



# Coimisiún na Scrúduithe Stáit State Examinations Commission

*Leaving Certificate Applied, 2004*

## Vocational Specialism – Engineering (240 marks)

Monday 14<sup>th</sup> June, 2004

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)

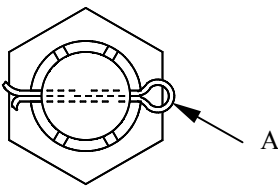
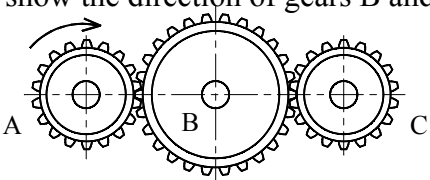
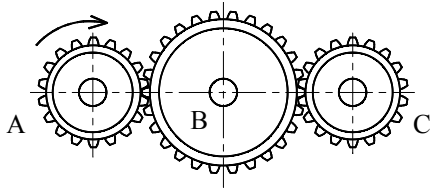



Answer all three questions

1.

**45 marks**

**Give brief answers to any fifteen of the following.**

(Sketches may be used to explain your answers).

QUESTION	ANSWER
<p>(a) State the name and use for part A.</p> 	<p>Name _____</p> <p>Use _____</p> <p>_____</p>
<p>(b) If gear A is rotating as shown use arrows to show the direction of gears B and C.</p> 	
<p>(c) What does this safety symbol indicate and where would it be used?</p> 	<p>This indicates _____</p> <p>Use _____</p> <p>_____</p>
<p>(d) Name the tool shown and state its use.</p> 	<p>Tool _____</p> <p>Use _____</p> <p>_____</p>
<p>(e) Explain why stainless steel is used for making cutlery.</p> 	<p>Reason _____</p> <p>_____</p> <p>_____</p>

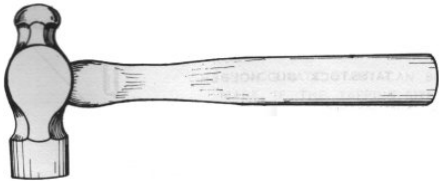
QUESTION	ANSWER
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(f) Name the type of fastener shown and give an example of where it is used.



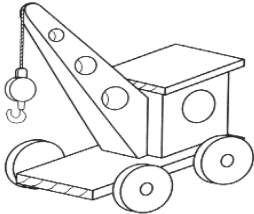
Name \_\_\_\_\_  
 Use \_\_\_\_\_  
 \_\_\_\_\_

(g) Name the type of hammer shown.



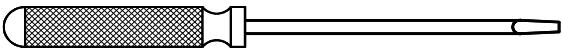
Type \_\_\_\_\_  
 \_\_\_\_\_

(h) Name a suitable material for children's toys and give a reason.



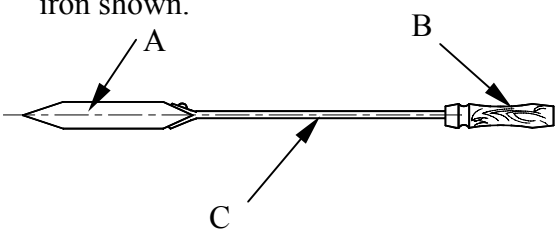
Material \_\_\_\_\_  
 Reason \_\_\_\_\_  
 \_\_\_\_\_

(i) State the reason for knurling the handle of a screwdriver.



Reason \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

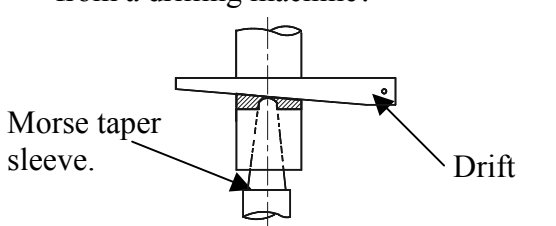
(j) Name **any two** parts of the soldering iron shown.



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

QUESTION	ANSWER
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(k) How is a Morse taper sleeve removed from a drilling machine?



Morse taper sleeve.

Drift

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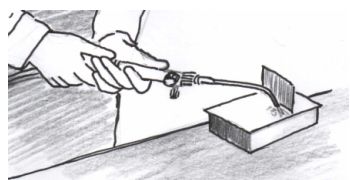


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(l) State **one** safety precaution that should be observed when welding.



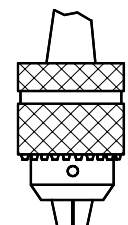
Safety precaution \_\_\_\_\_

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(m) Name the machine tool shown and state its use.



Name \_\_\_\_\_

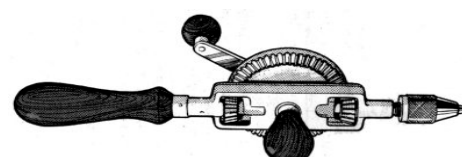
Use \_\_\_\_\_

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(n) Why is a hand drill sometimes used instead of an electric drilling machine?




