

Surname	Centre Number	Candidate Number
Other Names		



LEVEL 1/2 AWARD

9793/01



S15-9793-01

**ENGINEERING
UNIT 3: SOLVING ENGINEERING PROBLEMS
(VOCATIONAL)**

P.M. MONDAY, 8 June 2015

1 hour 30 minutes

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1.	24	
2.	16	
3.	20	
Total	60	

ADDITIONAL MATERIALS

In addition to this paper you may require a calculator and a ruler.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided in this booklet. Where the space is not sufficient for your answers, continue at the back of the book, taking care to number the continuation correctly.

INFORMATION FOR CANDIDATES

The total number of marks for this paper is 60.

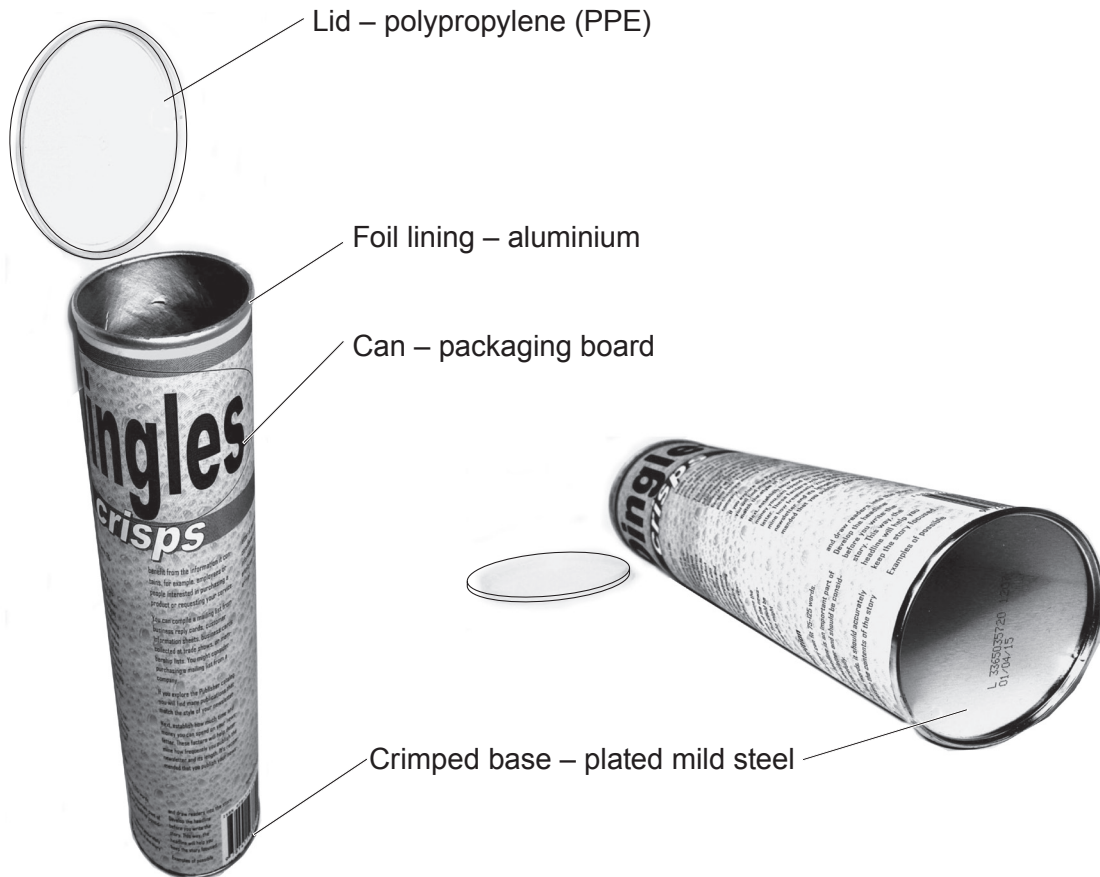
The number of marks is given in brackets at the end of each question or part-question.

