



# Coimisiún na Scrúduithe Stáit State Examinations Commission

*Leaving Certificate Applied, 2006*

## Vocational Specialism – Engineering (240 marks)

Monday 12<sup>th</sup> June, 2006

Morning 9.30 a.m. – 11.00 a.m.

### *General Directions to Candidates*

1. Write your **examination number** in this space.
2. Answer **all** questions from Section 1.
3. Answer **any three** questions from Section 2.
4. Write your answers in the spaces provided and include sketches as appropriate.
5. Hand up this paper at the end of the examination.
6. If Question 7 is attempted, answer any two topics.

<i>For the Superintendent only</i>	<i>For the Examiner only</i>	
<i>Centre Stamp</i>	1. Total of end of page totals	
	2. Aggregate total of all disallowed questions	
	3. Total mark awarded (1 minus 2)	
	4. Bonus mark for answering through Irish (if applicable)	
	5. Total mark awarded if Irish Bonus (3 plus 4)	
	Note: The mark in row 3 (or row 5 if Irish bonus is awarded) must equal the total mark on the flap at the end of the script.	






# Section 1 (90 Marks)

Answer **all three** questions

Section 1 Q1.


45 marks

Give brief answers to **any fifteen** of the following.  
(Sketches may be used to explain your answers).

QUESTION	ANSWER
<p>(a) What is the purpose of the plastic on the handles of this pliers?</p> 	<p>Purpose _____ _____ _____</p>
<p>(b) State <b>one</b> safety precaution to be observed when using a centre lathe.</p> 	<p>Safety precaution _____ _____ _____</p>
<p>(c) Name a suitable surface finish that will protect the door decoration, as shown, from the weather.</p> 	<p>Finish _____ _____</p>
<p>(d) Identify the tool shown and state its use.</p> 	<p>Tool _____ Use _____ _____</p>
<p>(e) Name the tool shown and give <b>one</b> example of where it may be used.</p> 	<p>Name _____ Use _____ _____</p>

QUESTION	ANSWER
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**(f)** Give **one** reason why childrens' play bricks are made from plastic.

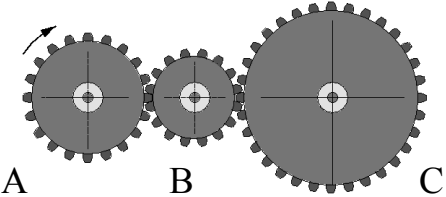
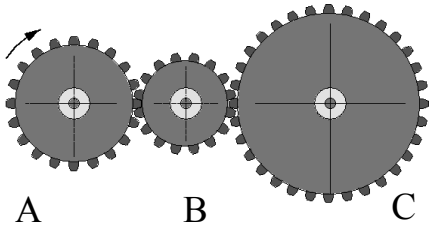


Reason \_\_\_\_\_


\_\_\_\_\_

\_\_\_\_\_

**(g)** If gear **A** rotates as shown, indicate with arrows the direction of gears **B** and **C**.

**(h)** Tick the correct box to indicate the two main metals used to make solder.




Brass + Steel

Lead + Tin

Zinc + Silver

**(i)** State **one** safety precaution to be observed when using a bench grinder, as shown.




Safety precaution \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**(j)** Name the tool shown and state a suitable use.




Name \_\_\_\_\_

Use \_\_\_\_\_

\_\_\_\_\_


QUESTION	ANSWER
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**(k)** Name a suitable material for the handle of the screwdriver shown.



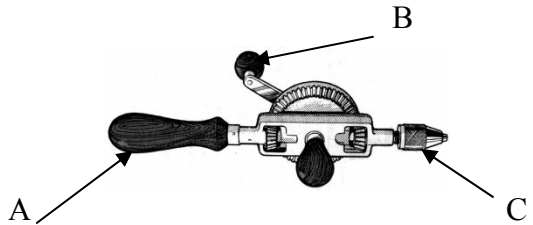
Material \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**(l)** Name the type of key shown and state where it may be used.




Name \_\_\_\_\_  
 Use \_\_\_\_\_  
 \_\_\_\_\_

**(m)** Name any **two** parts of the hand drill shown.




A \_\_\_\_\_  
 B \_\_\_\_\_  
 C \_\_\_\_\_

**(n)** Name the spanner shown and state where it may be used.



Name \_\_\_\_\_  
 Use \_\_\_\_\_  
 \_\_\_\_\_

**(o)** Name a suitable material used to make the teapot shown, and give **one** reason for your choice of material.



Material \_\_\_\_\_  
 Reason \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

QUESTION	ANSWER
----------	--------

(p) Name the tool shown and state its use.



Name \_\_\_\_\_

Use \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

(q) Give **one** reason why aluminium is used in the construction of aeroplanes.



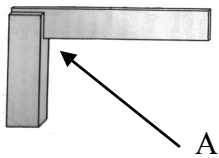
Reason \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

(r) State the size of the angle A on the try - square shown.



Size of angle A \_\_\_\_\_

(s) Identify the tool shown and give a suitable use.



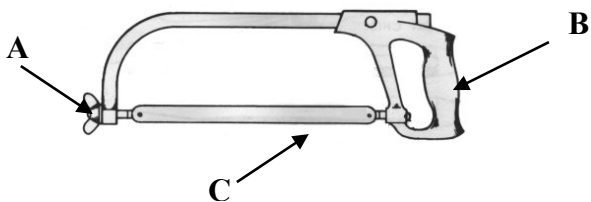
Name \_\_\_\_\_

Use \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

(t) Name any **two** parts of the hacksaw shown.