Reason \_\_\_\_\_

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(o) Name the electrical device shown.

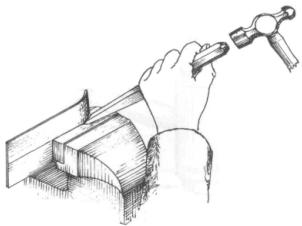


Name \_\_\_\_\_

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QUESTION	ANSWER
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(p) State **one** safety precaution to be taken when using a cold chisel?




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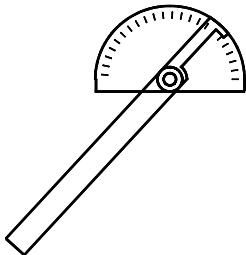


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(q) Name the tool shown and state its use.



Name \_\_\_\_\_

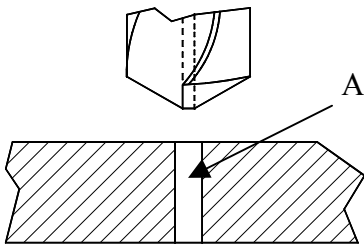
Use \_\_\_\_\_

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(r) What is the purpose of the pilot hole A?




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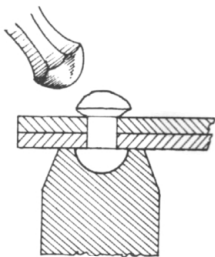


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(s) Name the joining process.



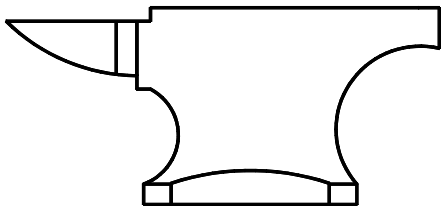
Process \_\_\_\_\_

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



Name \_\_\_\_\_

Use \_\_\_\_\_

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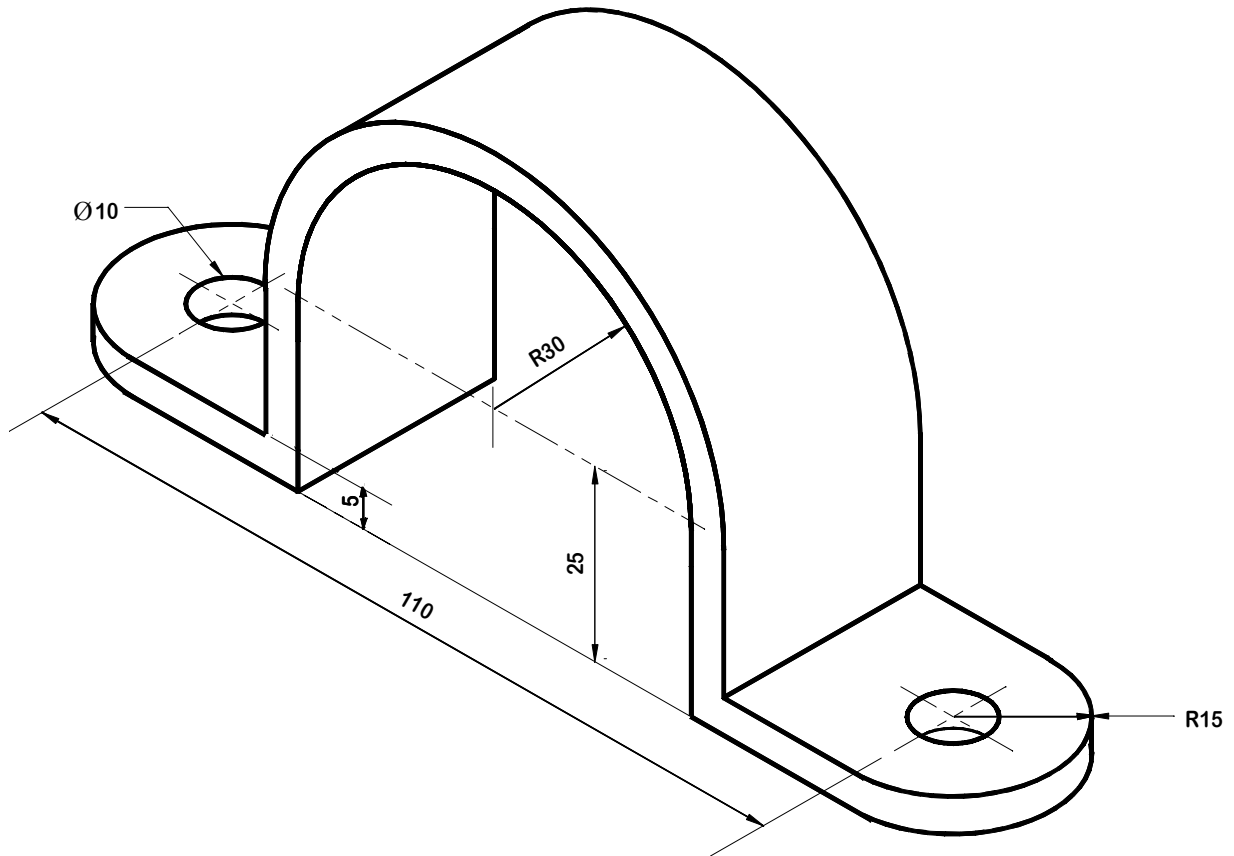
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2.

