CARIBBEAN EXAMINATIONS COUNCIL

CARIBBEAN SECONDARY EDUCATION CERTIFICATE® EXAMINATION

20 MAY 2026 (a.m.)

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FILL IN ALL THE INFORMATION REQUESTED CLEARLY IN CAPITAL LETTERS.

TEST CODE [redacted]

SUBJECT INDUSTRIAL TECHNOLOGY
OPTION B – MECHANICAL ENGINEERING TECHNOLOGY – Paper 02

PROFICIENCY TECHNICAL

REGISTRATION NUMBER | | | | | | | | | | |

SCHOOL/CENTRE NUMBER					

NAME OF SCHOOL/CENTRE

CANDIDATE'S FULL NAME (FIRST, MIDDLE, LAST)

DATE OF BIRTH | D | D | M | M | Y | Y | Y | Y |

SIGNATURE _____

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FORM TP 2026–089

TEST CODE 01373020

MAY–JUNE 2026

CARIBBEAN EXAMINATIONS COUNCIL

CARIBBEAN SECONDARY EDUCATION CERTIFICATE® EXAMINATION

INDUSTRIAL TECHNOLOGY

OPTION B – MECHANICAL ENGINEERING TECHNOLOGY

Paper 02 – Technical Proficiency

2 hours 10 minutes

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READ THE FOLLOWING INSTRUCTIONS CAREFULLY.

1. This paper consists of FIVE compulsory questions.
2. Use sketches, where necessary, to support your answers.
3. Write your answers in the spaces provided in this booklet.
4. Do NOT write in the margins.
5. You may use a silent, non-programmable calculator to answer questions.
6. This paper contains metric dimensions only. You should work your answers in the metric system.
7. You are advised to take some time to read through the paper and plan your answers.
8. If you need to rewrite any answer and there is not enough space to do so on the original page, you must use the extra lined page(s) provided at the back of this booklet. **Remember to draw a line through your original answer.**
9. **If you use the extra page(s), you MUST write the question number clearly in the box provided at the top of the extra page(s) and, where relevant, include the question part beside the answer.**

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DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

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1. (a) Complete the table below by stating ONE function for EACH of the following marking out tools used in mechanical engineering.

Marking Out Tool	Function
Pair of dividers	
Protractor	
Odd-leg/jenny caliper	

(3 marks)

(b) Figure 1 shows a pictorial and an orthographic view of a support bracket used to secure a mechanical device.

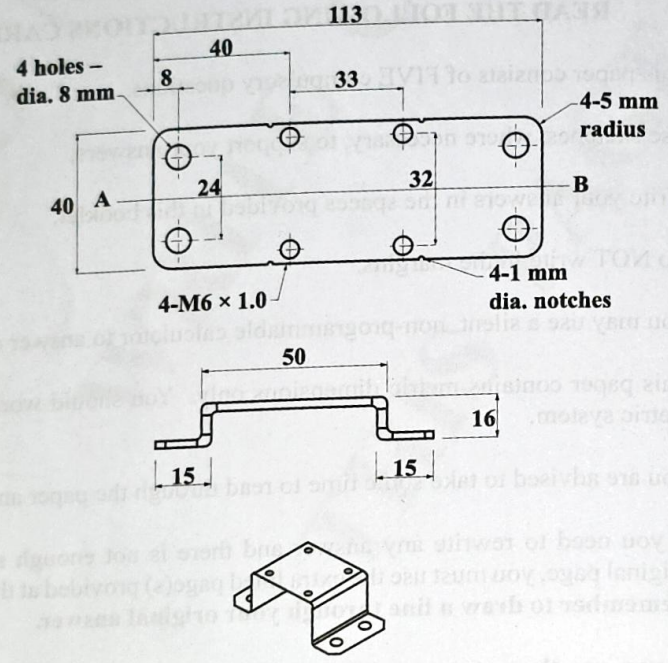


Figure 1. Pictorial and an orthographic view of a support bracket

Using the centre line AB as a reference, outline the sequential steps to be followed in marking out the support bracket shown in Figure 1 **on page 4**.

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(6 marks)

(c) Four M6 × 1.0 threaded holes are required to secure the mechanical device to the support bracket shown in Figure 1 **on page 4**. Outline the sequential steps required in order to

(i) drill ONE 5 mm tap drill size hole

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(3 marks)

(ii) cut the M6 × 1.0 internal threads in the 5 mm hole drilled in (c) (i).

