

# EXAMINATIONS COUNCIL OF SWAZILAND

## Junior Certificate Examination

CANDIDATE  
NAME

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CENTRE  
NUMBER

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NUMBER

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**Design and Technology**

**537/01**

Paper 1

**October/November 2018**

**2 hours**

Additional materials: Standard drawing equipment.

### READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name in the spaces provided at the top of the page.

Write in blue or black pen in the spaces provided on the question paper.

You may use a pencil / pen for any sketches, drawings or rough working.

Do not use staples, paper clips, highlighters, glue or correction fluid.

This paper consists of **two** (2) Sections. Section **A** and Section **B**

Answer **all** questions in Section **A** and any **two** (2) questions in Section **B** in the spaces provided.

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

| For examiner's use |  |
|--------------------|--|
| Section A          |  |
| Section B          |  |
| Total marks        |  |

This document consists of **19** printed pages and **1** blank page.

## SECTION A

This section consists of fifteen (15) questions.

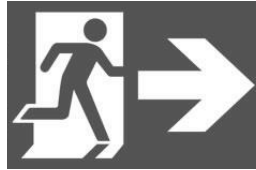
Answer **all** questions in this section.

For  
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- 1 Safety signs are useful in a school workshop. Analyse the signs below and answer the questions that follow.



Sign A



Sign B



Sign C



Sign D

- (a) Which sign should be placed near a fire extinguisher?

.....

[1]

- (b) Which sign reminds a student to wear a pair of goggles?

.....

[1]

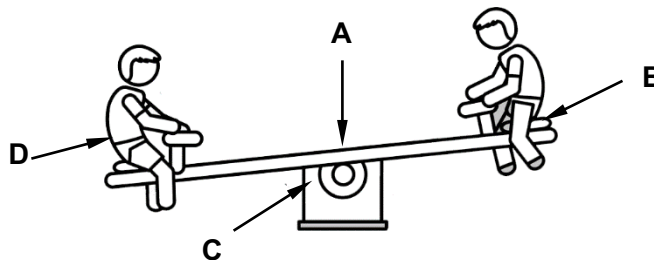
- 2 Name the stage of the Design Process described by the statement below.

Should be light in weight so that it can be carried around.

.....

[1]

- 3 The diagram below shows two children playing a see-saw game.

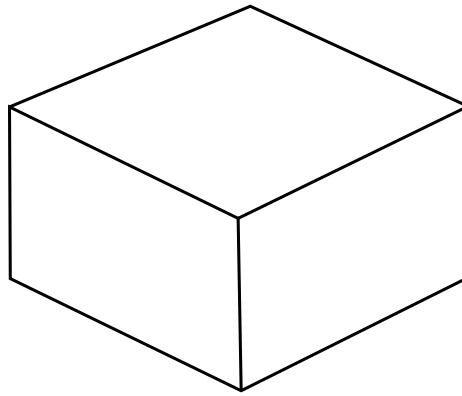


Which part of the diagram **A**, **B**, **C** or **D** is the fulcrum?

.....

[1]

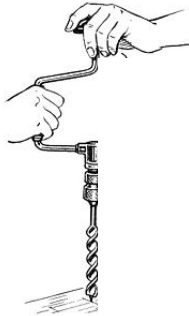
- 4 The drawing below shows a solid block to accommodate a cylindrical object.



On the top face of the block sketch an approximate full-size isometric hole  $\varnothing 20$  mm by 5 mm deep.

[5]

- 5 Figure 1 below shows a Form 2 student working in a school workshop.



**Fig. 1**

- (a) Name the process being done by the student:.....[1]
- (b) Name the tools used:.....[1]

- 6 Read carefully the Design brief given below to answer the questions that follow.

Design and make a night light lamp holder for a ten year old child.

- (a) Write down any **two** key words or phrases found in the Design Brief.

1.....[1]

2.....[1]

- (b) The night light lamp holder will be made from a plastic base.  
In the space below sketch **one** idea for the base.