A \_\_\_\_\_

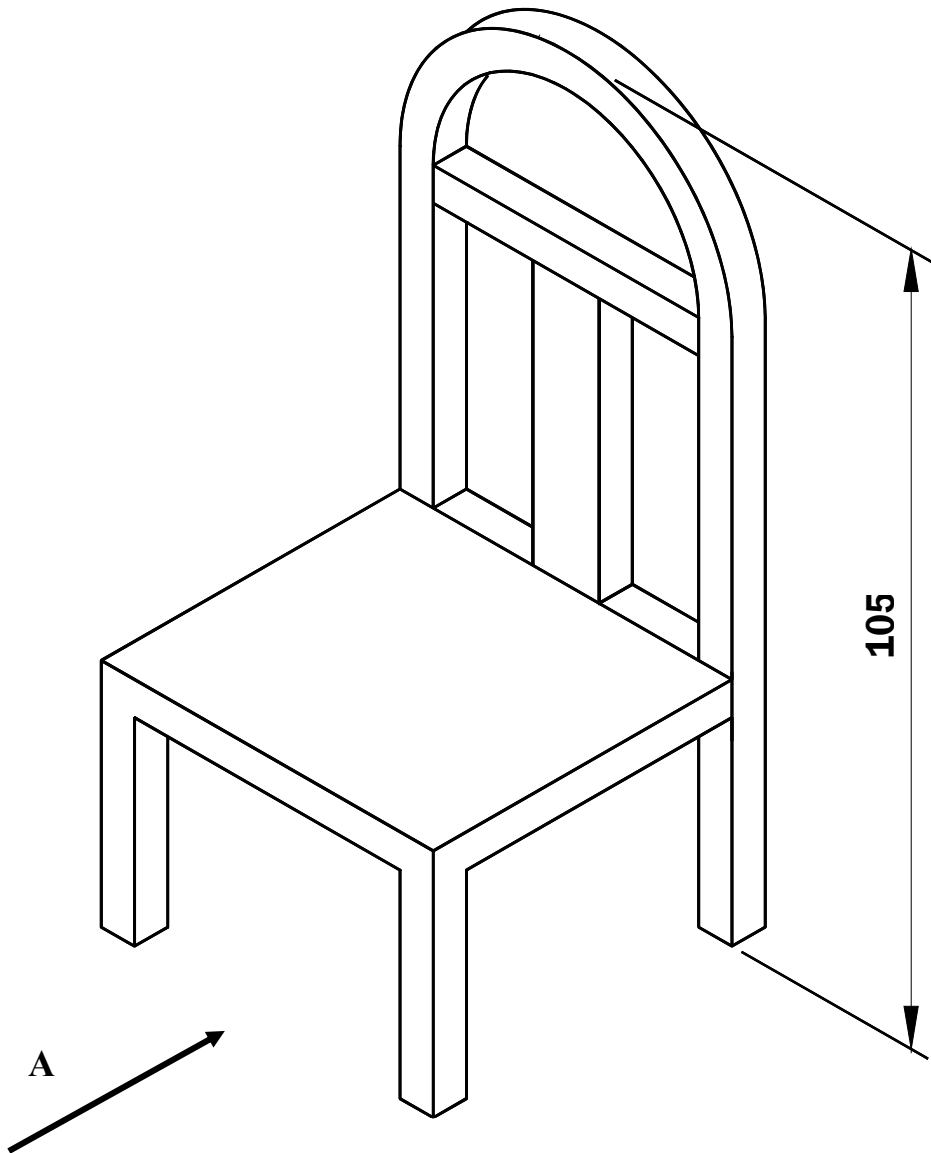
B \_\_\_\_\_

C \_\_\_\_\_

A pictorial view of a chair for a doll's house is shown below.  
Draw the following **two** views of the chair on the grid paper opposite.

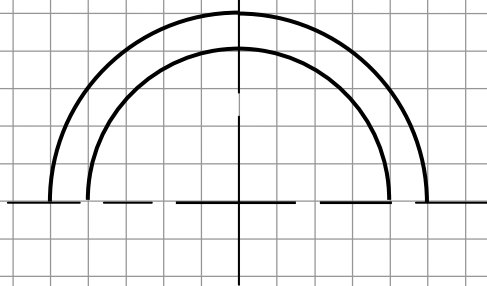
(a) A front elevation in the direction of arrow A.

(b) A plan projected from view (a).



(c) One dimension is shown on the pictorial view.  
Insert **three** other dimensions on your drawing below.

Note: Each grid space represents 5 mm



Complete the Elevation

Complete the Plan

(a) Name and give a suitable use for any **two** of the safety items used in an Engineering room, as shown below.



Safety item	Use
1. _____ _____	_____ _____
2. _____ _____	_____ _____

(b) The diagram shows an angle grinder. State **two** safety precautions that should be observed when using an angle grinder.

1. \_\_\_\_\_  
\_\_\_\_\_
2. \_\_\_\_\_  
\_\_\_\_\_





(c) When using electric welding equipment identify **any two** dangers and describe the safety precautions that should be observed in each case.

Danger \_\_\_\_\_

\_\_\_\_\_

Safety precaution \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Danger \_\_\_\_\_

\_\_\_\_\_

Safety precaution \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



(d) State **two** safety precautions that should be observed when using an electric soldering iron, as shown.

