

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

1. Figure 1 shows a batch produced children's wooden toy locomotive.

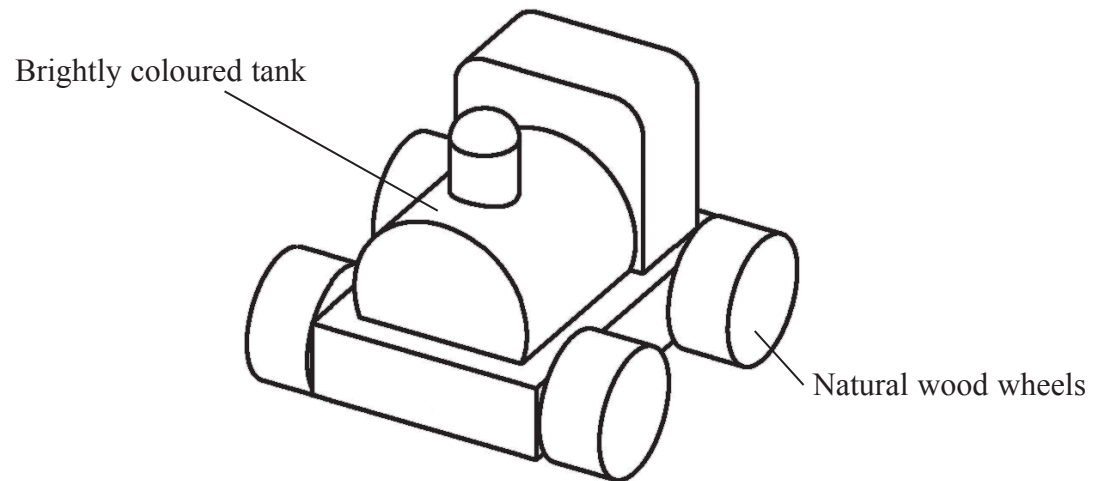


Figure 1

(a) Give **two** reasons why a softwood is used to make the toy locomotive instead of a hardwood.

1

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2

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(2)

(b) Complete the table below by naming a suitable surface finish for each component.

Component	Suitable surface finish
Brightly coloured tank	
Natural wood wheels	

(2)



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(c) Describe the following **three** stages in the batch production of the wooden toy locomotive.

(i) Preparation (of tools, materials and equipment)

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(2)

(ii) Production

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(3)

(iii) Assembly

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(2)

(Total 11 marks)