- 7 Sipho and Lethu raced two model cars on a sloppy surface having the same body shape and size. Sipho had used mild steel while Lethu used aluminium for making their cars.

[2]

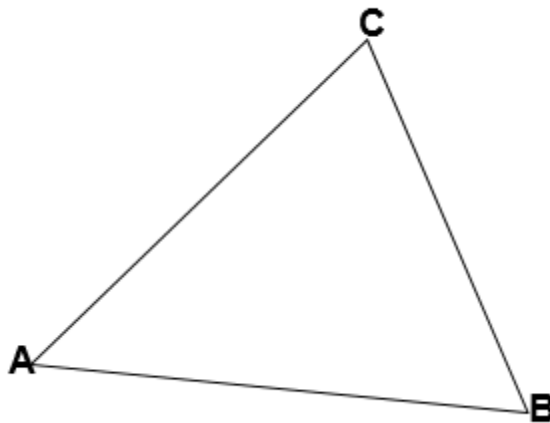
Lethu's car lost the race.

Suggest a possible reason why Lethu's car lost the race.

.....

[1]

- 8 Figure 2 below represents a triangular playground for a Pre-school in a local community.



**Fig. 2**

Using geometrical construction scribe a circle to represent a wall fence touching points **A**, **B** and **C**.

[3]

- 9 Figure 3 below shows a claw hammer being used to pull out a nail from wood.

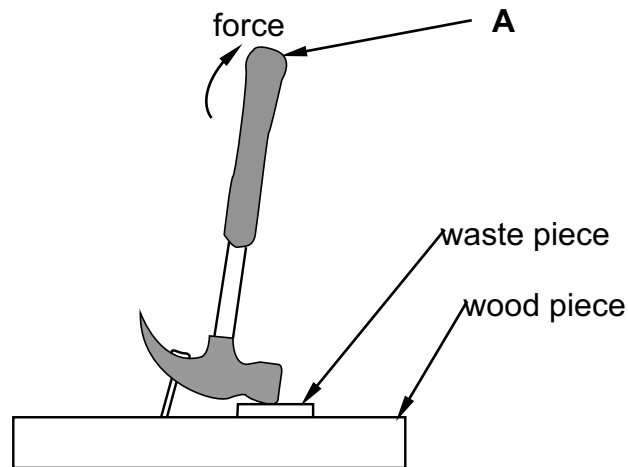


Fig. 3

- (a) Name the force applied at A.

.....

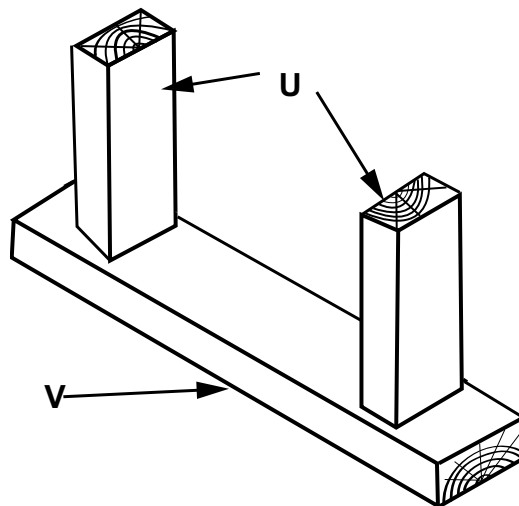
[1]

- (b) Identify and name the class of levers applied in the process above.

.....

[1]

- 10 The drawing below shows a bracket made from hard wood for holding 'T' squares in a Graphic Products room.



Name a suitable method of fixing the bracket onto a block wall.

.....

[1]

- 11 Figure 4 below shows a crossed belt and pulley systems.