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(3 marks)

(d) State TWO guidelines that should be observed when cutting internal threads.

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(2 marks)

(e) Reaming will be used to finish the 8 mm diameter holes shown in Figure 1 **on page 4.** State ONE reason for reaming a hole.

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(1 mark)

Total 18 marks

2. (a) Define the term 'tolerance' in relation to mechanical design.

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(2 marks)

(b) State TWO factors that designers should consider when selecting engineering materials for a project.

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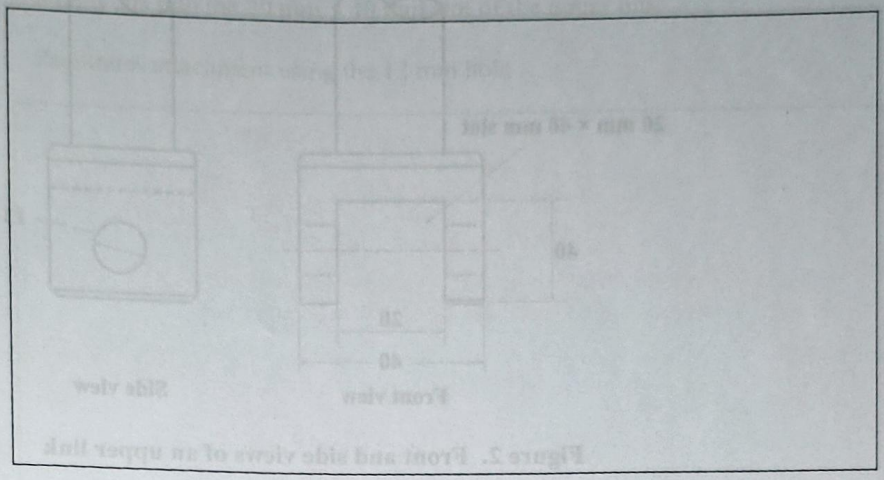
(2 marks)

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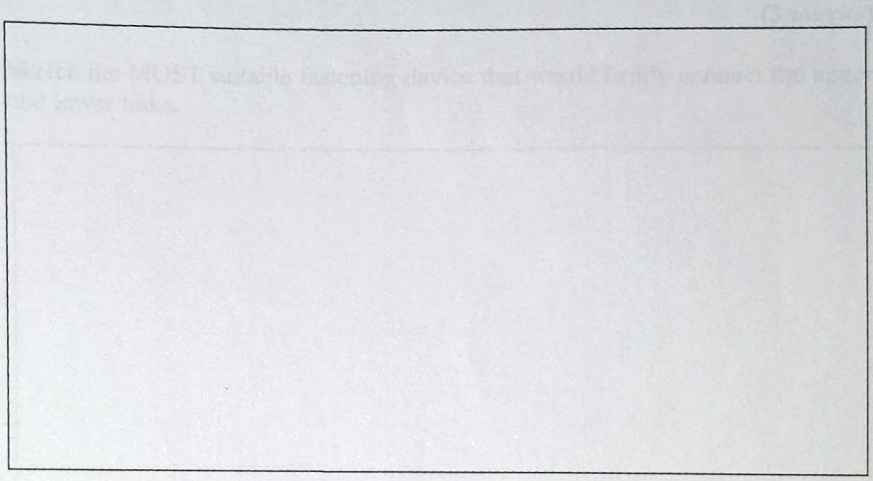
(c) Sketch the following mechanical keys.

(i) Square



(1 mark)

(ii) Woodruff



(1 mark)

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(d) Figure 2 shows the front and side views of an upper link for a mechanical mechanism.

