Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
3	
4	
5	
6	
7	
8	
TOTAL	

AQA

General Certificate of Secondary Education
Specimen Paper

Engineering XXXX/W

Unit 3: Written Paper

Date: Time

For this paper you must have:
- a pen, a pencil, a ruler, an eraser, a pencil sharpener and coloured pencils.

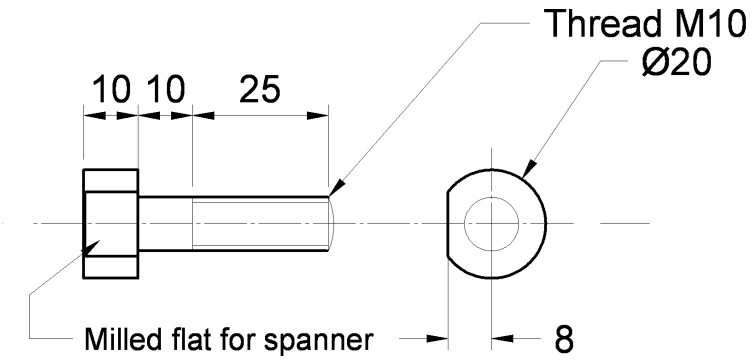
Time allowed: 1 Hour

Instructions
- Use black ink or ball - point pen. Use pencil only for drawing.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- Answer the questions in the space provided.
- Do all rough work in this book. Cross through any work you do not want to be marked.
- Show the working of your calculations.

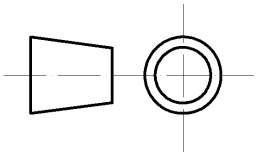
Information
- The maximum mark for this paper is 75.
- The marks for questions are shown in brackets.
- You are reminded of the need for good English and clear presentation in your answers. Quality of Written Communication will be assessed in question 7 (c) and in question 9.

Answer all questions in the spaces provided.

Question 1



Notes: Drawing not to scale
Material: Brass
All dimensions plus or minus 0.05mm



1 (a) State the two items of equipment which would be used in a machine shop to manufacture a batch of 100 of the bolts specified in the drawing on page 2.

Item 1 ……

Explain how the equipment would be used in manufacture.

…….

…….

…….

…….

Item 2 ……

Explain how the equipment would be used in manufacture.

……..

……..

……..

……

(6 marks)

Question 1 continues on the next page

1 (b) Explain how the following quality aspects would be achieved when manufacturing the bolt.

1 (b) (i) dimensional accuracy within tolerance.

……

……

……

……

(2 marks)

1 (b) (ii) good surface finish

……

……

……

……

(2 marks)

1 (c) Identify two health and safety hazards which would have to be considered when manufacturing the bolt.

1 (c) (i) Hazard 1 ……..

Method of controlling the risk of injury posed by the issue

……

……

……

(2 marks)

1 (c) (ii) Hazard 2 ……..

Method of controlling the risk of injury posed by the issue

……

……

……

(2 marks)

Question 2

2 Draw a flow chart in the space below to show how the flat on the bolt in question 1 would be machined. Use standard flow chart symbols and include a method for checking how this meets the final dimensions.

(8 marks for correct flow shown)
(2 marks for symbols)

10

Barcode

Question 3

3 (a) Engineering components which are manufactured from low carbon (mild) steel need a protective coating to prevent them from corroding. Describe one way of achieving this.

3 (a) (i) Method ……..

(1 mark)

3 (a) (ii) Describe the steps in the process.

……

……

……

……

(2 marks)

3 (a) (iii) State **one** advantage of the method you have described.

……

……

(1 mark)

5

Question 4

4 A torch contains the following components:
a battery, a switch, connecting wires, and a Light Emitting Diode (LED).

Draw a circuit diagram showing the torch circuit.

(2 marks for circuit)
(3 marks for symbols)
(1 mark for quality of drawing)

6

Barcode

Question 5

5 (a) Give **two** advantages of a CNC lathe when manufacturing batches of circular components.

Advantage 1 …….

…….

……

Advantage 2 …….

…….

……

(4 marks)

5 (b) State the difference between a CNC lathe and a CNC machining centre.

……..

……..

……..

……..

(2 marks)