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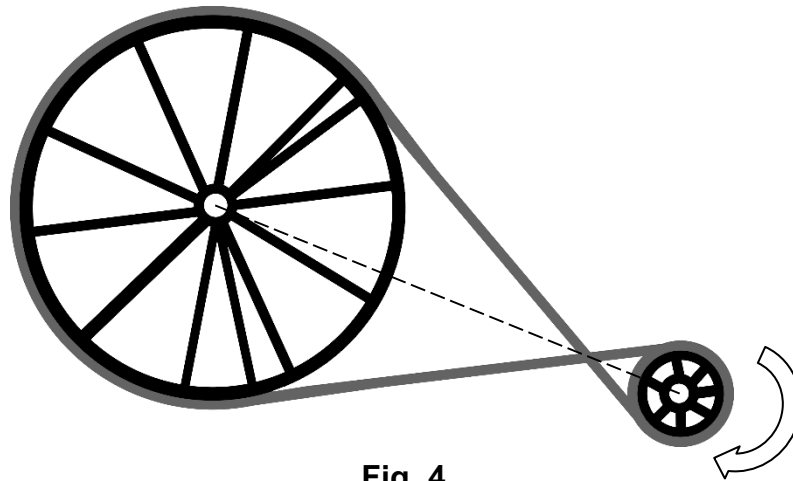


Fig. 4

Indicate on Figure 4, the rotational direction of the bigger pulley.

[1]

- 12 Gears are provided to transmit rotary motion and force on machines.

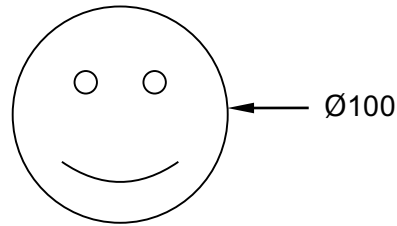
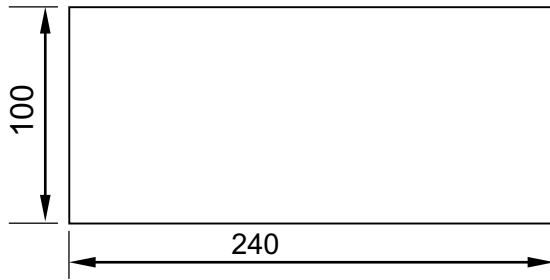


Name the gears shown above.

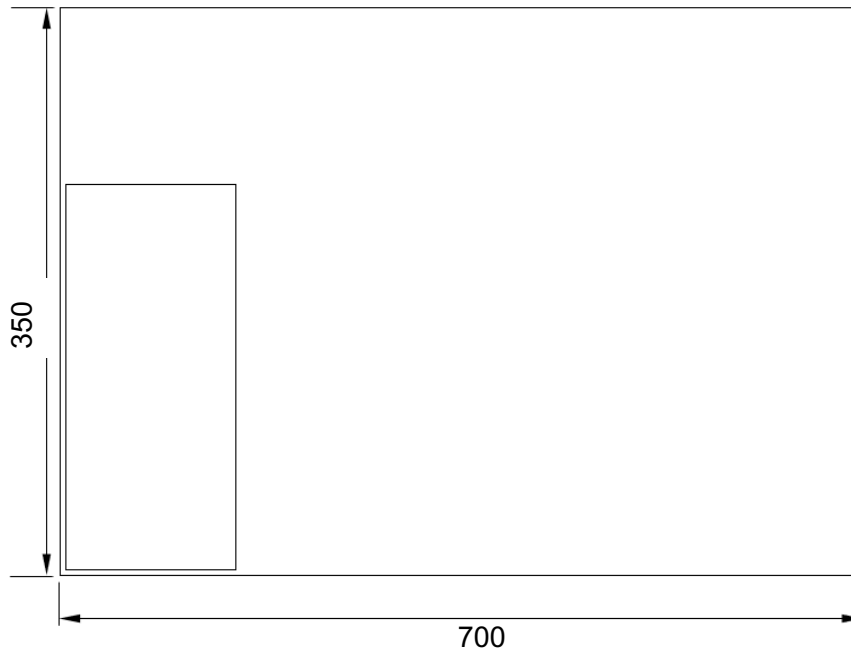
.....

[2]

- 13** A Form 3 Graphic Products student needs to cut out the two shapes shown below from a 3 mm thick acrylic sheet.



