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Surname

Other names

Pearson
Edexcel GCE

Centre Number

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Candidate Number

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Design and Technology

Product Design: Resistant Materials Technology
Advanced Subsidiary

Unit 2: Design and Technology in Practice

Monday 23 May 2016 – Morning

Time: 1 hour 30 minutes

Paper Reference

6RM02/01

You do not need any other materials.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- If pencil is used for diagrams/sketches it must be dark (HB or B). Coloured pens, pencils and highlighter pens must **not** be used.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
– *there may be more space than you need.*

Information

- The total mark for this paper is 70.
- The marks for **each** question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed
– *you should take particular care on these questions with your spelling, punctuation and grammar, as well as the clarity of expression.*

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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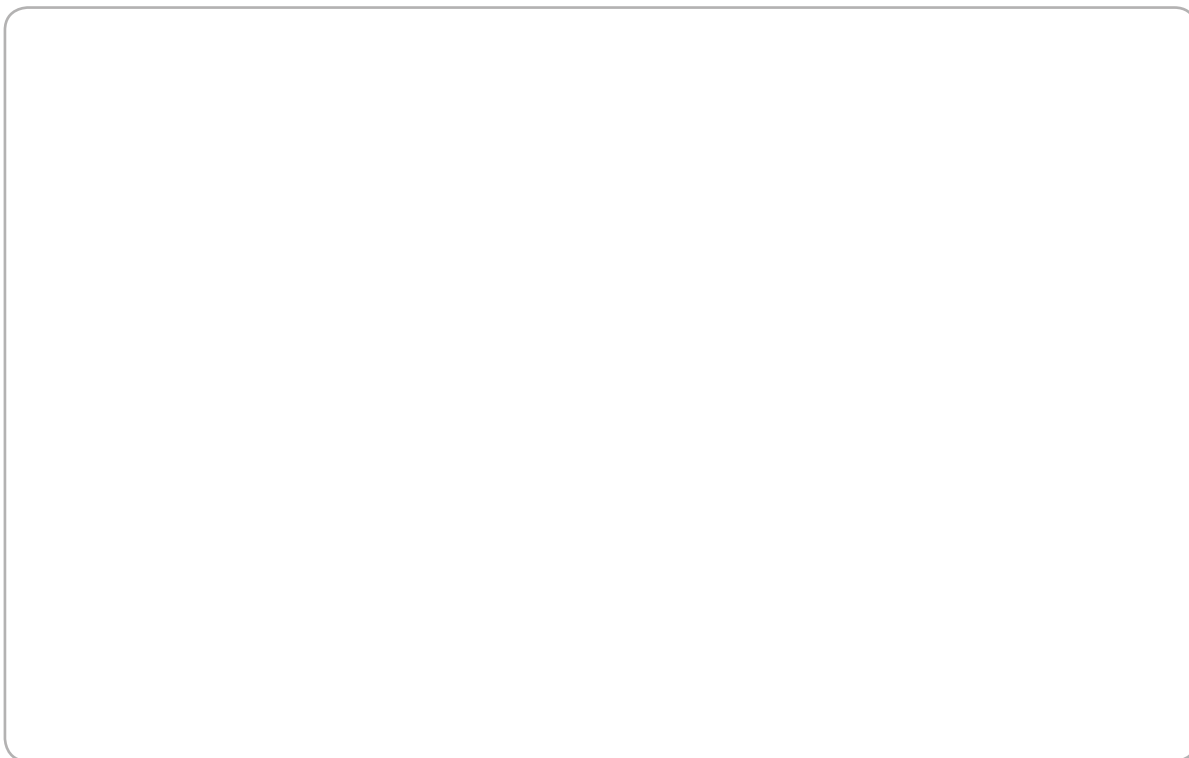


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Answer ALL the questions. Write your answers in the spaces provided.

- 1 (a) Draw a diagram showing the structural composition of thermosetting plastic.

(2)



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(b) Figure 1 shows an image of some disposable cutlery manufactured from polystyrene.



Figure 1

Polystyrene was selected for the disposable cutlery as it is lightweight and available in a range of colours.

State **six** further characteristics of polystyrene that make it a suitable material for disposable cutlery.

(6)

1

2

3

4

5

6

(Total for Question 1 = 8 marks)



2 Figure 2 shows an image of a simple gear train.



Figure 2

(a) Name the type of gears used in a simple gear train. (1)

(b) In the box below draw the graphical symbol for a compound gear train. (2)

(c) Explain **one** advantage a compound gear train has over a simple gear train. (2)



(d) Figure 3 shows a drill with its chuck mounted at a 90° angle to the motor in the body.



Figure 3

In the box below draw and name the type of gears used in the drill to transmit motion through 90°.

(2)

Name

(Total for Question 2 = 7 marks)



3 Figure 4 shows an engineer's bench vice.



Figure 4

(a) Name a suitable material for manufacturing the body of the vice shown.

(1)

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(b) Steel railings can be galvanised by coating them in a layer of zinc.