Safety precaution 1 \_\_\_\_\_

\_\_\_\_\_

Safety precaution 2 \_\_\_\_\_

\_\_\_\_\_



(e) Give **one** reason why safety boots should be worn in a workshop environment.

Reason \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



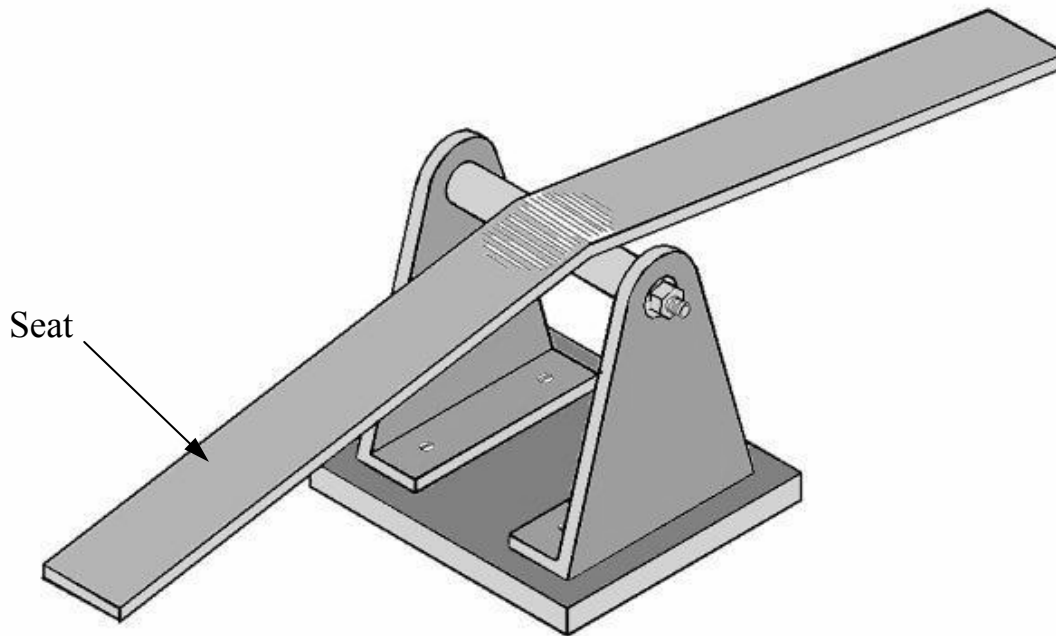
*Section 2 (150 Marks)*

Answer **any three** questions

*Section 2*    **Q4.**

**50 marks**

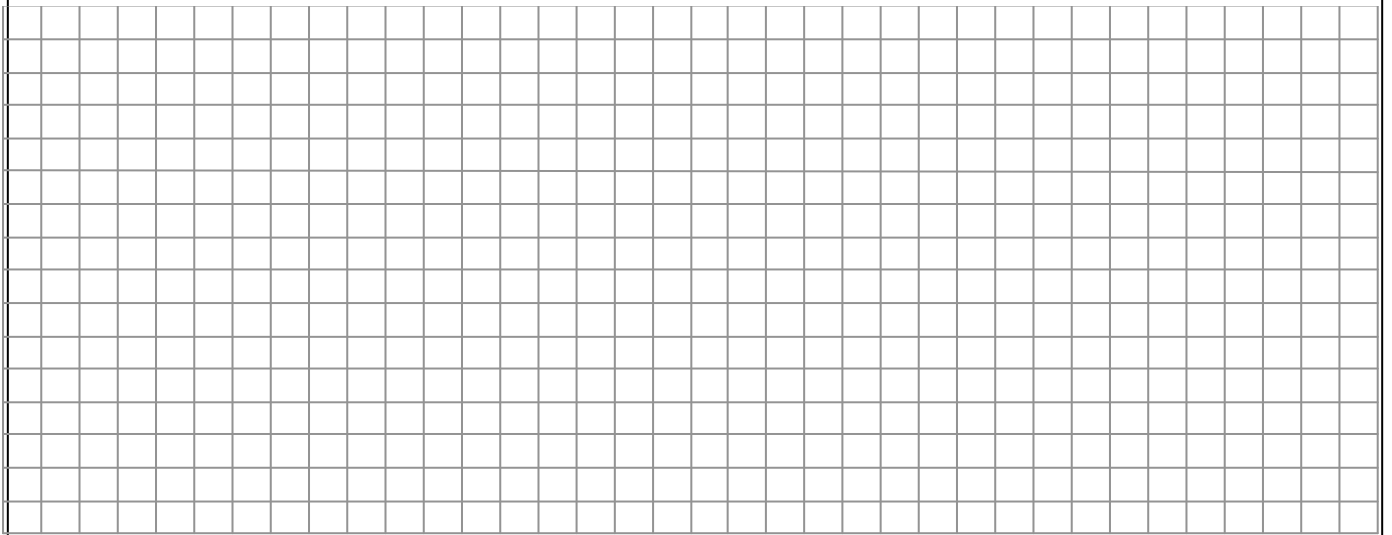
The metallic seat of the see-saw shown below has sagged at the centre point due to poor design.