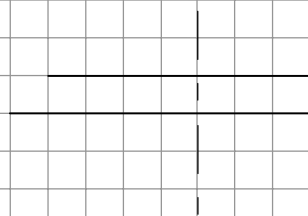
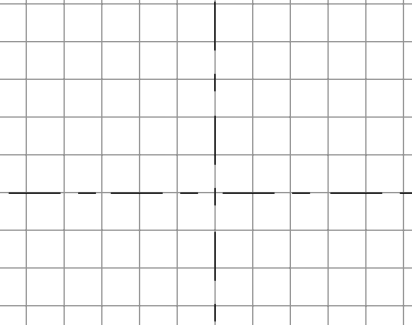
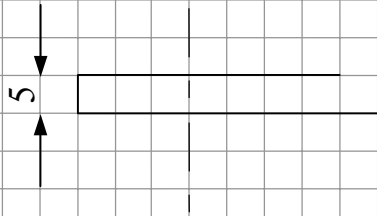
25 marks

A pictorial view of a pipe bracket drawn full size is shown below.

- (a) Complete the elevation and plan of the pipe bracket on the grid paper opposite.



(b) One dimension is shown. Insert **three** others on your drawing.



Complete the Elevation

Draw the Plan

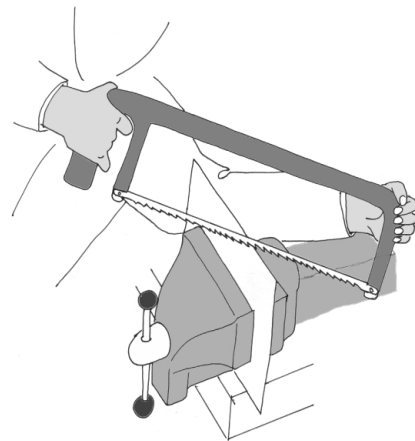
(a) The diagram shows a person brazing. List **two** safety precautions observed and give a reason for each. One example is already listed.



Safety precaution	Reason
Example: An apron is worn.  1. _____ _____  2. _____ _____	To protect clothes from being burnt by sparks.  _____ _____ _____ _____

(b) The diagram below shows a person using a hacksaw to cut sheet metal. State a danger involved in this process.

Danger \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_





(c) When using the drilling machine shown, identify **any two** dangers and briefly describe the safety precautions that should be taken in each case.

Danger \_\_\_\_\_

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

Danger \_\_\_\_\_

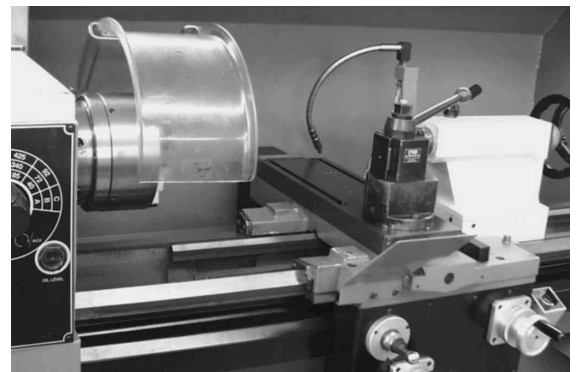
Safety precaution \_\_\_\_\_



(d) State **two** safety precautions when using a lathe.

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

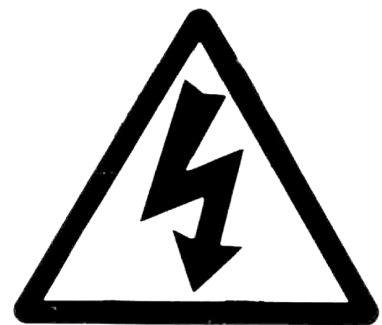
Safety precaution 2 \_\_\_\_\_



(e) What does this safety symbol indicate and where would it be used?