The rectangle below represents the acrylic sheet. The 240 x 100 mm rectangle has already been marked on the sheet.



On the outline of the acrylic sheet represented by the 700 x 350 mm draw the remaining shape with the least wastage possible.

[3]

- 14** Give **one** reason why plastics are mostly used for making toys for children.

.....[1]

- 15** Name a suitable plastic for making a kettle

.....[1]

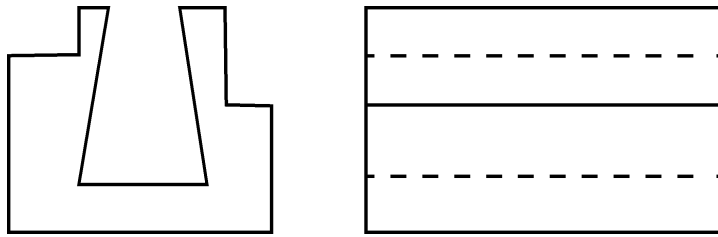
## SECTION B

For  
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This section consists of **three** questions.  
Answer any **two** questions in this section.

### Question B 1

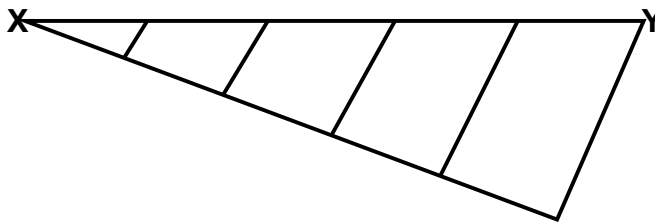
- 1 Name the type of projection shown in the figure below.



.....

[1]

- 2 Identify and state the number of parts into which the line **XY** has been divided.



Number of parts:.....

[1]

- 3 With reference to Figure 1 below, complete the statement under the figure.

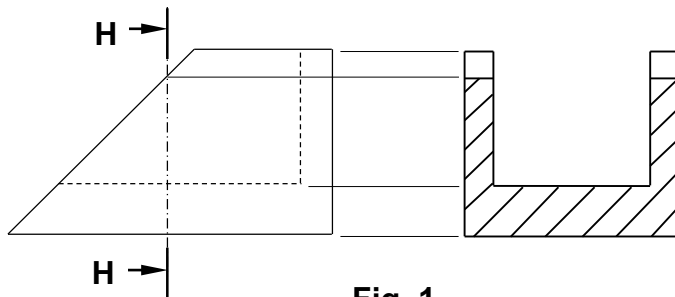


Fig. 1

The view on the right is a .....on **H - H**

[1]

- 4 Figure 2 below shows a task carried out during a practical exercise in a school workshop.



Fig. 2

Name a tool and material shown in the figure.

Tool:..... [1]

Material:..... [1]

- 5 Figure 3 represents a triangular plot **A, B, C** for an Agriculture student that has sides **AC** extended to **D** and **AB** extended to **E**.