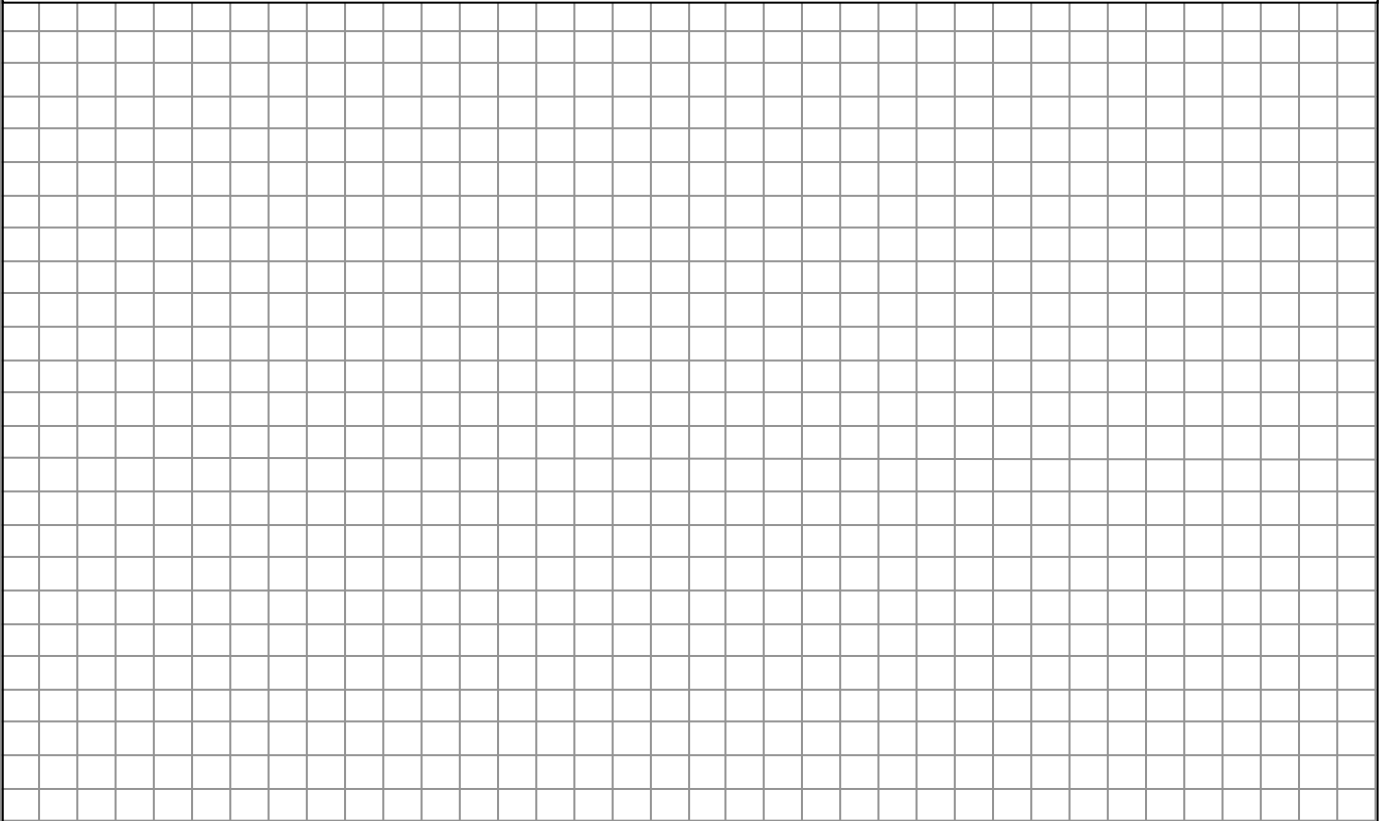
**(a)** (1) Outline **one** major design flaw in the see-saw shown.

Design flaw \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(2) Sketch a design feature that will make the seat of the see-saw safer when in use.



(b) (1) In the space provided, sketch a design modification to the seat of the see-saw which will prevent it sagging.



(c) You are required to mark out the 6 mm diameter hole at A on the support bracket, as shown below.

(1) List **three** stages in the marking out process for the hole.