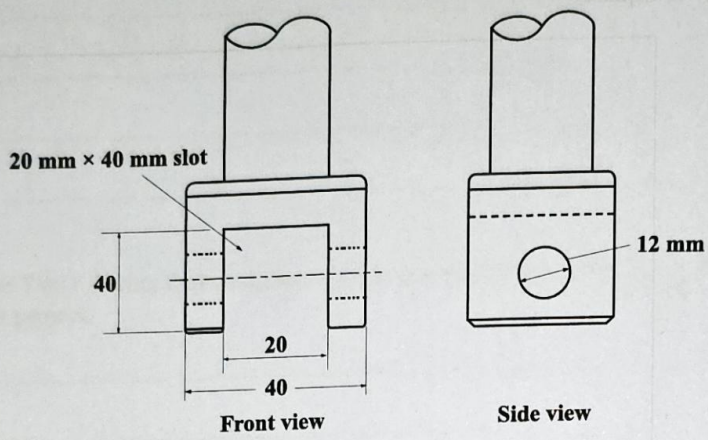
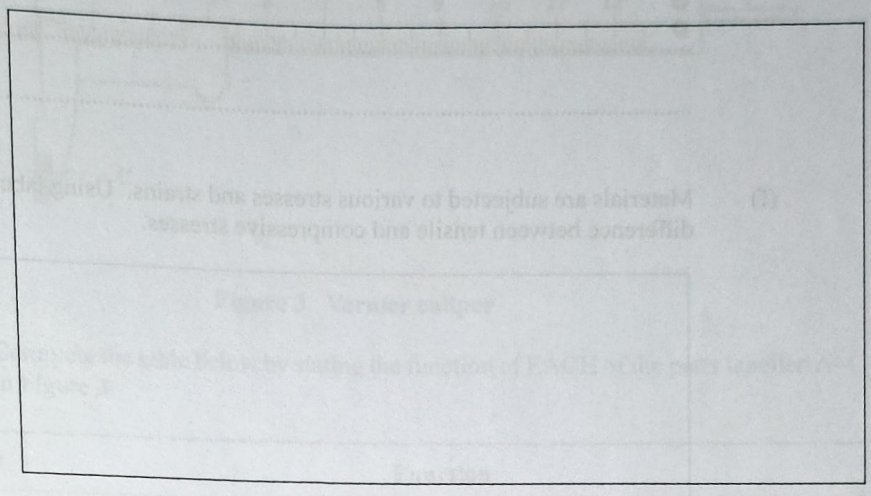


Figure 2. Front and side views of an upper link

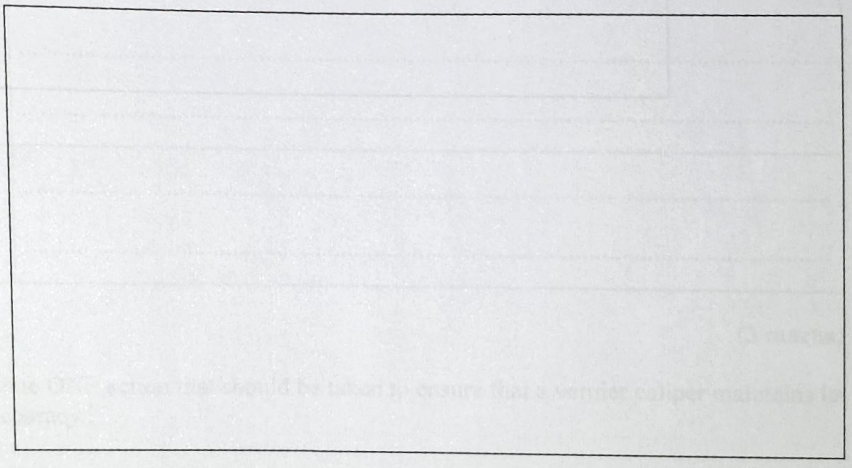
(i) Sketch a design for a lower link of the mechanism which meets the following criteria.

- Snugly fits into the 20 mm × 40 mm slot of the upper link
- Facilitates attachment using the 12 mm hole



(3 marks)

(ii) Sketch the MOST suitable fastening device that would firmly connect the upper and lower links.



(3 marks)

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(e) Identify TWO milling cutters that would be used to cut the 20 mm × 40 mm slot shown in Figure 2 **on page 10**.

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(2 marks)

(f) Materials are subjected to various stresses and strains. Using labelled sketches, show the difference between tensile and compressive stresses.

(4 marks)

Total 18 marks

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3. Figure 3 shows a diagram of a vernier caliper.

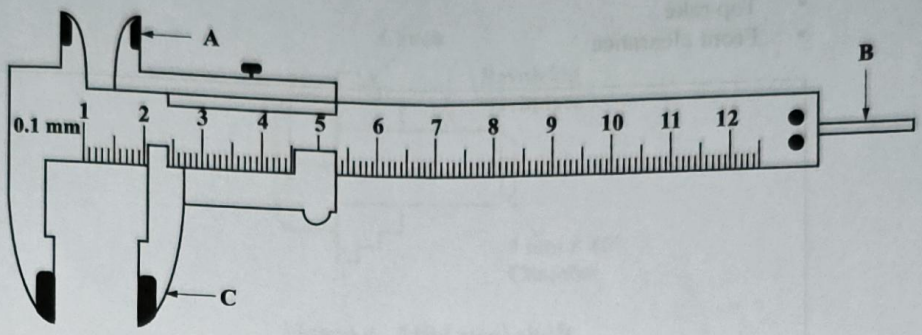


Figure 3. Vernier caliper

(a) (i) Complete the table below by stating the function of EACH of the parts labelled A–C in Figure 3.