Q1

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3

Turn over



N 3 3 0 3 3 A 0 3 1 6

2. Figure 2 shows an isometric drawing of a children's wooden toy locomotive. The front and end views are labelled.

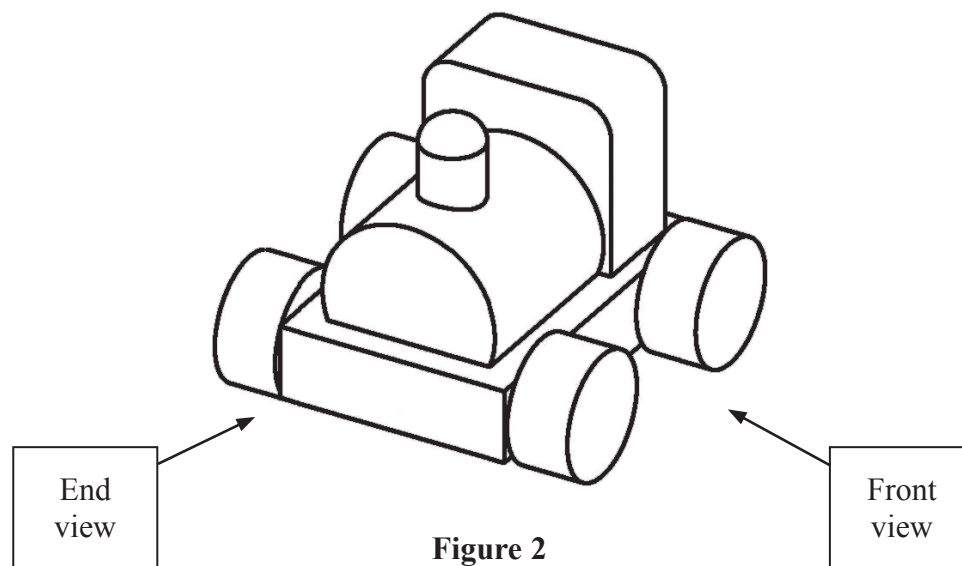


Figure 2

- (a) In the space below, sketch a 3rd angle orthographic representation of the toy locomotive.

Your sketch must show front, end and plan views.

A large empty rectangular box provided for the student to sketch a 3rd angle orthographic representation of the toy locomotive, showing front, end, and plan views.

(6)



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blank

(b) A designer would have produced the isometric drawing of the toy locomotive using a 3H pencil and shaded using coloured pencils.

(i) Name the **two** materials that commonly make up the lead of a coloured pencil.

1

2

(2)

(ii) Identify **two** ways in which the composition of the lead in a 3H pencil differs from the lead in an HB pencil.

1

2

(2)

Q2

(Total 10 marks)

5

Turn over



3. Figure 3 shows a fizzy drink bottle made from PET.

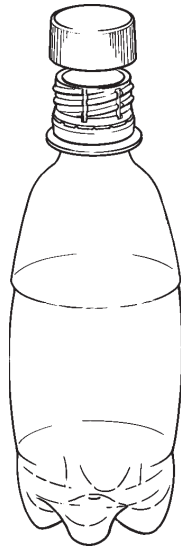


Figure 3

(a) Name the scale of production used to produce fizzy drinks bottles 24 hours a day, 7 days a week.

..... (1)

(b) The bottle was produced using the blow moulding process.

Describe, using notes and sketches, the blow moulding process.

(3)



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(c) Explain **two** properties of PET that make it suitable for use in a fizzy drink bottle.

1

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2

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(4)

(d) The bottle has a standard diameter of 60 mm.

Explain **two** reasons why a standard bottle size is used by all manufacturers of fizzy drinks.

1

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2

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(4)

Q3

(Total 12 marks)



4. Figure 4 shows a mass produced 'single use' camera.

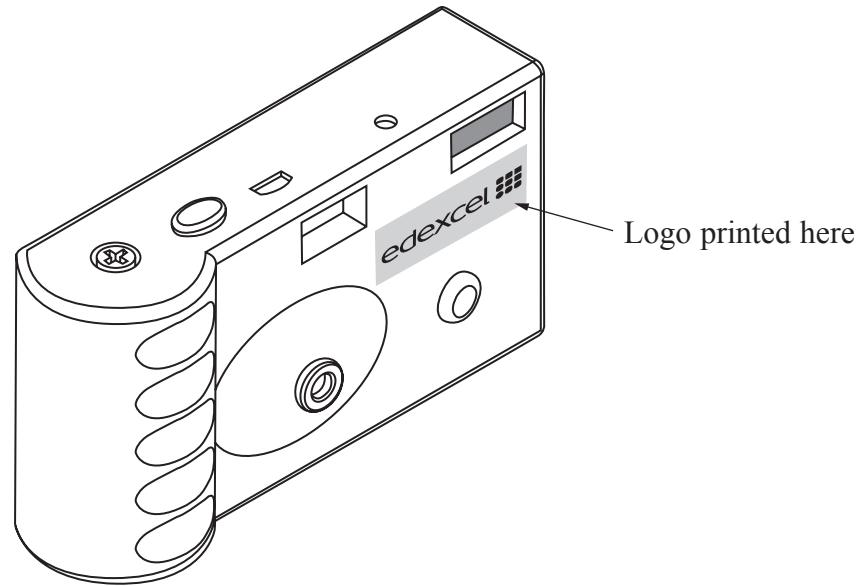


Figure 4

(a) Name a suitable printing process for printing the logo directly onto the camera.