Symbol indicates \_\_\_\_\_

Used \_\_\_\_\_



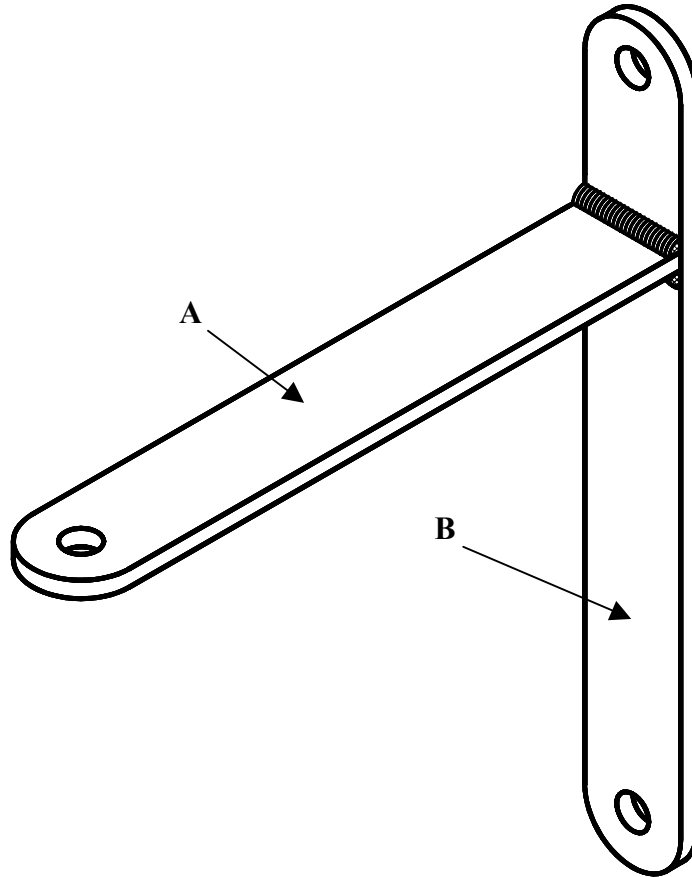
*Section 2 (150 Marks)*

Answer any three questions

4.

50 marks

The wall bracket is used to support a hanging basket for flowers. It is made from two pieces of steel, A and B that are welded together.