Part	Function
A	....
B	....
C	....

(3 marks)

(ii) State ONE action that should be taken to ensure that a vernier caliper maintains its accuracy.

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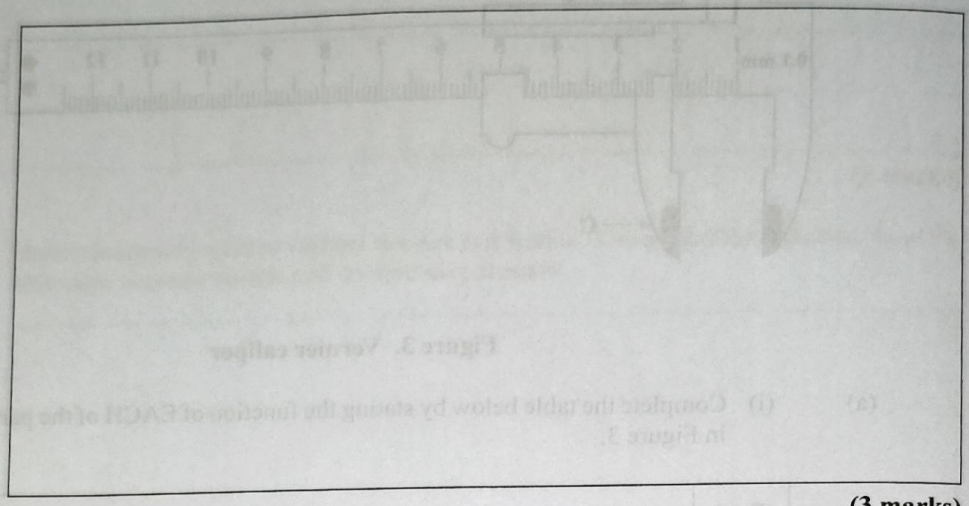
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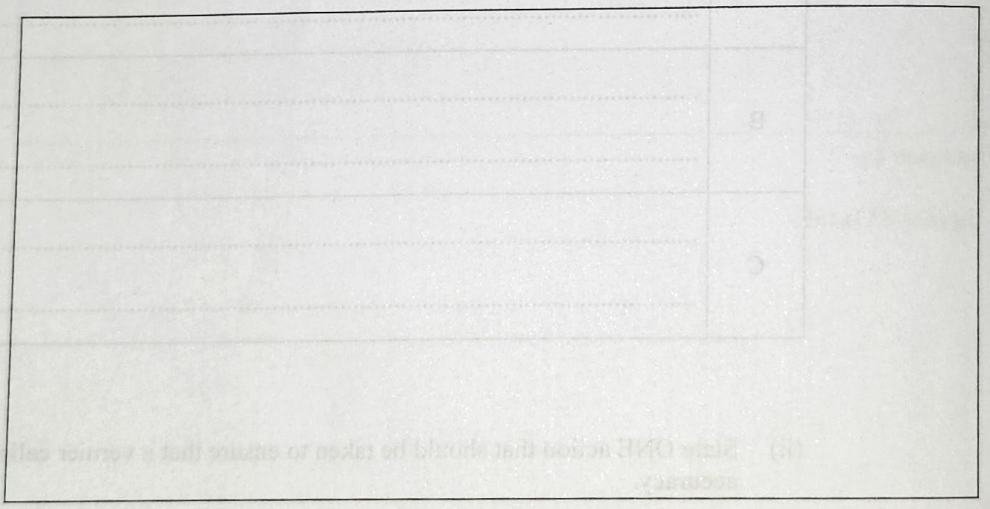
(b) Sketch and label a lathe cutting tool showing the following angles.

- Top rake
- Front clearance



(3 marks)

(c) Using a labelled diagram, illustrate a lathe setup for facing.