You are reminded of the necessity for good English and orderly presentation in your answers.

Answer **all** questions in the spaces provided.

1. The sketch below shows a 'crisp' storage container.

This container helps prevent the crisps from breaking and keeps them fresh.



- (a) Name **one** part of the crisp storage container that could be injection moulded. [1]

- (b) Metals can be divided into ferrous and non-ferrous.

- (i) State which part of the container would be a ferrous metal. [1]

- (ii) Suggest **one** method of checking a metal is ferrous. [1]

(c) The lid is manufactured from polypropylene (PPE). One of the properties of polypropylene (PPE) is its ability to stretch or flex.

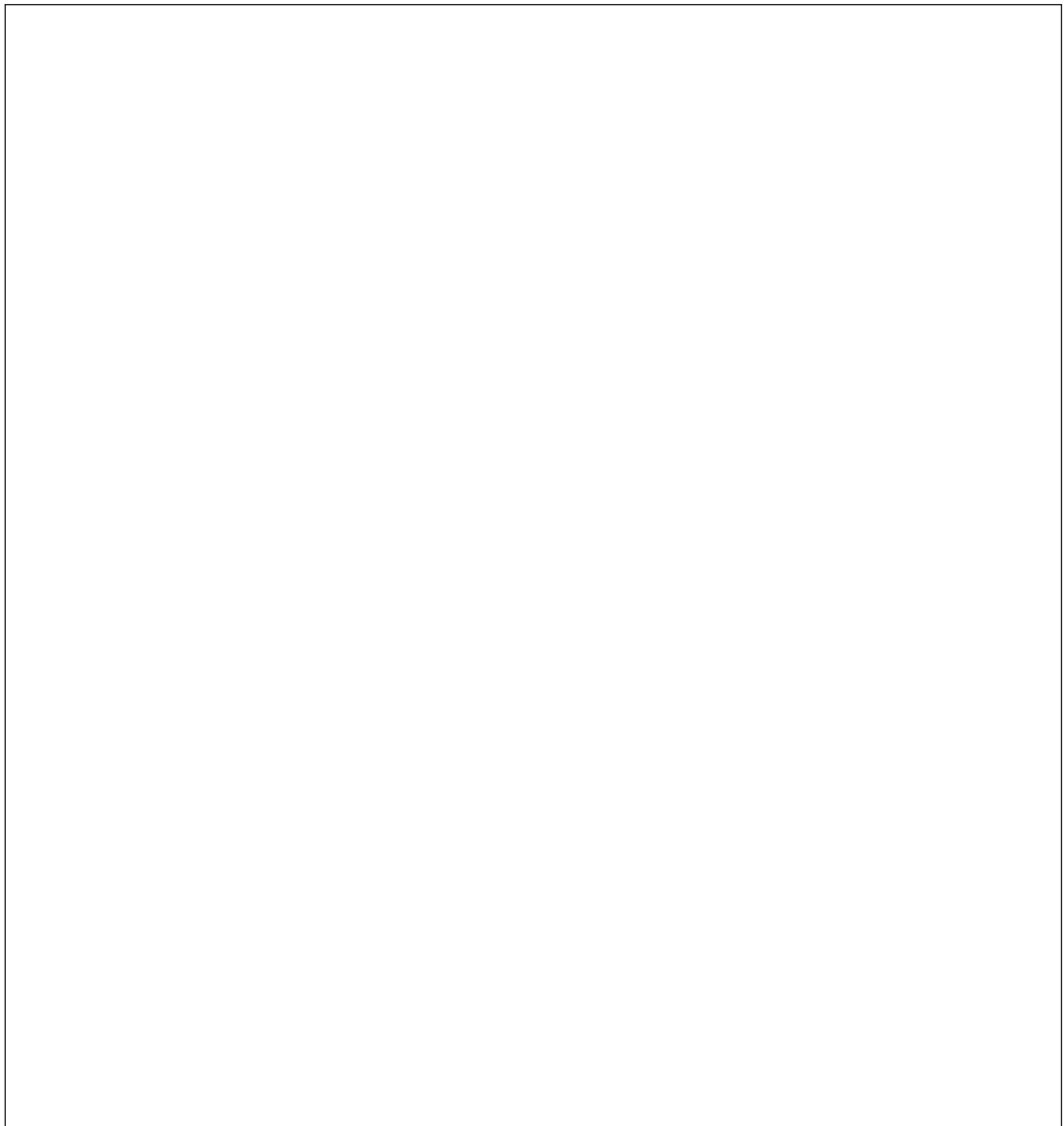
(i) Why is it important that the lid is able to stretch or flex? [2]