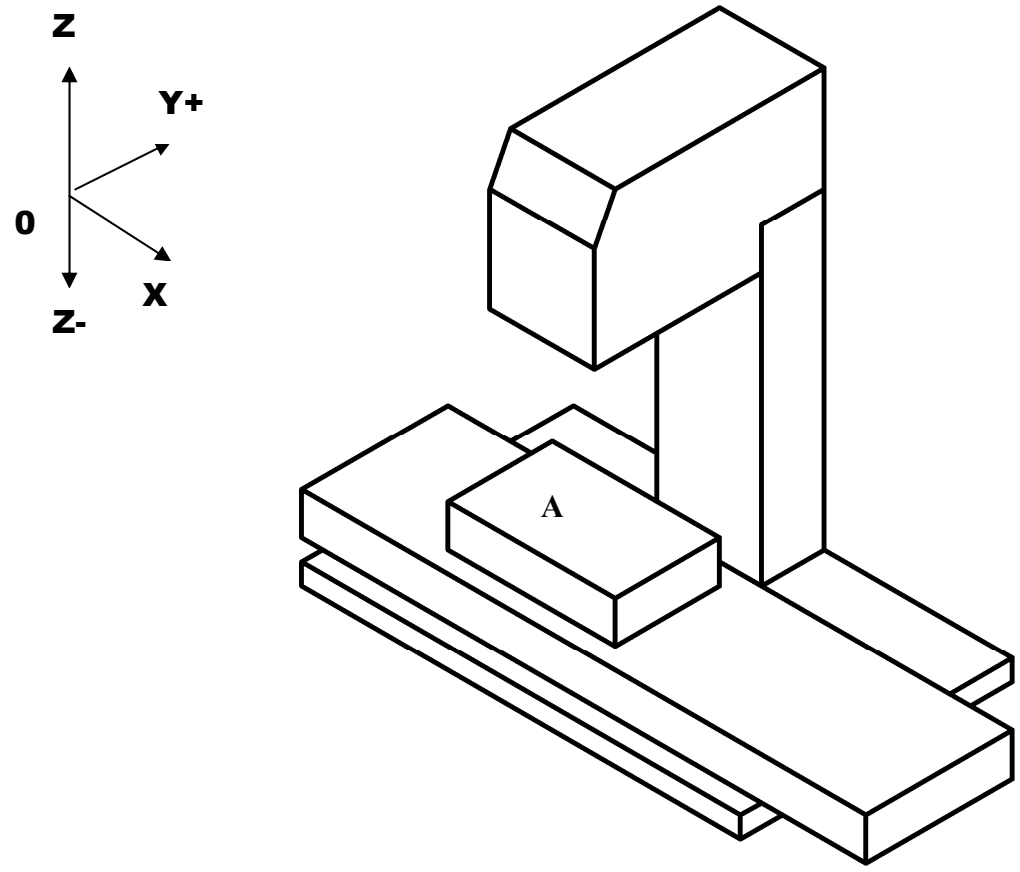
6

There are no questions printed on this page

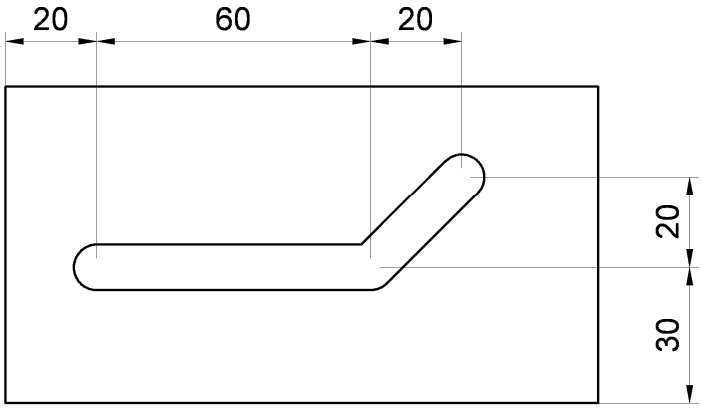
Barcode

Question 6

The diagram below shows the arrangement of a CNC milling machine, and its three axes.



The block of material to be machined is shown as **A** in the diagram above.
Complete the table on the page opposite to work out the coordinates to which the cutter needs to go to *start* cutting, **and** the coordinates to which it needs to go to *finish* the cut.



Origin 0,0,0

Plan view of block
Slot to be cut to 6mm depth

Operation	x co-ordinate	y co-ordinate	z co-ordinate
Move to start	+20	+30	**+15**
Plunge to depth	+20		**-6**
Move to:		+30	**-6**
Move to:			
Lift		+50	**+15**
Return to origin	**0**	**0**	**0**

(1 mark for each missing value)
(6 marks)

6

Turn over ►

Question 7

The motor manufacturing industry uses Computer Integrated Manufacture (CIM) to enable it to make individual cars on a production line.

7 (a) Robots are used in sub-assemblies when making cars. Describe why robotic systems are used to make these sub-assemblies. You must give **three** examples in your answer.

Example 1……..

…….

…….

Example 2……..

…….

…….

Example 3……..

…….

…….

(6 marks)

7 (b) Explain briefly the difference between Computer Aided Manufacture and Computer Integrated Manufacture.

……..

……..

……..

……..

……..

……..

(3 marks)

(c) Explain how Computer Integrated Manufacture is used to manufacture cars of *different specification* on the *same* production line.

…….

…….

…….

…….

…….

…….

……..

……..

(4 marks)

13

Barcode

Question 8

8 (a) (i) Name one product which has a microcontroller within it.

……..

……..

(1 mark)

8 (a) (ii) Explain briefly why the microcontroller is used.

……

……

……

……

……

……

(3 marks)

8 (b) Explain how the development of electronic components has impacted upon the design of manufactured products.

……

……

……

……

……

……

(3 marks)

7

Question 9

9 (a) The increasing use of plastics for manufactured products is a current environmental problem. Explain the waste disposal issues that this causes.

……

……

……

……

……

……

……

……

(4 marks)

9 (b) Describe in detail how applying one aspect of modern technology will help to limit damage to the environment.

……

……

……

……

……

……

……

……

(4 marks)

8

END OF QUESTIONS

Barcode