(3 marks)

0 1 3 7 3 0 2 0 1 4

(d) Figure 4 shows a mild steel shaft measuring 25 mm in diameter, mounted in a lathe's chuck.

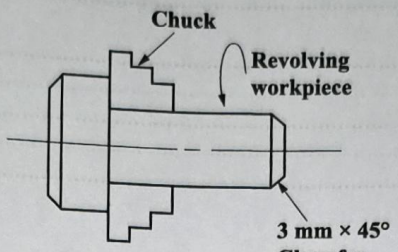


Figure 4. Mild steel shaft

Outline, in sequence, the steps required for cutting the 3 mm × 45° chamfer on the revolving workpiece shown in Figure 4.

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(3 marks)

(e) (i) State TWO finishing techniques that can be applied to protect metal surfaces.

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(2 marks)

(ii) Outline the sequential steps required in order to apply ONE of the finishes identified in (e) (i).

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(3 marks)

Total 18 marks

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4. (a) Identify ONE piece of personal protective equipment (PPE) that should be worn when welding, to protect EACH of the following body parts.

(i) Eyes

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(1 mark)

(ii) Lungs

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(1 mark)

(b) Name TWO gases that are used in welding.

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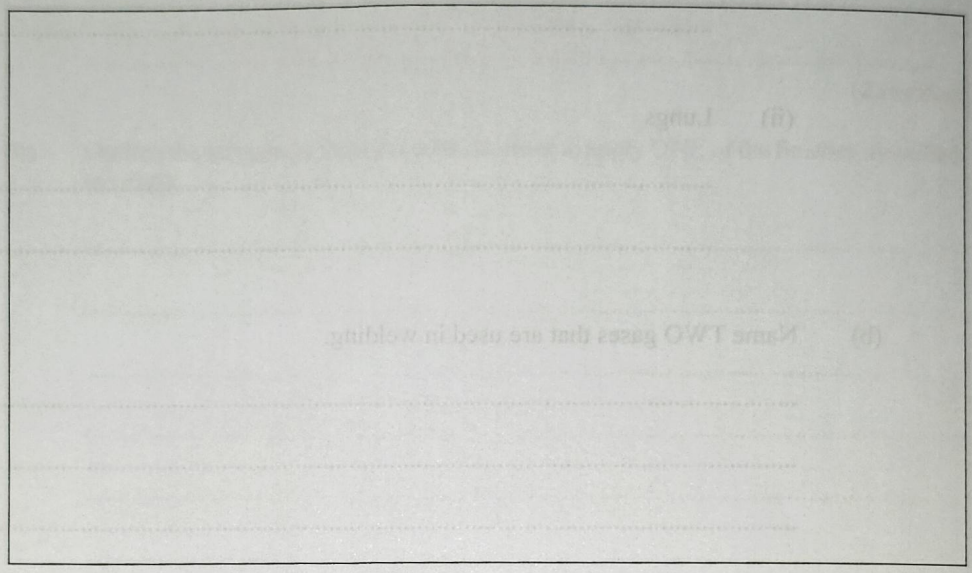
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(2 marks)

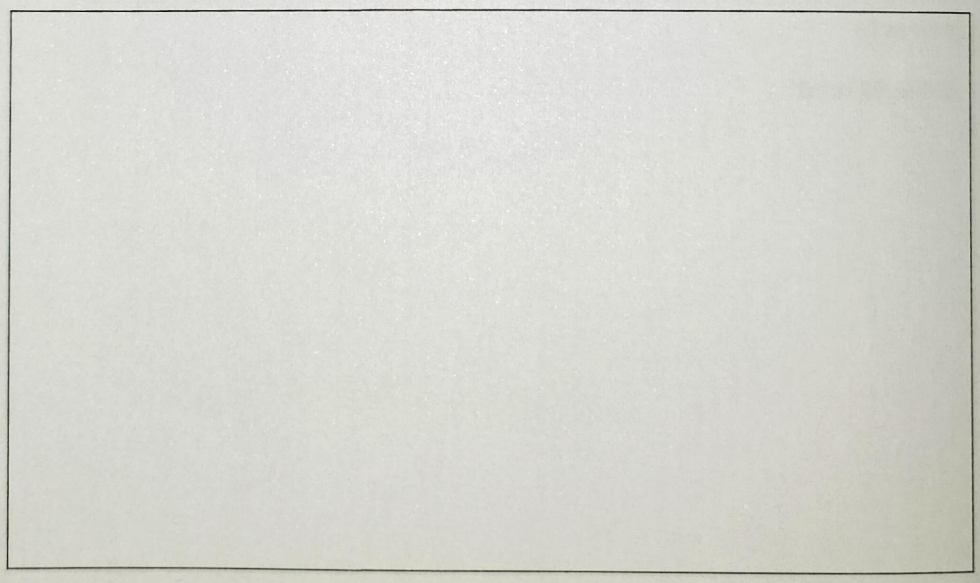
(c) Draw and label a diagram showing the rightward (backhand) gas welding process. The diagram should include the following.