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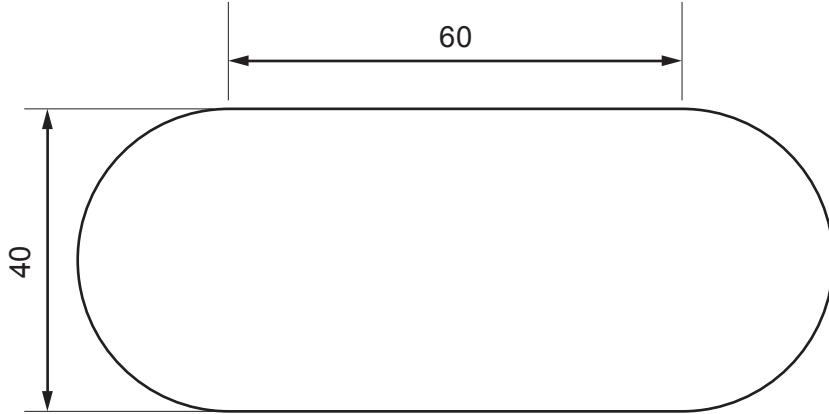
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(ii) Your engineering teacher has asked you to devise a simple test that would stretch the polypropylene (PPE) lid to breaking point. Describe using notes and sketches how you could perform this test in a workshop environment. [5]



- (d) A new self-adhesive label has been designed to attach to the crisp storage container. The dimensions are shown below.



All dimensions are in mm.

Calculate the surface area of the label.

[6]

Show all your workings.

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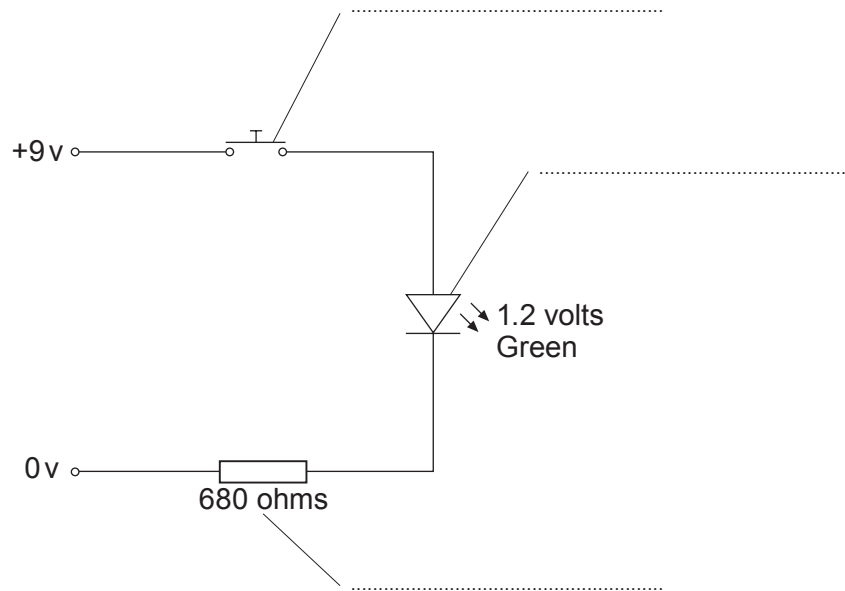
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(e) A student has used the crisp storage container body to create a light project. Study the diagram below, which shows the electrical circuit for the light.