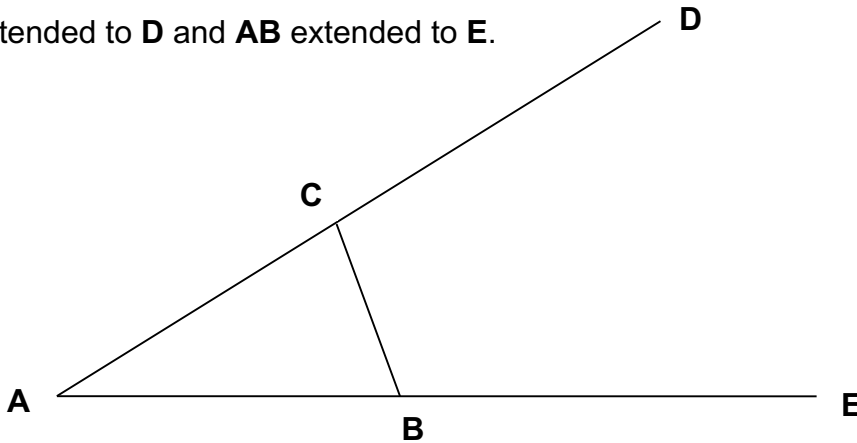
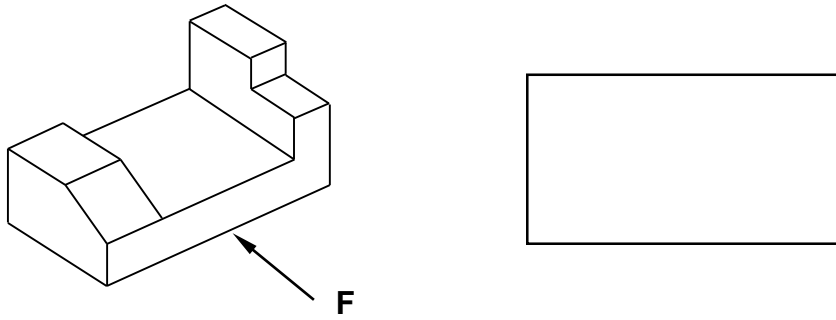


Fig. 3

Using geometric construction draw a circle representing a water tank to touch sides **DC, CB** and **BE**.

[3]

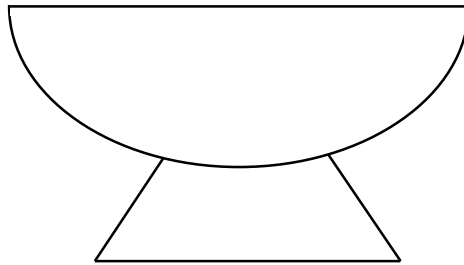
- 6 The drawing below shows an isometric view of a metal block.



In the box drawn to the right of the block sketch an approximate full size front view of the block as viewed from the direction of arrow **F**.

[3]

- 7 Figure 4 below represents an incomplete front view of a trophy.

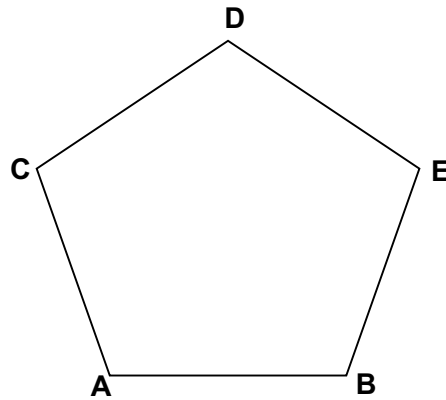


**Fig. 4**

Complete the drawing by adding the semi-ellipse top part of the trophy when the minor axis is 40 mm.

[4]

- 8 Figure 5 below represents a boundary for storing river sand for a building contractor.



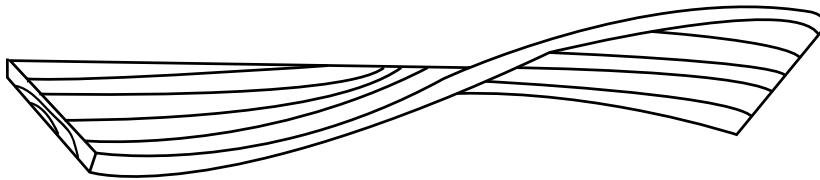
**Fig. 5**

Using geometric construction convert the area of the polygon to a triangle of equal area.

[5]

### Question B 2

- 1 Identify and name the timber defect shown in Figure 1 below.



**Fig. 1**

.....[1]

- 2 Figure 2 below shows a picture of a garden spade.