- Position of the rod
- Position of the nozzle/tip
- Welding direction



(3 marks)

(d) Sketch a welding corner joint and label the **root** and the **first filler** weld passes.



(3 marks)

(e) State TWO functions of the coating on an arc welding electrode.

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(2 marks)

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(f) Figure 5 shows a square metal frame measuring 900 mm × 900 mm. The frame is to be fabricated from a length of hollow section mild steel, measuring 25 mm × 25 mm × 6000 mm.

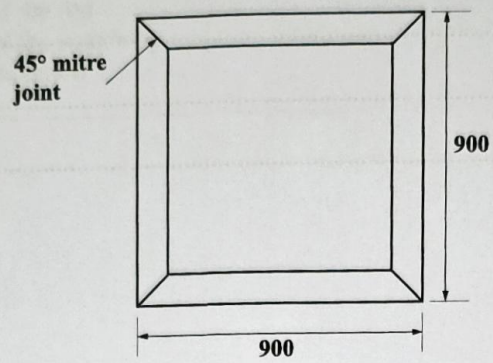


Figure 5. Square metal frame

Using arc welding, outline the sequential steps required in order to fabricate the frame shown in Figure 5.

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(6 marks)

Total 18 marks

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5. Figure 6 shows a pictorial view of a truncated metal cone.

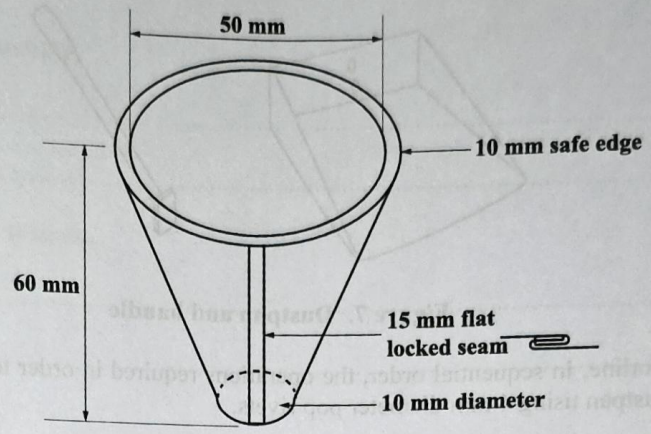


Figure 6. Truncated metal cone

(a) Sketch the development (layout) of Figure 6, showing the dimensions for the safe edge and seam.

(6 marks)

(b) Figure 7 shows a dustpan and handle.

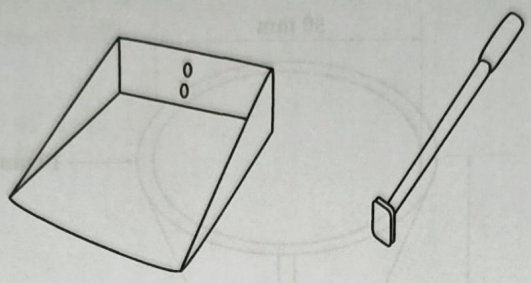


Figure 7. Dustpan and handle

Outline, in sequential order, the operations required in order to attach the handle to the dustpan using 4 mm diameter pop rivets.

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(3 marks)

(c) Define the term 'malleability' in relation to the mechanical properties of metal.

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(2 marks)

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(d) For EACH of the following mechanical properties, state ONE example of a metal that fits each description.

(i) Ductility

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(1 mark)

(ii) Brittleness

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(1 mark)

(e) Gear teeth are typically case-hardened. Outline, in sequential order, the process required in order to case-harden the teeth of a gear.

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(3 marks)

(f) State TWO safety precautions that should be observed when sand casting.

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..... **(2 marks)**

Total 18 marks

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END OF TEST

IF YOU FINISH BEFORE TIME IS CALLED, CHECK YOUR WORK ON THIS TEST.

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