(i) State the name of the components in the diagram below.

[3]



(ii) Describe the purpose of the 680 ohms component in the circuit.

[2]

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(f) Describe, using **one** example, what is meant by the term 'smart' material.

[3]

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2. The world of engineering is greatly influenced by developments in technology. One area that has seen many changes is the design and use of computers.



- (a) Computer aided design (CAD) now plays a major role in the design of engineered products. Discuss the advantages of computer aided design to the engineer. [4]

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- (b) The two images above are of a 1990s computer and a modern sleek tablet form of computer. Describe the technological developments in its design that have enabled the computer to become smaller. [4]

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(c) The recycling and disposal of products, materials and components plays a major role in our everyday life. Discuss how the manufacturer of computers has tried to address these issues. [4]

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(d) Explain **two** reasons why expanded polystyrene is used for the packaging of computer products.

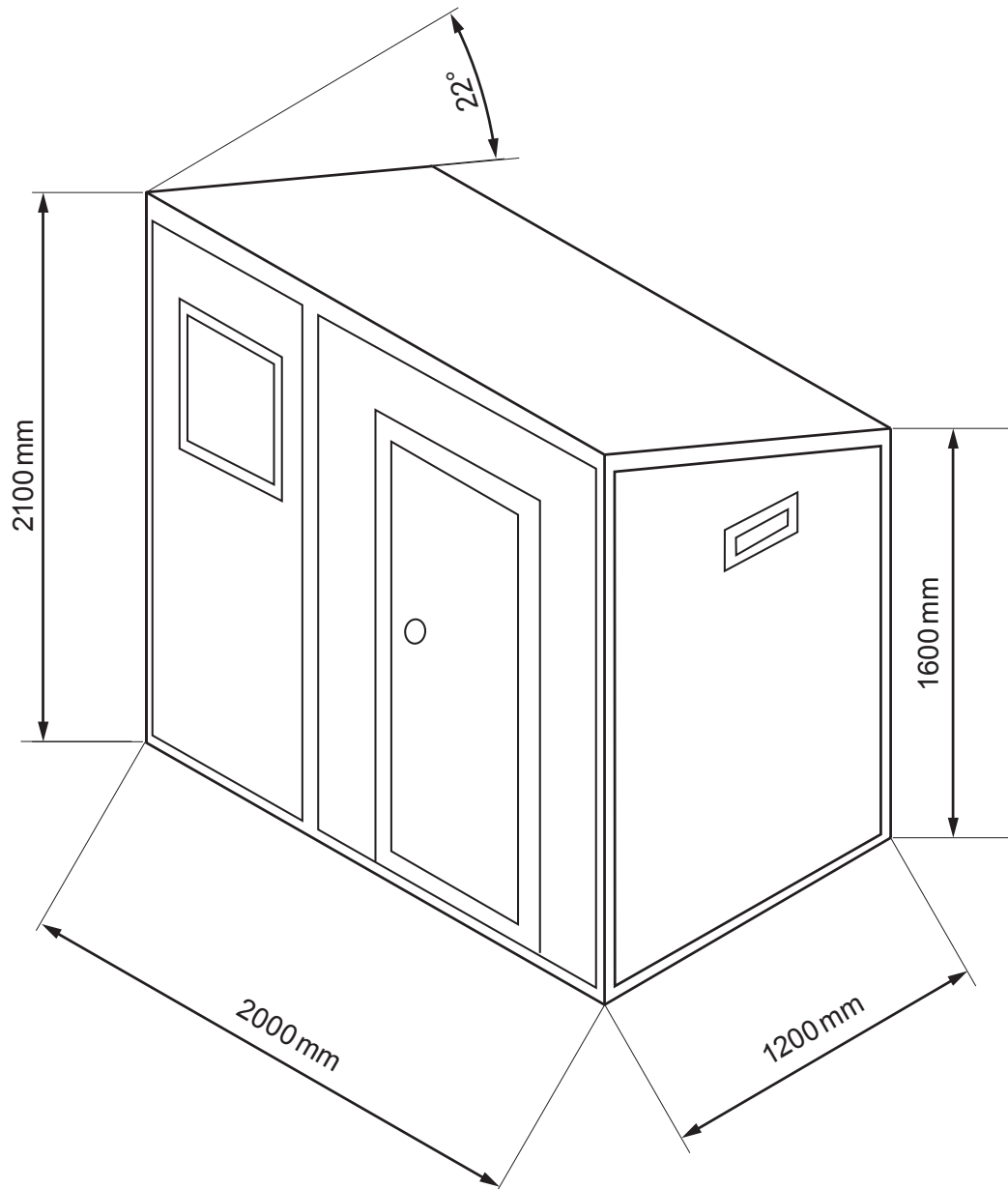
Reason 1:

..... [2]

Reason 2:

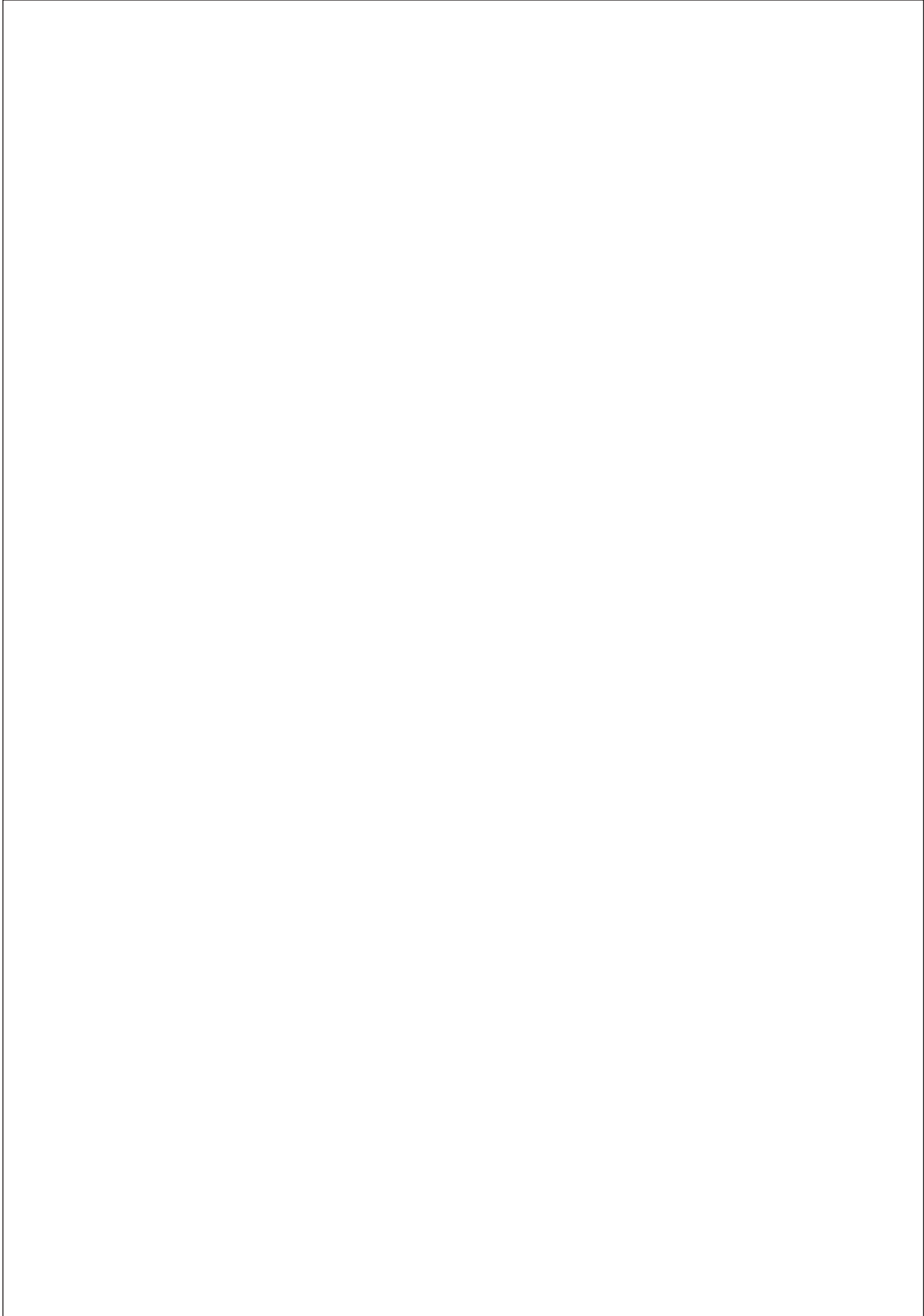
..... [2]