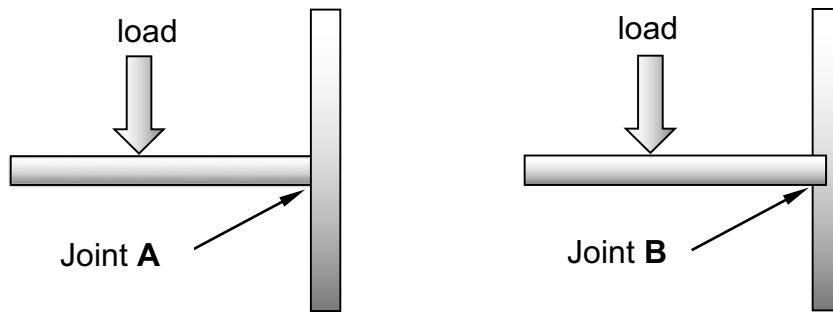
**Fig. 2**

Name the class of levers to which the spade belongs.

.....[1]

- 3 Figure 3 below shows two joints **A** and **B** as used in the construction of a bookshelf.

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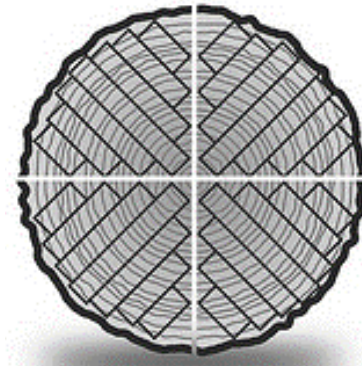


**Fig. 3**

Explain why joint **B** would carry more weight load than joint **A** without failing.

.....  
 .....[2]

- 4 Boards are obtained from logs by a process known as conversion.



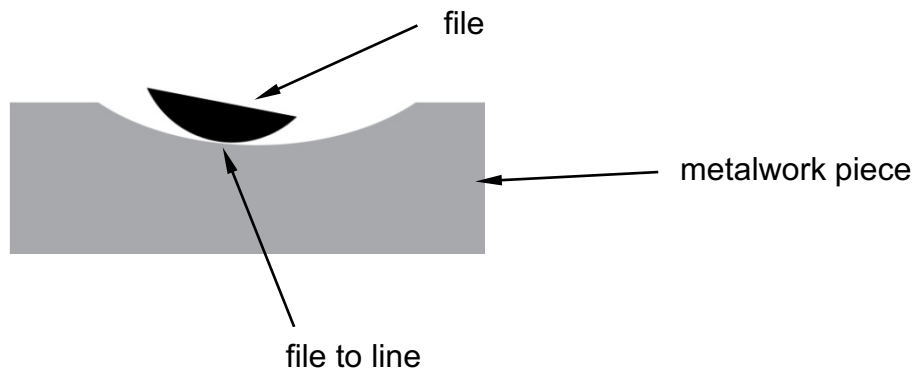
- (a) Identify and name the method of conversion of timber shown above.

..... [1]

- (b) Give an advantage of boards produced by this method.

..... [1]

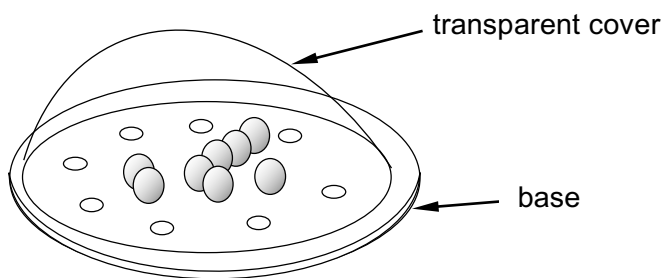
- 5 Shown below is a metalwork piece being filed.



Name the type of file being used.

.....[1]

- 6 The drawing below shows a plastic game in which each ball has to fit in each hole.



- (a) Name a suitable plastic for making the cover.

.....[1]

- (b) Give **two** properties of the plastic that makes it suitable for the cover.

1.....[1]

2.....[1]

- 7 Figure 4 shows the drive mechanism of a bicycle.