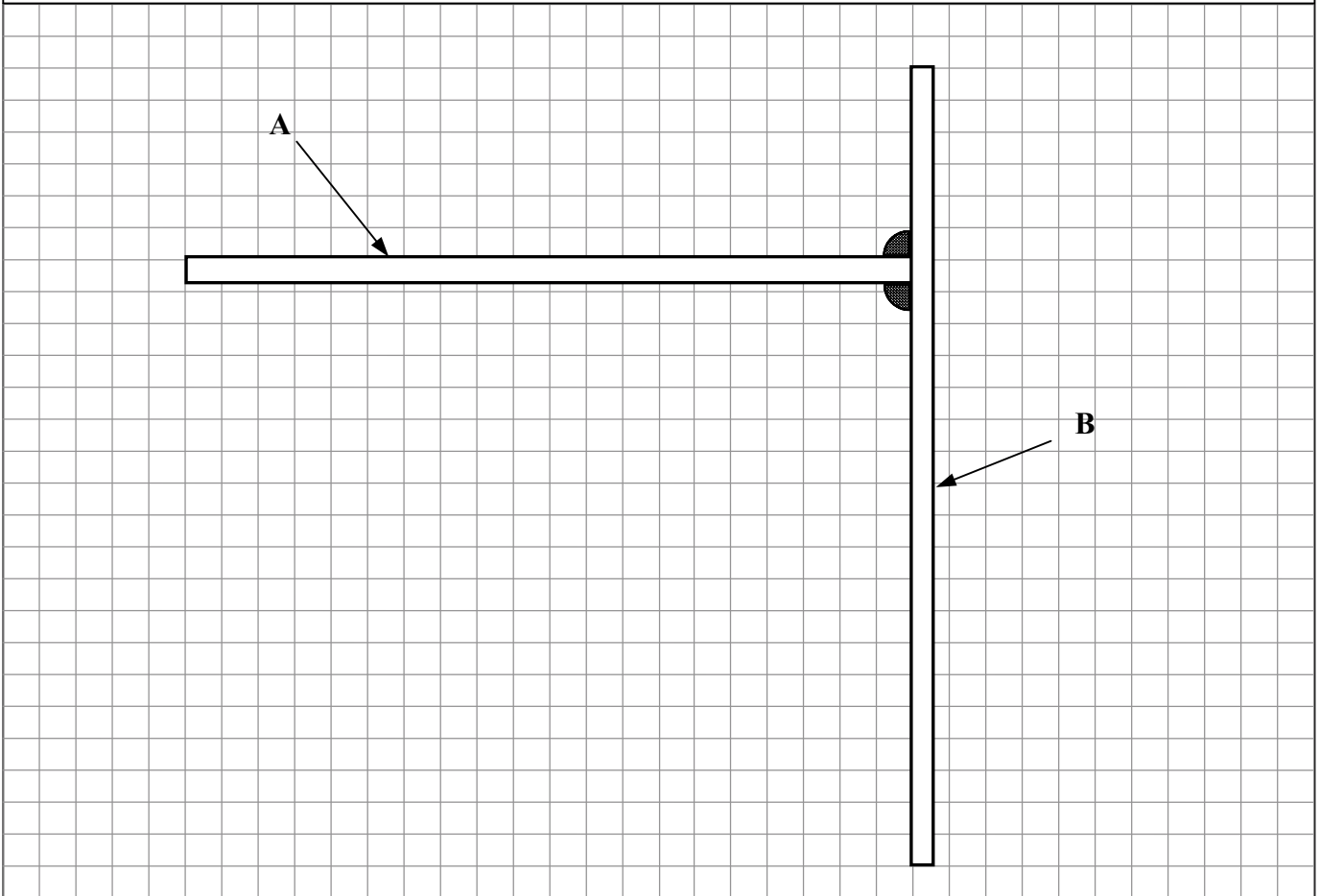


(a) Outline any two shortcomings with this design.

1 \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2 \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

- (b) A side view of the wall bracket is shown below.  
With the aid of sketches indicate any improvement you would make to this design.



- (c) You are required to mark out and shape the semicircle at the top of the bracket below.

- (1) List **three** marking out tools you would use.

1 \_\_\_\_\_

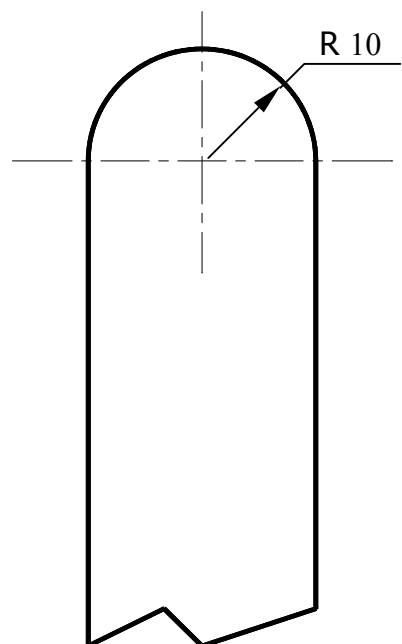
2 \_\_\_\_\_

3 \_\_\_\_\_

- (2) List **two** shaping tools you would use.

1 \_\_\_\_\_

2 \_\_\_\_\_



5.

50 marks

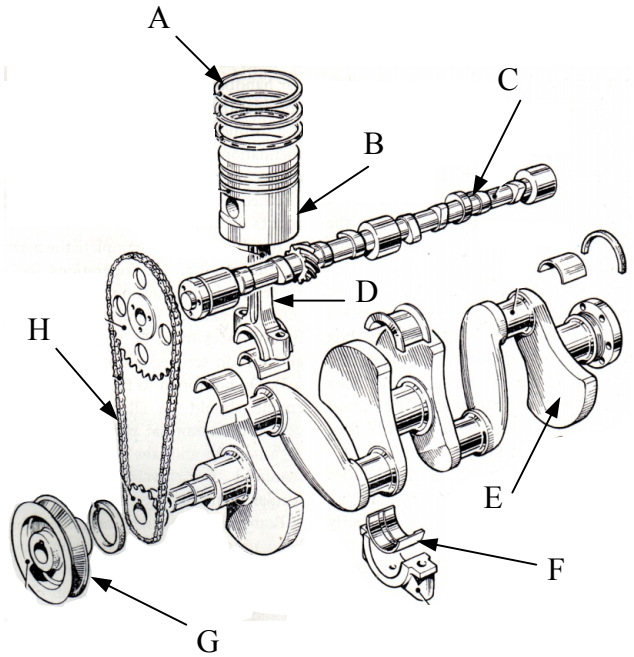
(a) Name **any five** parts of the engine shown.

A \_\_\_\_\_ E \_\_\_\_\_

B \_\_\_\_\_ F \_\_\_\_\_

C \_\_\_\_\_ G \_\_\_\_\_

D \_\_\_\_\_ H \_\_\_\_\_



(b) Most modern engines operate on the four-stroke cycle; induction, compression, power and exhaust. Explain the operation of the induction and compression strokes (use sketches as appropriate).