..... (1)

(b) Explain **two** reasons why injection moulding is used for forming the casing of the camera.

1

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2

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..... (4)



5. Figure 5 shows the components of a mass produced yoghurt pot.

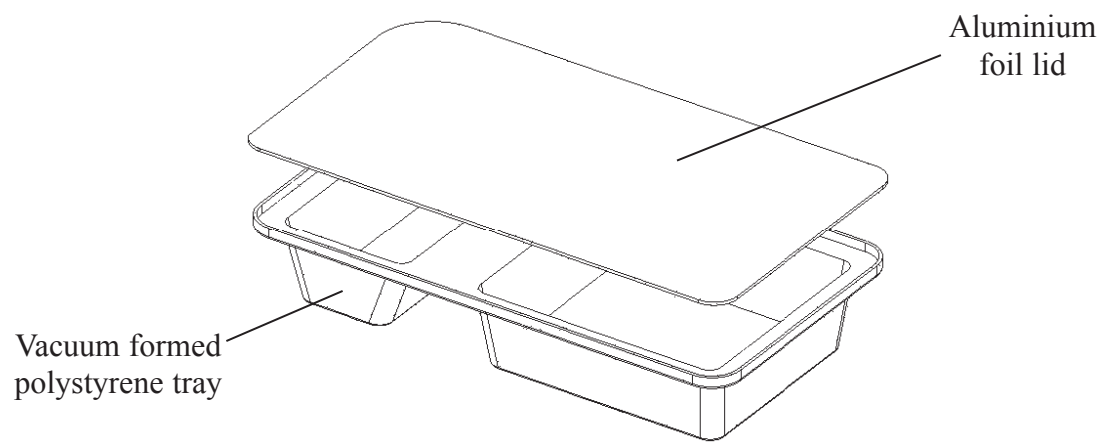


Figure 5

(a) Give **one** reason why a surface finish does not need to be applied to the polystyrene tray.

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(1)

(b) Explain **one** reason why aluminium foil is a suitable material for the lid of the yoghurt pot.

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(2)



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(c) The vacuum forming moulds were machined from steel using a CNC milling machine.

Give **three** reasons why CNC machines were used to produce the moulds.

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(3)

(d) The polystyrene tray was vacuum formed in China.

Explain why companies manufacture components in developing countries such as China.

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(3)

Q5

(Total 9 marks)



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6. Standard performance tests are carried out on a wide range of materials by the British Standards Institute (BSI).

(a) Give **two** reasons why the BSI carries out standard performance tests on materials.

1

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2

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(2)

(b) In the spaces below, name and sketch the appropriate symbol that features on materials and products that meet British Standards (BS).

Sketch:

Name of symbol:

.....

(2)



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(c) Complete the table below by:

- naming **one** characteristic of the mechanical property
- naming the appropriate British Standard performance test.

Mechanical property	Characteristic of mechanical property	Name of BS performance test
Toughness

Hardness

(4)

(d) Many BS performance tests can be replicated in the workshop in order to determine the best material for the job.

Describe how a standard performance test for **tensile strength** can be carried out so that it can be replicated in a school workshop.

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(4)

(Total 12 marks)

Q6

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7. Modern composite materials are now commonplace in a wide range of products.

(a) Describe the process of manufacturing a shell structure using glass reinforced plastics (GRP).

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(4)

(b) Kevlar is a type of carbon fibre.

Explain **two** properties of carbon fibre that make it suitable for use in military and security forces' uniforms and equipment.

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(4)

Q7

(Total 8 marks)



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8. The Bauhaus school of art and design was extremely influential in the styling of products and architecture in the modernist movement.

(a) Select **two** of the following design philosophies and explain how they influenced the Bauhaus school of art and design:

- 'Form follows function'
- 'Everyday objects for everyday people'
- 'Products for a machine age'
- 'Less is more'

Design philosophy 1

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Design philosophy 2

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(4)

QUESTION 8 CONTINUES ON NEXT PAGE