(i) \_\_\_\_\_

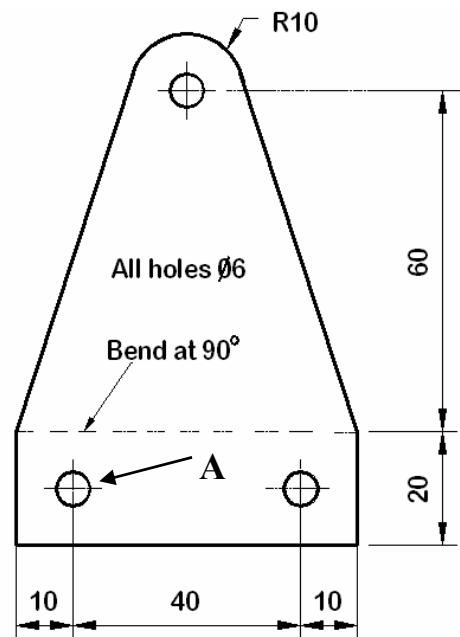
(ii) \_\_\_\_\_

(iii) \_\_\_\_\_

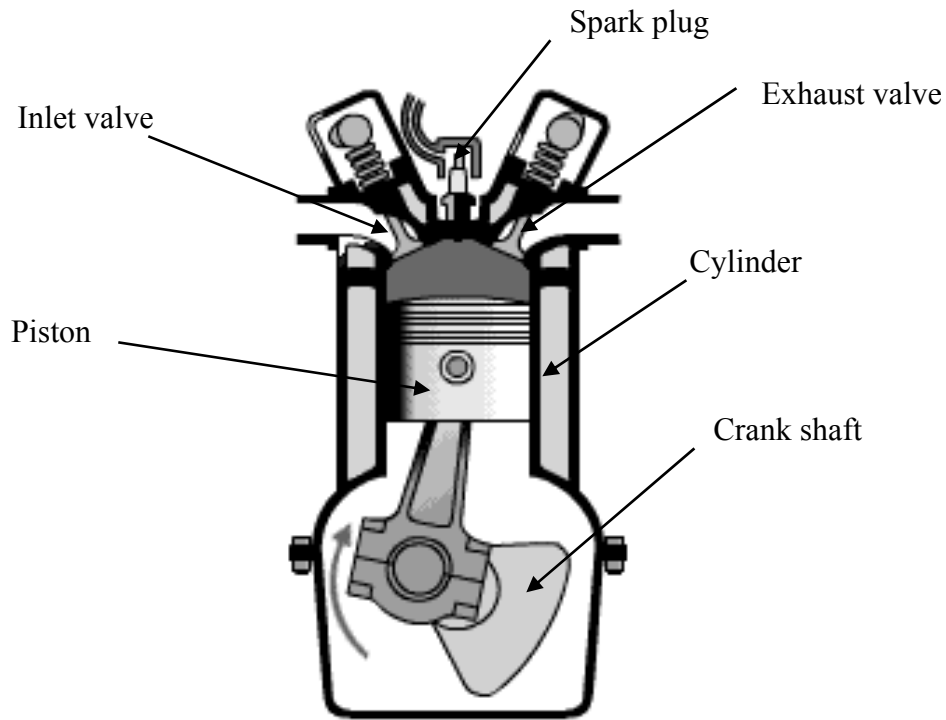
(2) List **two** tools you would use to mark out the hole.

(i) \_\_\_\_\_

(ii) \_\_\_\_\_



- (a) A diagram of a four stroke petrol engine, with the main parts labelled, is shown below. Describe any **two** of the four strokes, (i) induction (ii) compression (iii) power (iv) exhaust.



(i) Induction \_\_\_\_\_

\_\_\_\_\_

(ii) Compression \_\_\_\_\_

\_\_\_\_\_

(iii) Power \_\_\_\_\_

\_\_\_\_\_

(iv) Exhaust \_\_\_\_\_

\_\_\_\_\_

(b) Four common components used in the engine of a motor car are shown below. Identify any **three** of the components and explain the function of each.



Component \_\_\_\_\_

Function \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_



Component \_\_\_\_\_

Function \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_



Component \_\_\_\_\_

Function \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_



Component \_\_\_\_\_

Function \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

(a) Describe briefly any **four** stages used to produce the scroll at A. The scroll is made from mild steel bar of diameter 10mm. (*Use sketches as appropriate*).

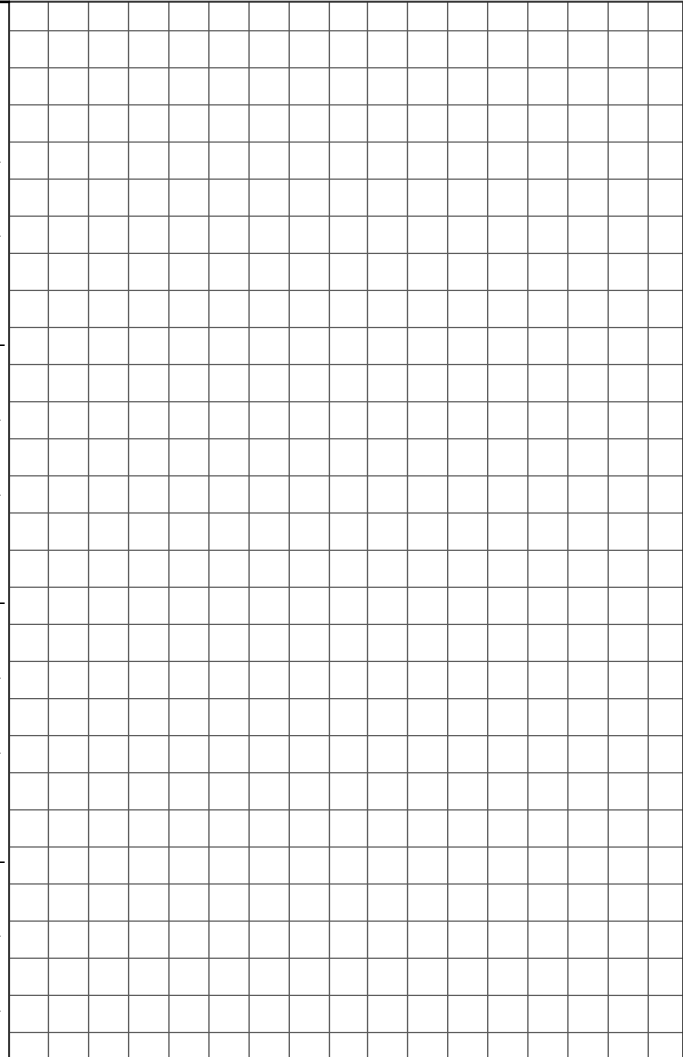


Stage 1 \_\_\_\_\_

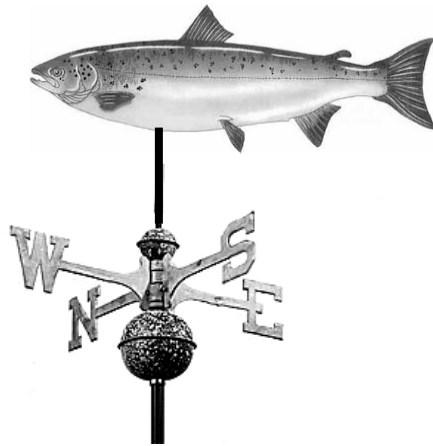
Stage 2 \_\_\_\_\_

Stage 3 \_\_\_\_\_

Stage 4 \_\_\_\_\_



- (b) A weather vane to indicate wind direction is shown below.  
Name a suitable sheet material you would use to make the fish shape and describe **three** processes used in the making of the fish shape. (*Use sketches as appropriate*).