Induction \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Compression \_\_\_\_\_

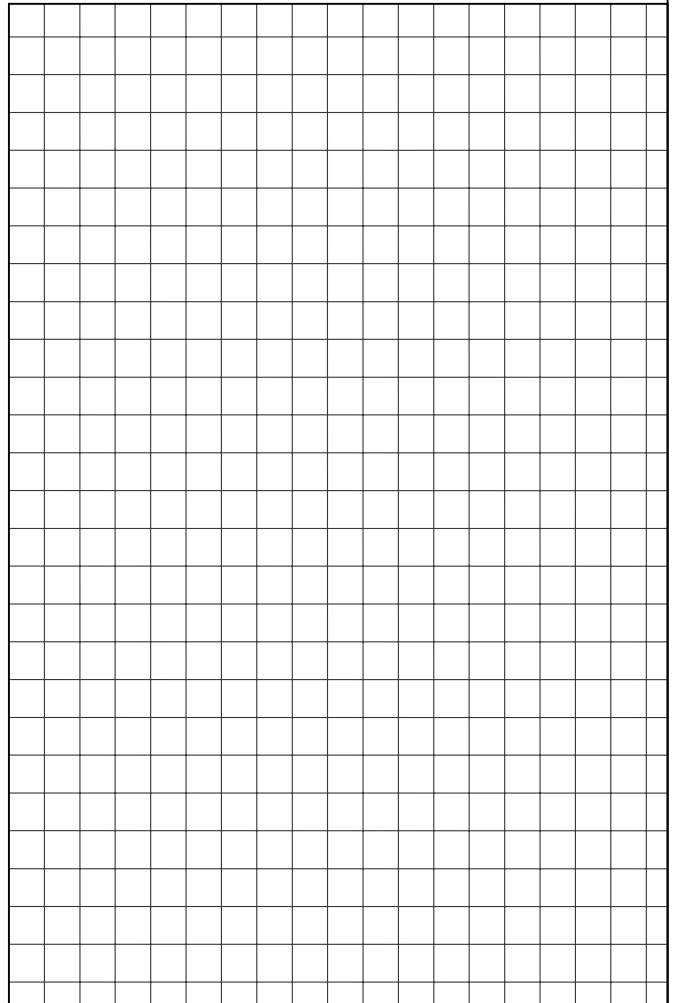
\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

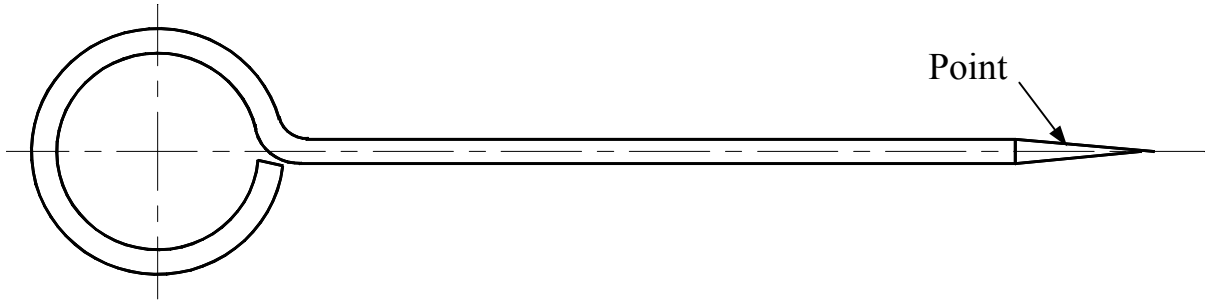
\_\_\_\_\_





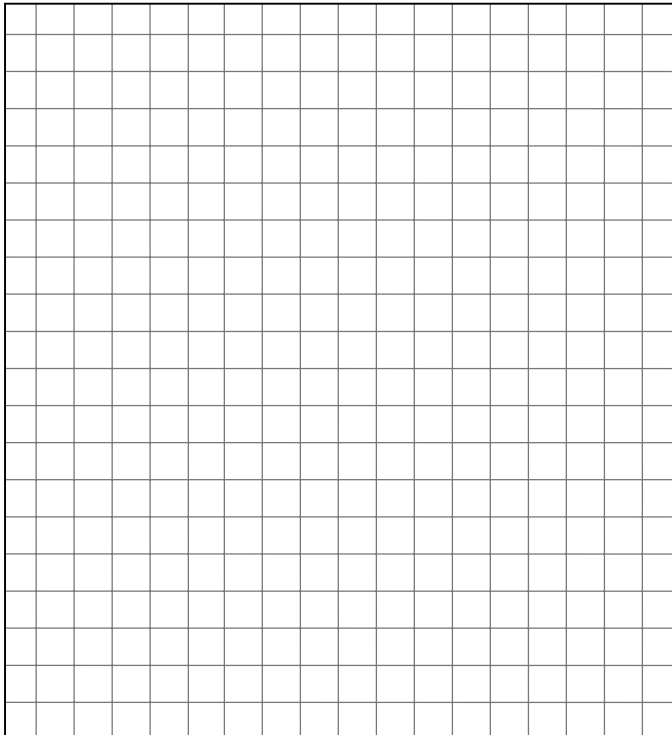


(c) You are required to forge a point at the end of the poker as shown. Briefly describe **any two** stages of this process (use sketches as appropriate).