For  
Examiner's  
Use

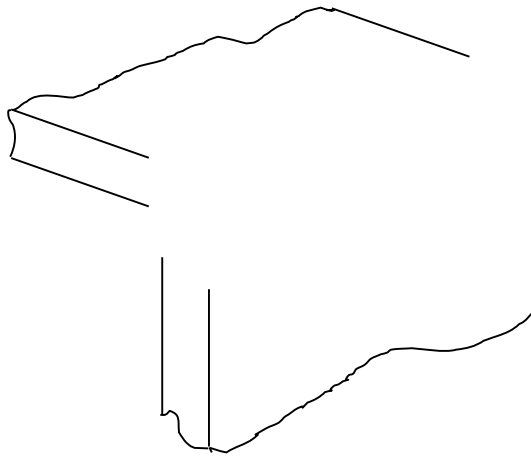


**Fig. 4**

Explain why a belt and pulley system would **not** be an efficient method for use in a bicycle.

.....  
.....[1]

- 8 The drawing below shows an incomplete corner joint for a book case.

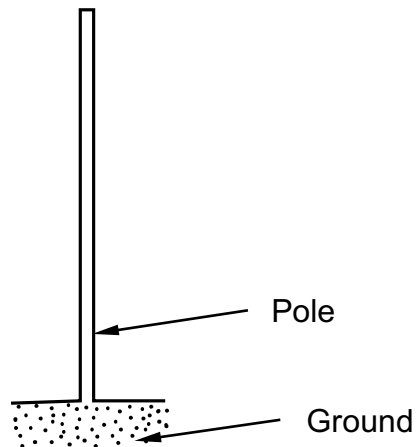


Complete the drawing to show an appropriate joint other than a butt joint.

[3]

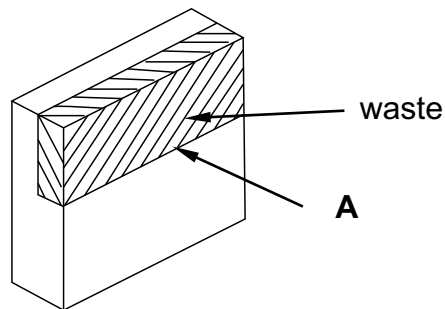
- 9 The picture below shows two horses drinking water from a container placed on the ground. Chicken and other animals usually dirty the drinking water for the horses.

Sketch a holder for the container to be attached to the pole at a high position. The pole has been drawn for you on the right side of the picture showing horses drinking



[4]

- 11 Figure 5 below represents a joint marked out by a Design and Technology student on a piece of wood.



**Fig. 5**

Name an appropriate tool to be used to:

- (a) Mark out the line at **A**.

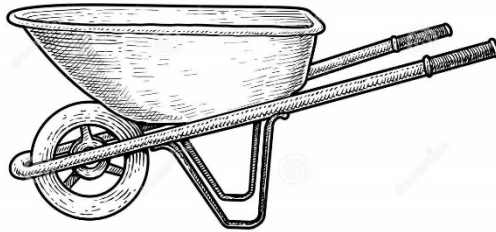
..... [1]

- (b) Remove the waste material.

..... [1]

**Question B 3**

- 1 Figure 1 shows a wheel barrow as an example of a class of levers.

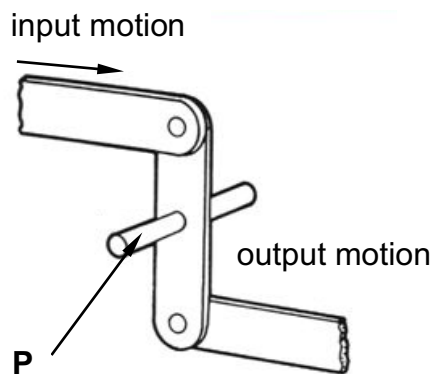
**Fig. 1**

Name the class of levers represented by the wheel barrow.

.....

[1]

- 2 Figure 2 shows a reverse motion linkages.

**Fig. 2**

- (a) Name the type of pivot shown by arrow P.

.....[1]

- (b) On Figure 2 show by means of an arrow the direction of the output motion.

[1]

- 3 In explaining the general concept of levers, it is mentioned that a lever is acted upon by two forces. Name these forces.

