in an engineering workplace. (2 marks)

b) Other than Health and Safety, state **three** things that should be considered when planning an activity in an engineering workshop. (3 marks)

(Total marks 5)

2 a) State the purpose of a surface plate when marking out a component. (1 mark)

b) Name **two** tools that can be used to tighten a nut onto a bolt. (2 marks)

(Total marks 3)

3 State **two** types of defect or quality issues in a machined part that can be identified by a visual inspection. (2 marks)

(Total marks 2)

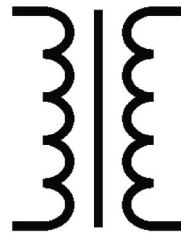
- 4 a) State the meaning of the following symbol on a drawing of a mechanical component. (1 mark)



- b) State the meaning of the following Geometric Dimensioning and Tolerancing symbol. (1 mark)



- c) Identify the electrical component represented by the following symbol. (1 mark)



(Total marks 3)

5 a) Describe how a Gantt chart is used in an engineering business. (2 marks)

b) A small, local engineering company has been bought by a large multinational company. It will continue with its current manufacturing activities, but now work as a division of the large company. Explain how this may change how the local company is organised. (3 marks)

(Total marks 5)

6 Explain **one** benefit and **one** limitation of using a general assembly drawing when manufacturing a product. (4 marks)

(Total marks 4)

- 7 A company needs to manufacture a one-off replacement part for an inspection cover. This cover is part of the hull for a speedboat. It will be attached to the hull using bolts. The part design is shown in Figure 1. The maximum dimensions of the part are 300 mm x 200 mm, with a thickness of 6 mm. This will be made as a one-off using a material chosen by the company.

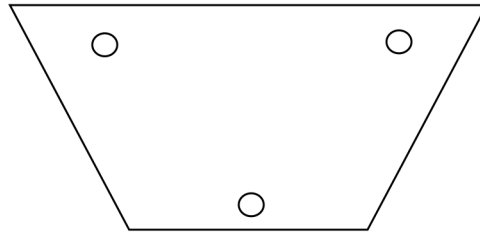


Figure 1

Suggest a suitable material to make the part. Give reasons for your suggestion and describe how the part will be made.

(6 marks)

(Total marks 6)

8 a) State the definition of the scientific term 'force'. (1 mark)

b) State the mechanical property that means the ability of a material to be deformed without rupturing. (1 mark)

c) State the mechanical property that means the ability of a material to resist wear, abrasion and scratches. (1 mark)

d) Name **two** types of corrosion that occur in engineering materials. (2 marks)

(Total marks 5)



- 9 a) For **each** of the following types of mechanical testing, state the material property that it measures.

Complete the table below with your responses.

(4 marks)

Mechanical test	Property measured
Brinell	
Charpy	
Wohler	
Tensile	

- b) Explain how annealing changes the properties of a metal.

(4 marks)

(Total marks 8)



10 a) The following part needs to be marked out:

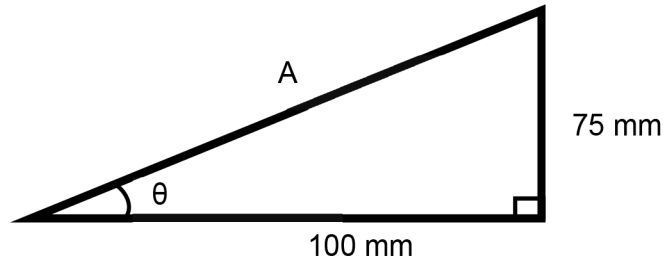


Figure 2 – NOT TO SCALE

Calculate the length of side A

(2 marks)

b) Solve x and y in the following simultaneous equations.

$$x + 4y = 26$$

$$2x + 3y = 27$$

(4 marks)

(Total marks 6)

11 Figure 3 shows two resistors arranged in parallel.

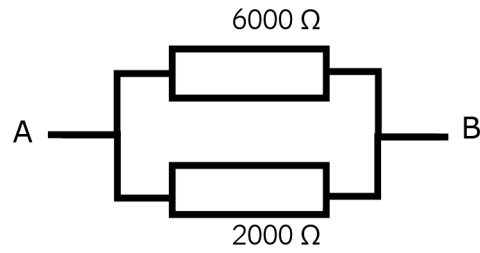


Figure 3

You may find the following formula useful: $1 / R_T = 1 / R_1 + 1 / R_2$

a) Calculate the total resistance offered by this arrangement.

(2 marks)

b) The current in the circuit was measured as 0.006 amps.
Calculate the voltage between A and B.

(2 marks)

(Total marks 4)

12 Discuss how the number of products to be made influences the design and manufacture of a product.

(9 marks)