3. (a) A plastic storage shed presents a simple and affordable solution to outdoor storage. Weatherproof plastic sheds offer the space to house bicycles, toys, tools, supplies and other belongings. The shed is made up of plastic polymer panels which are simply bolted together.

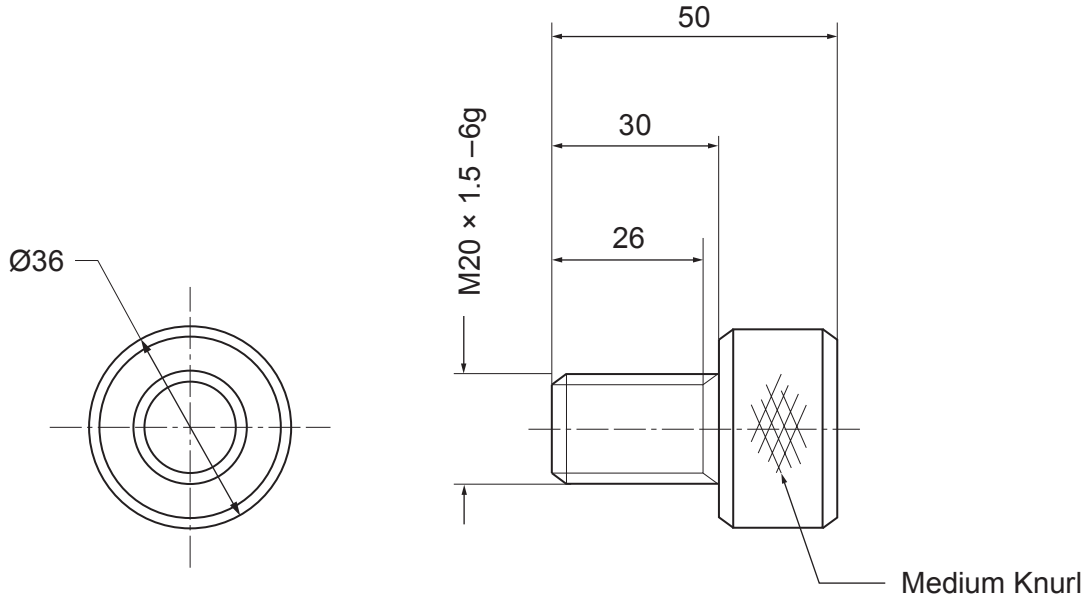


Sketch a 3rd angle orthographic projection of the shed in the space below. You must use a suitable scale, include all construction lines and hidden detail. [12]

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only



(b) The storage shed wall panels are attached together using bolts.



All dimensions in mm

Identify and list the basic machining operations that are required to make the bolt from aluminium bar of 36mm diameter using a centre lathe. [5]

1.
2.
3.
4.
5.

(c) Traditionally shed panels are made from wood or metal. What are the benefits of using plastic polymer panels? [3]

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END OF PAPER