1:.....[1]

2:.....[1]

- 4 Figure 3 shows a set of gears.



**Fig. 3**

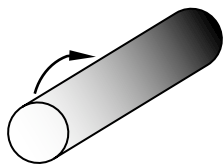
- (a) Name the type of gears shown in Figure 3.

.....[1]

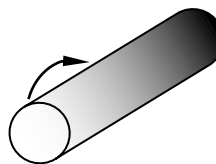
- (b) Name **one** tool in a workshop that uses this type of gears.

.....[1]

- 5 Rotary motion is the most common type of motion for shaft or an axle.



**Shaft A**



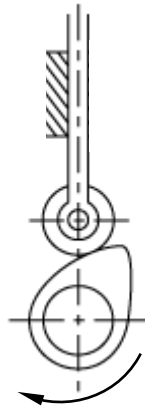
**Shaft B**

Name the possible way in which rotary motion can be transmitted from shaft **A** to shaft **B**.

.....[2]

- 6 Figure 4 below shows a type of cam and follower.

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**Fig. 4**

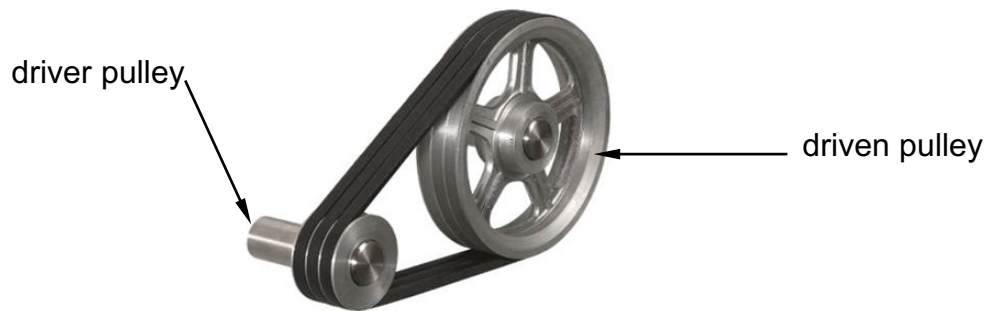
- (a) Identify and name the type of follower shown in Figure 4.

.....[1]

- (b) Use arrow heads to indicate the direction of movement of the follower in Figure 4 above.

[1]

- 7 Figure 5 represents a pulley and belt systems for a workshop machine.



**Fig. 5**

- (a) Looking at the sizes of the pulleys, how would be the rotational speed of the driven pulley?

Rotational speed will be .....[1]

- (b) Give a reason for your answer to (a) above.

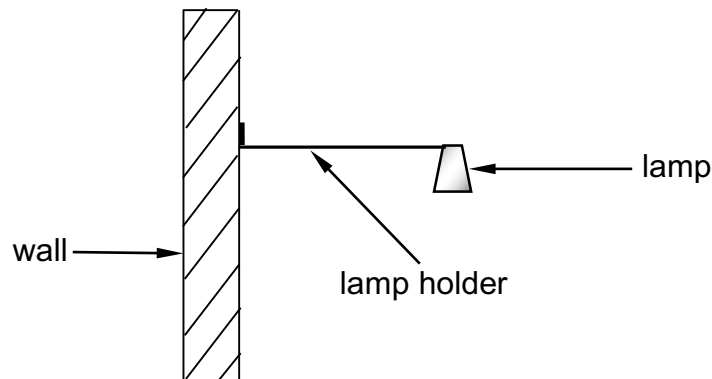
.....

.....[2]

- 8 In the space provided below make a simple line sketch of an eccentric cam.

- 9 Figure 6 shows a line diagram of a lamp holder fixed onto a wall.

[2]



**Fig. 6**

- (a) On Figure 6 above sketch a support for the lamp holder. [1]

- (b) Name the structural member you have drawn in (a) above.

.....[1]

- (c) Explain what would happen if the support you have sketched was not provided.

.....

.....[1]

- (d) Name the force that would act on the structural member you have sketched.

.....[1]

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