1 \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2 \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



(d) Plastic dip coating is a suitable finish for the poker handle. Describe **three** stages of plastic dip coating.

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

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

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

## **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

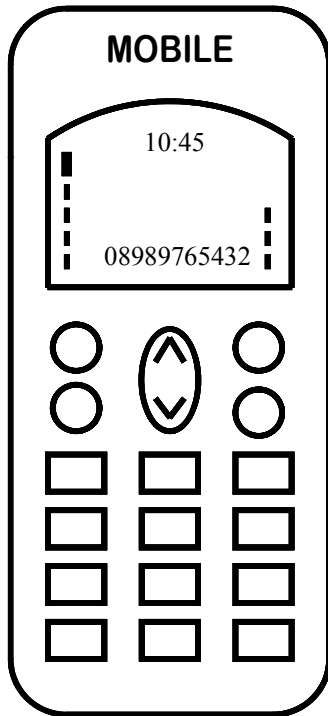
Topic (c) – Electronics

Topic (d) – Mechanisms

Topic (e) – Pneumatics

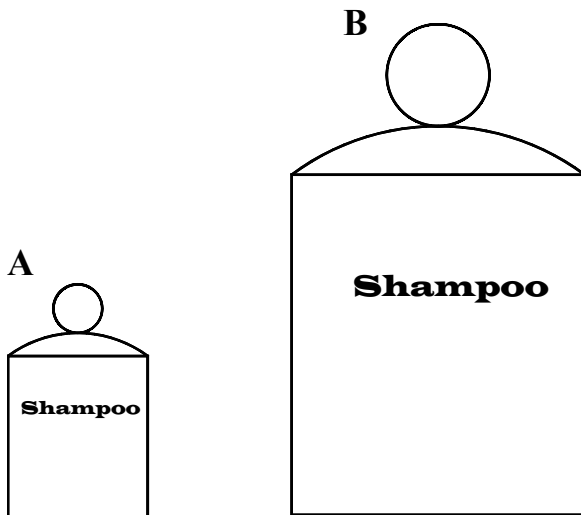


- (a) A drawing of the face of a mobile phone is shown. List any five CAD commands necessary to produce the drawing.



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

- (b) Having drawn the small shampoo bottle A using a CAD package, name the main command and procedure used to draw the bottle B.



Command \_\_\_\_\_

Procedure \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## 7 (b) Electricity

25 marks

- (a) (1) Electric current can be supplied as AC or DC. What do these terms represent?

AC \_\_\_\_\_

DC \_\_\_\_\_

- (2) In what form is current supplied to our homes?

\_\_\_\_\_

- (b) Three wires A, B and C are to be connected to the ceiling rose below.

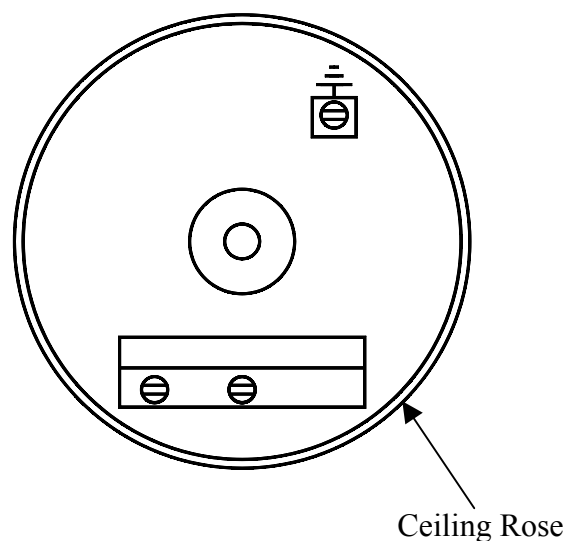
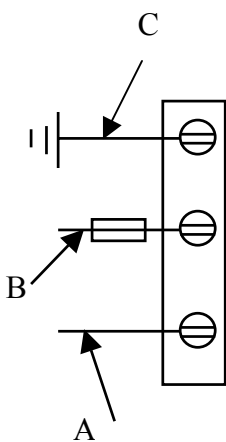
- (1) Name the three wires.

A \_\_\_\_\_

B \_\_\_\_\_

C \_\_\_\_\_



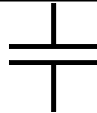
- (2) Using the drawing below, connect wires A, B and C to the ceiling rose.





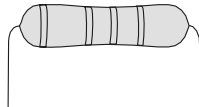
# 7 (c) Electronics

25 marks

(a) Name and give a use for **any four** of these electronic symbols and components.