Material \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Process 1 \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Process 2 \_\_\_\_\_

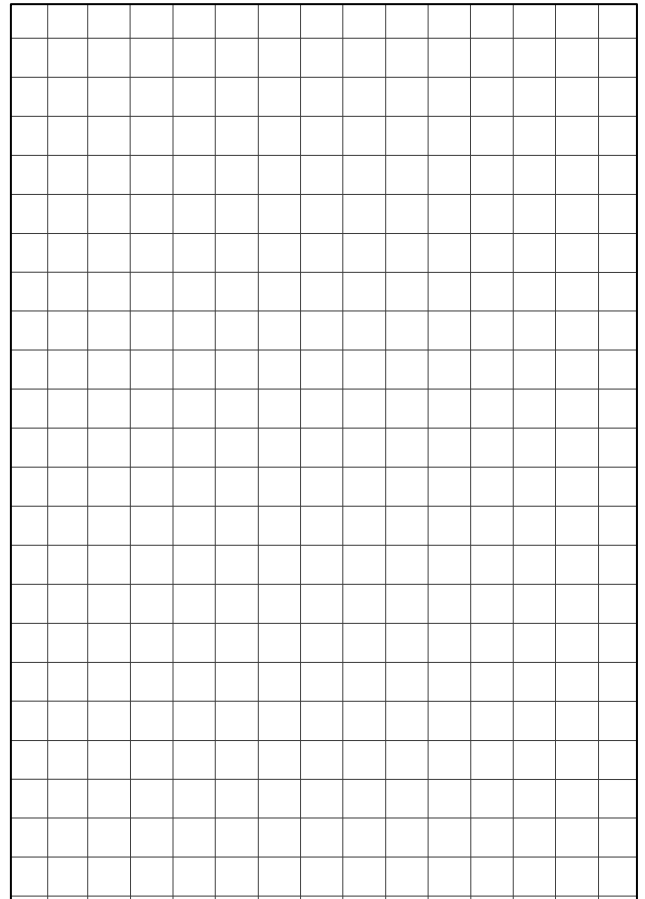
\_\_\_\_\_

\_\_\_\_\_

Process 3 \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



Name a tool used to cut out the fish shape from sheet metal.

\_\_\_\_\_

- (d) State one safety precaution to be observed when cutting sheet metal.

\_\_\_\_\_

## **Systems Module**

(Any two topics comprise a full module)

Answer **any two** from the following five topics.

Topic (a) – Computer Aided Design (CAD)

Topic (b) – Electricity

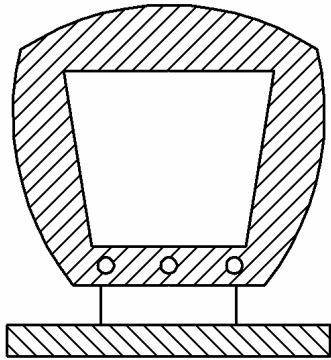
Topic (c) – Electronics

Topic (d) – Mechanisms

Topic (e) – Pneumatics

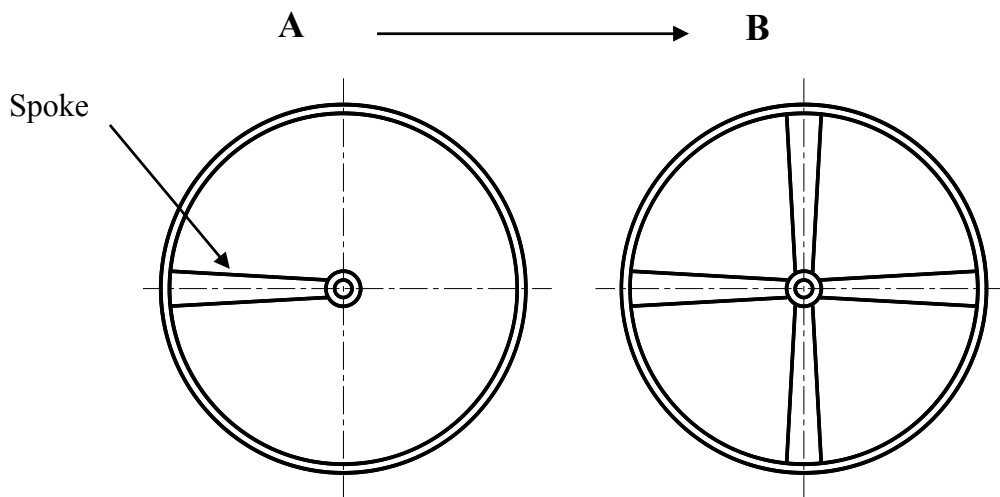


(a) A CAD drawing of a computer monitor is shown. List any **four** CAD commands necessary to produce the drawing.



- 1 \_\_\_\_\_
- 2 \_\_\_\_\_
- 3 \_\_\_\_\_
- 4 \_\_\_\_\_

(b) Given the drawing of a wheel with one spoke shown at A, outline the CAD procedure used to complete the drawing at B.

