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Candidate surname	Other names
Pearson BTEC Level 1/Level 2 First Award	Centre Number <input style="width: 20px; height: 20px;" type="text"/> <input style="width: 20px; height: 20px;" type="text"/> <input style="width: 20px; height: 20px;" type="text"/> <input style="width: 20px; height: 20px;" type="text"/> <input style="width: 20px; height: 20px;" type="text"/> <input style="width: 20px; height: 20px;" type="text"/> <input style="width: 20px; height: 20px;" type="text"/>
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<h2 style="margin: 0;">Tuesday 15 January 2019</h2>	
Morning (Time: 1 hour)	Paper Reference 20573G
<h1 style="margin: 0;">Engineering</h1> <h2 style="margin: 0;">Unit 38: Materials Used in Engineered Products</h2>	
You do not need any other materials.	Total Marks <input style="width: 50px; height: 30px;" type="text"/>

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and learner registration 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 50.
- The marks for **each** question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*

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

Some questions must be answered with a cross in a box ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

1 The materials used in the manufacture of engineered products are chosen because of their specific properties or characteristics.

(a) Name **one** example of a ferrous material.

(1)

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.....

(b) Identify **two** characteristics of metals.

(2)

- A crystal growth
- B monomer
- C fibre alignment
- D grain structure
- E translucence

(c) Name **two** examples of composite materials.

(2)

1

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2

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(d) Identify **two** examples of chemical and durability properties.

(2)

- A melting point
- B corrosion resistance
- C Young's modulus
- D refractive index
- E wear resistance

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'How much mass a material has in a given space' is a definition of a physical material property.

(e) Name the property.

(1)

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(Total for Question 1 = 8 marks)

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2 (a) Engineering materials are processed as part of their life cycle.

Identify **one** factor that is considered when processing raw materials.

(1)

- A** primary research
- B** energy use
- C** market pull
- D** equipment installation

These **two** engineering products are produced by different engineering sectors.

(b) Draw **one** straight line from each product to the engineering sector that is most likely to have produced it.

(2)

Product



Body panel



Anchor

Engineering sector

Automotive

Chemical

Electrical

Nuclear

Marine

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(c) State **one** advantage of anodising aluminium.

(1)

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(Total for Question 2 = 4 marks)

3 (a) Identify **one** material type that is associated with particulates.

(1)

- A alloy
- B electrochromic
- C composite
- D copper

(b) Polymers can be supplied in sheet or tube forms.

State **two** other forms of supply for polymer materials.

(2)

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(c) These component parts of cars are made from different materials.

Draw **one** straight line from each component to the material it is most likely to be made from.

(2)

Component

Material



Engine block



Brake pedal pad

Aluminium

Bronze

Chromium

Elastomer

Nylon

(Total for Question 3 = 5 marks)

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4 SK3 Engineering manufactures aircraft engines.



(a) Name the engineering sector that manufactures aircraft. (1)

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(b) State **two** properties of duralumin that make it suitable for use in aircraft engines. (2)

1

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2

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(c) Explain **two** advantages of having the materials for the outer casing of the aircraft engine supplied in sheet form. (4)

1

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(Total for Question 4 = 7 marks)



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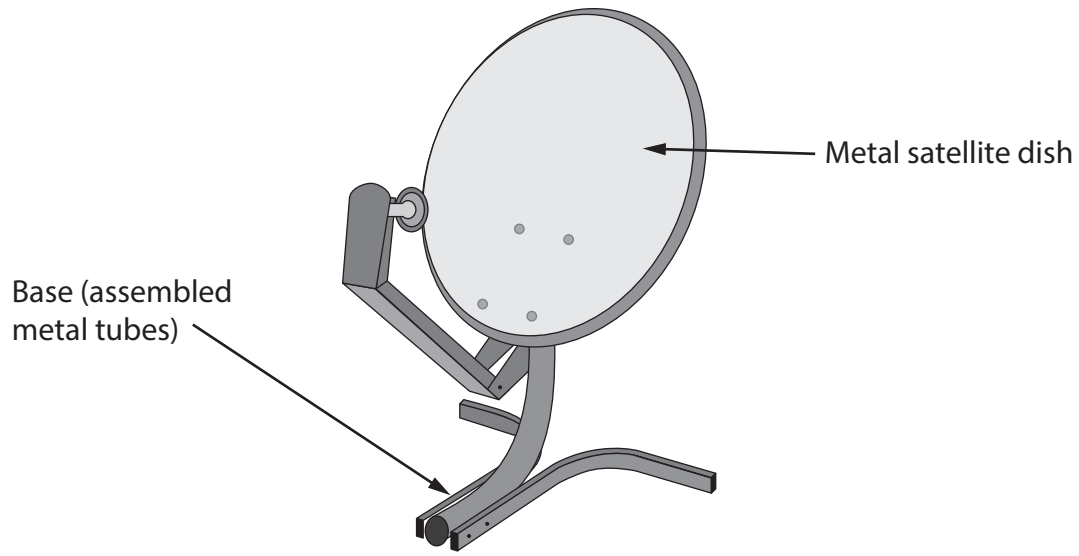
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5 PR9 Engineering manufactures portable satellite receivers.



(a) Shape memory alloy is used in the construction of the satellite receivers.

State the change in the environment that causes a shape memory alloy to change its form.

(1)

(b) The satellite dish is manufactured from metal and has a plastic coating applied to it.

State **two** advantages of applying a plastic coating to the metal satellite dish.

(2)

1

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(c) PR9 Engineering anneals the metal tubes before bending them into shape.

Explain **one** advantage of annealing ferrous metals in this situation.

(2)

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(d) PR9 Engineering is considering using a casting rather than assembled tubes for the base of the satellite receiver.

Explain **two** disadvantages of using a casting in this situation.

(4)

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(Total for Question 5 = 9 marks)

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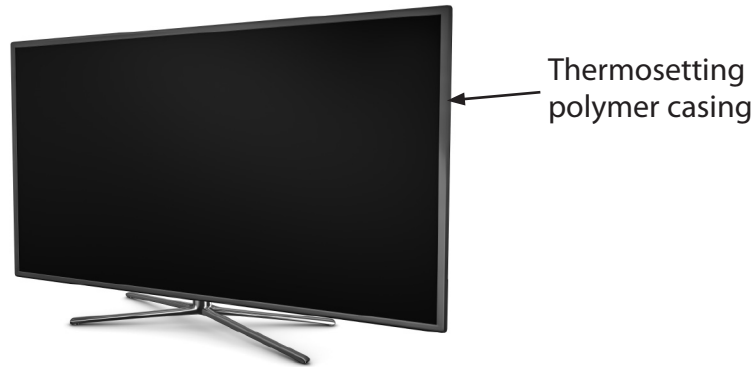
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6 BL3 Engineering manufactures televisions.

The casings of some of the televisions are made from thermosetting polymers.



(a) State **one** property of thermosetting polymers that makes them suitable for television casings.

(1)

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(b) The televisions are designed to have a life cycle of six years.

Explain **two** reasons why care will be needed when disposing of the materials used in a television at the end of its life cycle.

(4)

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(c) BL3 Engineering is considering the use of electrochromic materials for the screens of the televisions.

Explain **two** disadvantages of using electrochromic materials in television screens.

(4)

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(Total for Question 6 = 9 marks)

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7 8WB Engineering manufactures mobile phones. The company is considering using quantum tunnelling composites (QTC) and piezoelectric materials to improve the functionality of its mobile phones.

Discuss how these materials can improve mobile phones.

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(Total for Question 7 = 8 marks)

TOTAL FOR PAPER = 50 MARKS

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