Apart from aesthetics, give **one** advantage and **one** disadvantage of coating steel railings in zinc.

(2)

Advantage

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Disadvantage

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(c) Explain **three** mechanical properties of copper that make it suitable for electrical wire.

(6)

1

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2

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(d) Describe the effects of work hardening on copper.

(2)

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(Total for Question 3 = 11 marks)



4 (a) Timber is usually seasoned before use.

Outline the advantages of kiln seasoning over natural seasoning.

(5)

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(b) A school student selects pine rather than beech to manufacture a product, partly because pine costs less and has good aesthetics.

Justify **two** further reasons for selecting pine, in preference to beech, to manufacture the product.

(4)

1

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2

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(Total for Question 4 = 9 marks)



5 Computer-aided design (CAD) and computer-aided manufacture (CAM) are used extensively in the design and development of products.

(a) Describe **three** health and safety risks, and the subsequent control measures needed, when working at a computer for an extended period of time.

(6)

1 Risk

Control measure

2 Risk

Control measure

3 Risk

Control measure



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*(b) Many businesses manufacture models of designs using rapid prototype machines rather than traditional modelling methods.

Explain the advantages for a business of using rapid prototype machines when modelling designs.

(8)

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(Total for Question 5 = 14 marks)



- 6 Figure 5 shows a tank used for the storage of oil. The tank was manufactured using the rotational moulding process.



Figure 5

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PLEASE USE THE SPACES OPPOSITE FOR YOUR RESPONSE.**

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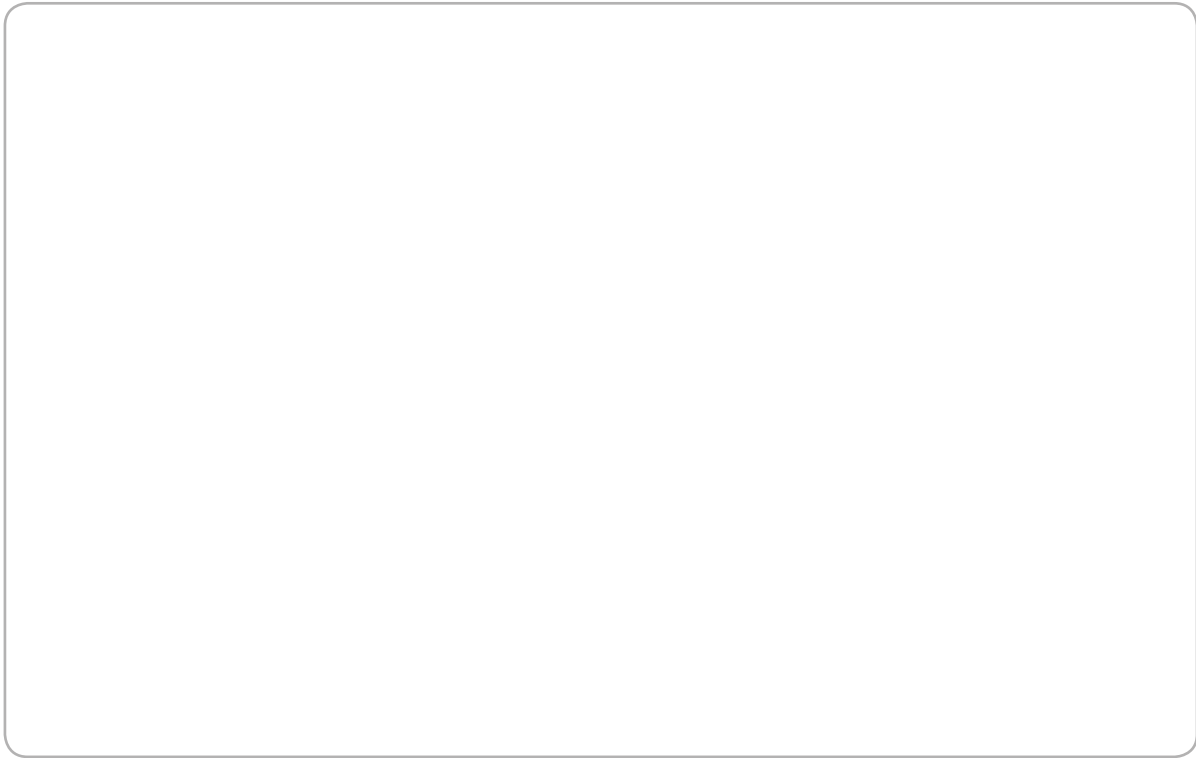
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(a) Using notes and/or sketches, describe the rotational moulding process.

(7)



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(b) Outline the advantages of rotational moulding over injection moulding.

(4)

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(Total for Question 6 = 11 marks)

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*7 The use of total quality management (TQM) strategies affects many areas within a business.

Evaluate the impact on employees of using total quality management (TQM) strategies.

(10)

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(Total for Question 7 = 10 marks)

TOTAL FOR PAPER = 70 MARKS