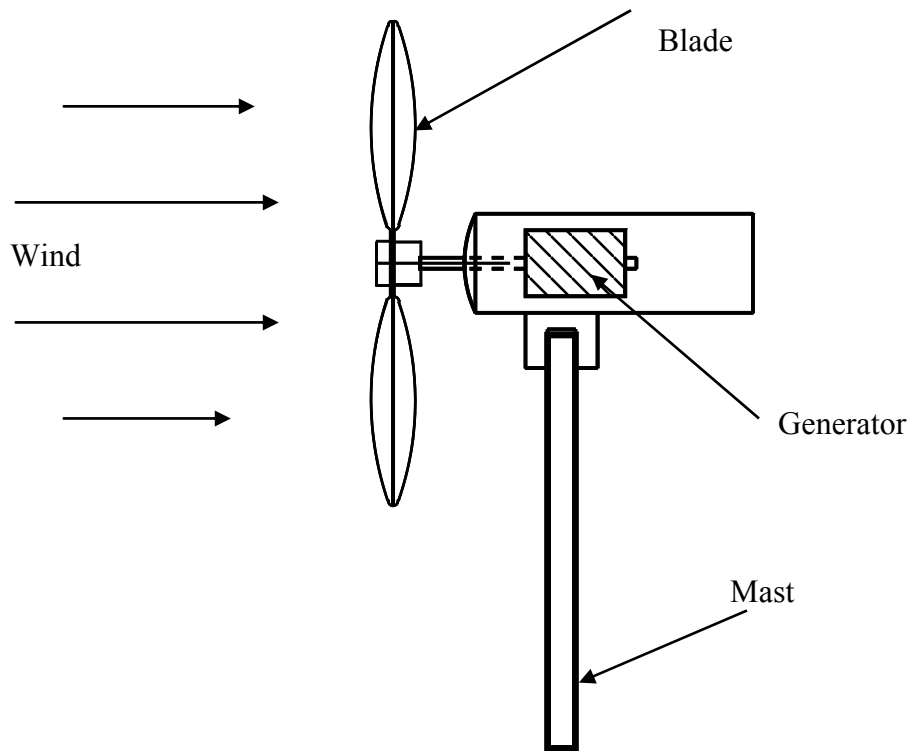


Procedure \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

- (a) A diagram of a wind generator is shown below.  
Explain briefly how the generator works.



Explanation \_\_\_\_\_







\_\_\_\_\_

\_\_\_\_\_

- (b) State the function of any **three** of the following electrical devices used in the home.

Electrical Device	Function
Fuse	
Thermostat	
ELCB	
Switch	

(a) Name and give a use for any **four** of the components shown.

 <p>Name _____</p> <p>Use _____</p> <p>_____</p>	 <p>Name _____</p> <p>Use _____</p> <p>_____</p>	 <p>Name _____</p> <p>Use _____</p> <p>_____</p>
 <p>Name _____</p> <p>Use _____</p> <p>_____</p>	 <p>Name _____</p> <p>Use _____</p> <p>_____</p>	 <p>Name _____</p> <p>Use _____</p> <p>_____</p>

(b) A basic circuit for a water level indicator is shown below.  
 Explain how the circuit works when the water level rises to cover the probes.

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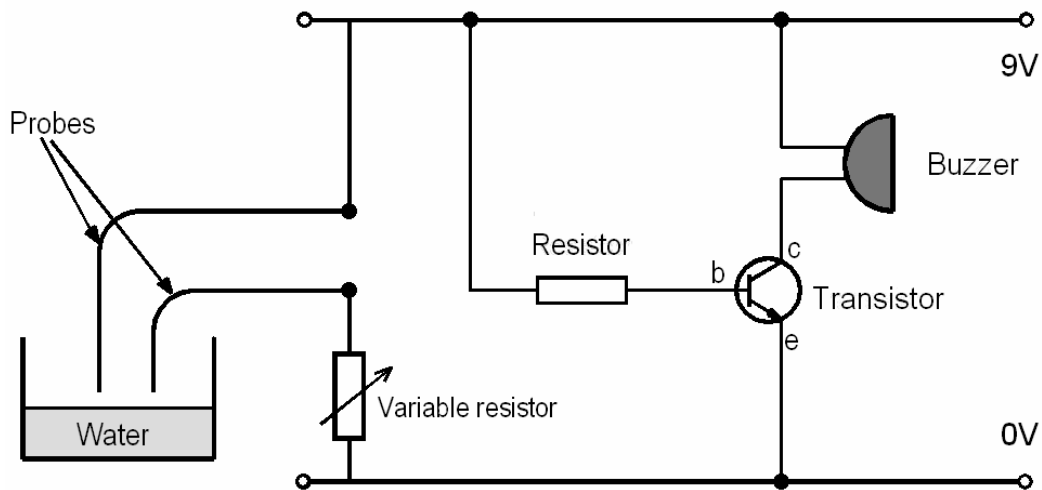
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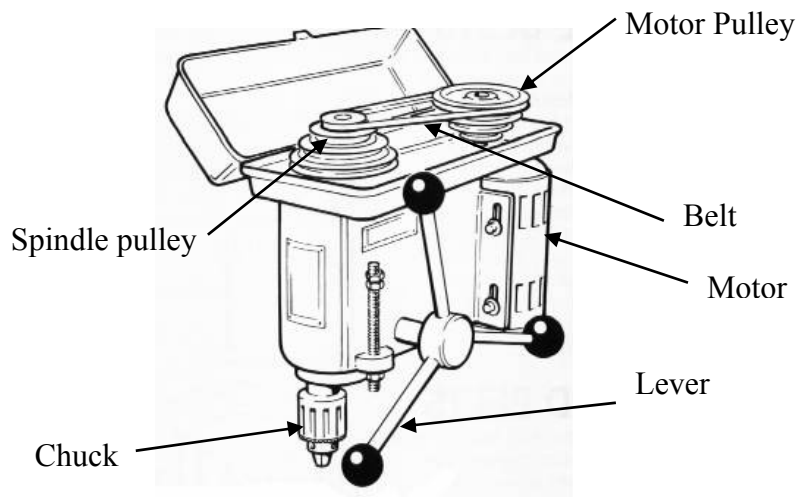
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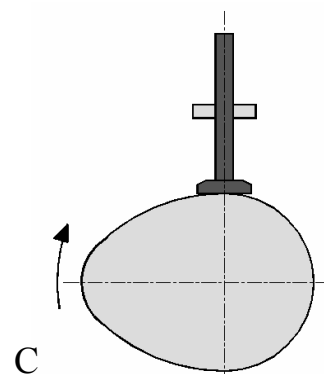
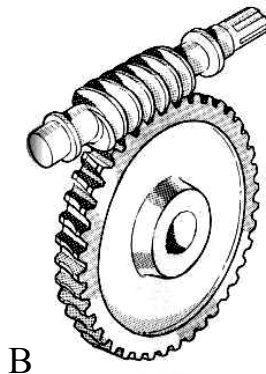
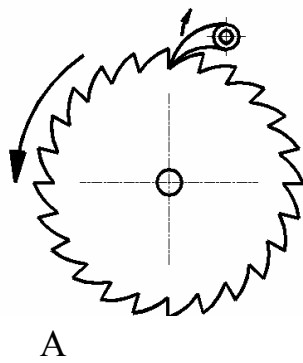


