Write your name here

Surname	Other names

Pearson BTEC Level 1/Level 2 First Award

Centre Number | | | | | | |

Learner Registration Number | | | | | | | | |

Engineering

Unit 38: Materials Used in Engineered Products

Friday 19 May 2017 – Morning
Time: 1 hour

Paper Reference
20573G

You do not need any other materials.

Total Marks

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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Pearson

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 because they are a particular type of material.

(a) Name **one** example of an alloy.

(1)

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(b) Identify **one** example of a smart material.

(1)

☒ **A** Carbon fibre

☒ **B** Elastomer

☒ **C** Magneto-rheostatic fluid

☒ **D** Thermosetting polymer

(c) Name **two** examples of physical material properties.

(2)

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(d) Identify **one** example of a composite material.

(1)

- ☒ **A** Zinc
- ☒ **B** Tin
- ☒ **C** Acrylic
- ☒ **D** Kevlar

(e) Name the mechanical property which defines that a material can break without deformation.

(1)

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(Total for Question 1 = 6 marks)

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2 (a) These two components are produced by different engineering sectors.

Draw **one** straight line from each component to the sector that has produced it.

(2)

Component	**Sector**
 Braking system	Chemical
	Automotive
© Vladimiroquai iStock	Marine
 Wireless router	Communications
© farakos iStock	Nuclear

(b) Identify **two** characteristics of composite materials.

(2)

- ☒ **A** Particulate
- ☒ **B** Ore
- ☒ **C** Laminar
- ☒ **D** Viscosity
- ☒ **E** Monomer

(c) Metal form types can be supplied as forgings.

Give **two** advantages of having metal form types supplied as a forging.

(2)

1 .....

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2 .....

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(d) Raw engineering materials are transported to companies before being made into products.

State the stage in the life cycle of engineering materials when this occurs.

(1)

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(Total for Question 2 = 7 marks)

3 (a) Identify **one** example of a heat treatment.

(1)

- ☒ **A** Rolling
- ☒ **B** Mining
- ☒ **C** Tempering
- ☒ **D** Extruding

(b) Name **two** examples of chemical and durability material properties.

(2)

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(Total for Question 3 = 3 marks)

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4 5UF Engineering produces components that are used in the production of games consoles. These components are manufactured from a range of materials, including composites.

(a) Name the engineering sector that manufactures games consoles.

(1)

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(b) These two component parts of a games console 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**
Casing (games console controller)	Graphene
	Copper
	Bauxite
Wire core (games console power lead)	HDPE
	Bakelite

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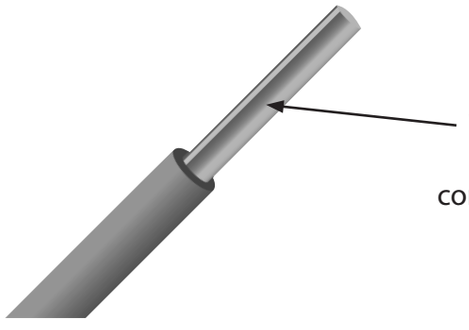

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(c) The games console controller has been designed to be recycled.

Explain **one** advantage of recycling the materials used to manufacture the controller.

(2)

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(Total for Question 4 = 5 marks)

5 BT18 Engineering manufactures a range of products using polymers.

(a) Describe **one** difference between a thermoplastic polymer and a thermosetting polymer.

(2)

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(b) BT18 Engineering applies a plastic coating rather than paint to the surface of washing machine casings.

Explain **two** reasons why BT18 Engineering uses a plastic coating rather than paint in this situation.

(4)

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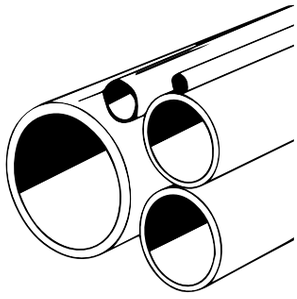
(Total for Question 5 = 6 marks)

6 SK5 Autoengineering uses a wide range of metals, polymers and smart materials to manufacture parts for cars.

(a) The image shows an example of a form of supply used for metals and polymers.



Identify the form of supply shown.

(1)

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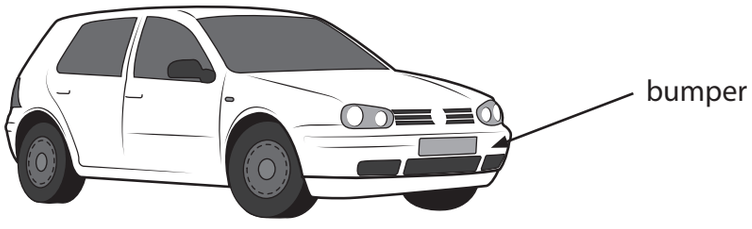
(b) SK5 Autoengineering uses a thermoplastic material to manufacture bumpers for cars.



State **two** reasons why thermoplastic material is suitable for the manufacture of car bumpers.

(2)

1 .....

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2 .....

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(c) SK5 Autoengineering is planning to manufacture electrochromic glass panels that will be used in car roofs.

Explain **two** advantages of using electrochromic materials for this application.

(4)

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2 .....

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(Total for Question 6 = 7 marks)

7 SO15 Engineering manufactures a range of parts for engines.

(a) Cast iron parts have surface treatments applied to them.

Explain **one** reason for applying a surface treatment to a cast iron part.

(2)

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(b) SO15 Engineering uses cast iron to manufacture piston rings for engines.

Explain **two** advantages of using cast iron in this application.

(4)

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(c) SO15 Engineering uses fibre reinforced composite material when manufacturing hoses for engines.

Explain **one** advantage of fibre reinforcement when used in engine hoses.

(2)

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(Total for Question 7 = 8 marks)

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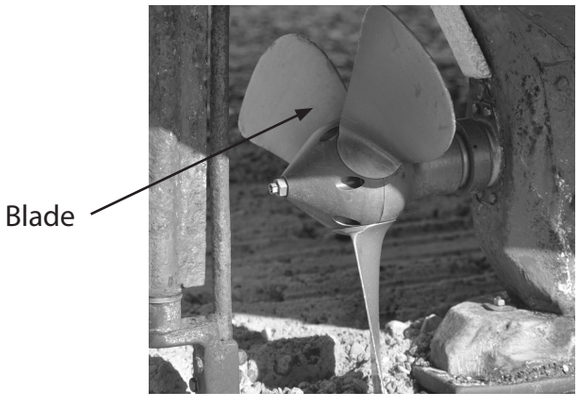
QUESTION 8 BEGINS ON THE NEXT PAGE

8 6FX Engineering produces propellers for the marine engineering sector. In order to increase the competitiveness of its product range, the company wants to manufacture propellers from a range of alternative materials.

The company currently uses aluminium to cast propellers and is considering developing blades manufactured from a polymer.



Discuss the factors that the company must consider when selecting a suitable polymer for the propeller.

(8)

(Total for Question 8 = 8 marks)

TOTAL FOR PAPER = 50 MARKS

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