(a) The drive mechanism of a drilling machine, with the safety guard cover in the open position, is shown below.



- (i) Explain how the speed of the chuck is decreased. \_\_\_\_\_  
\_\_\_\_\_
- (ii) Name the mechanism used to raise and lower the chuck \_\_\_\_\_

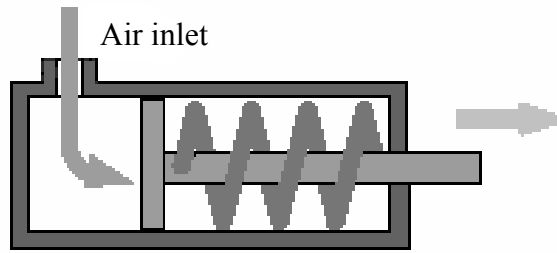
(b) Identify any **two** of the mechanisms A, B and C and state where they are used.



	Name	Where used
Mechanism A		_____
Mechanism B		_____
Mechanism C		_____

(a) A single-acting pneumatic cylinder is shown below.

(i) Explain briefly how it functions.



Function \_\_\_\_\_

\_\_\_\_\_

(ii) What is the purpose of the spring? \_\_\_\_\_

\_\_\_\_\_

(b) (i) Give **one** use for the air compressor shown below

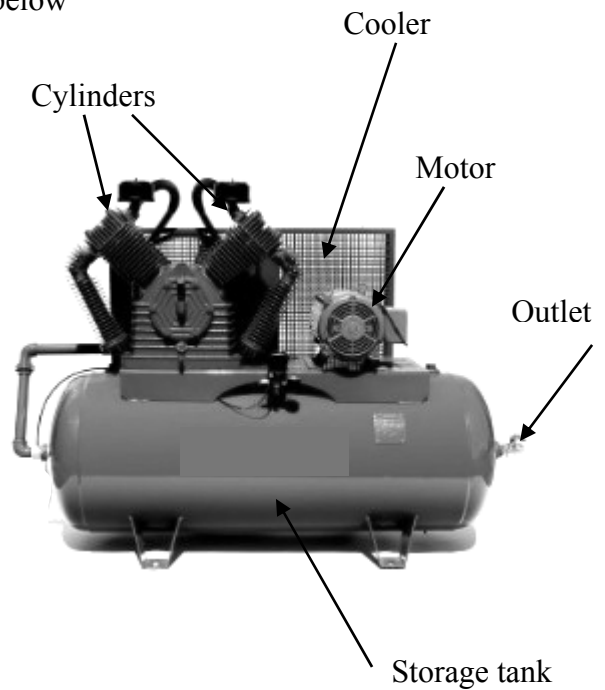
\_\_\_\_\_

\_\_\_\_\_

(ii) Why is the storage tank required?

\_\_\_\_\_

\_\_\_\_\_



(c) Give **two** safety precautions that must be observed when using compressed air.

1 \_\_\_\_\_

\_\_\_\_\_

2 \_\_\_\_\_

\_\_\_\_\_

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**For Examiners use only**

<b>Question</b>	<b>Mark</b>	<b>Total</b>
<b>SECTION 1</b>		
<b>1</b>		
<b>2</b>		
<b>3</b>		
<b>SECTION 2</b>		
<b>4</b>		
<b>5</b>		
<b>6</b>		
<b>7(a)</b>		
<b>7(b)</b>		
<b>7(b)</b>		
<b>7(c)</b>		
<b>7(d)</b>		
<b>TOTAL</b>		