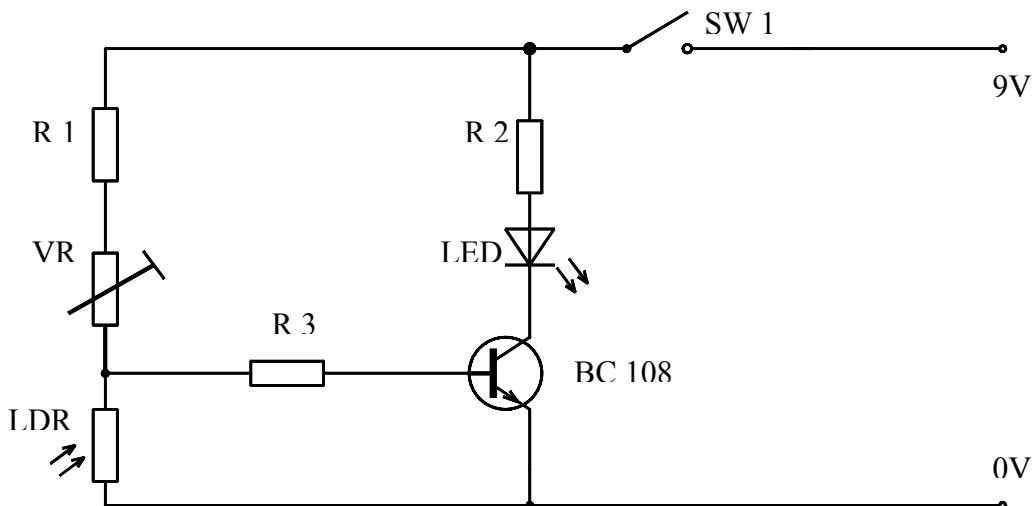
		
Name _____	Name _____	Name _____
Use _____	Use _____	Use _____
_____	_____	_____

		
Name _____	Name _____	Name _____
Use _____	Use _____	Use _____
_____	_____	_____

(b) Part of a sensor circuit to control street lighting is shown below.  
State the name and use of **any two** of the following components.

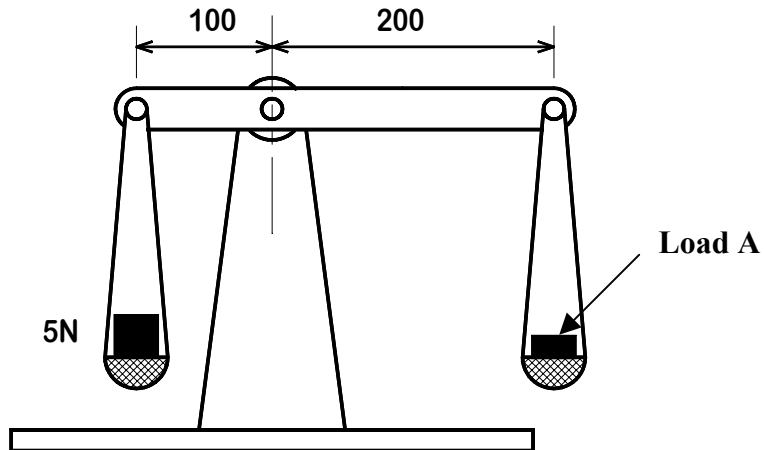
Component	Name	Use
SW 1		
LED		
VR		
LDR		



## 7 (d) Mechanisms

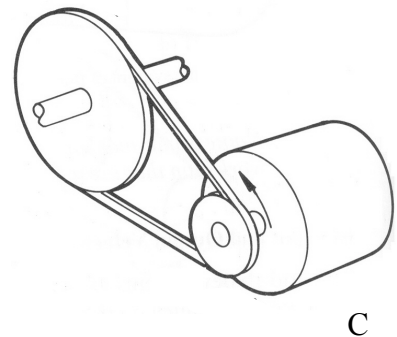
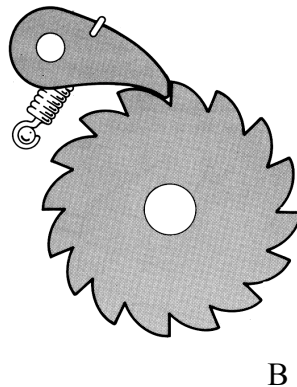
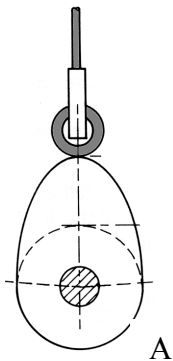
25 marks

- (a) A load of 5N is acting downward 100mm from the fulcrum as shown below. Calculate the load A on the right required to balance the scales.



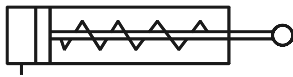
Calculation \_\_\_\_\_  
 \_\_\_\_\_

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



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

(a) Give a name and use for **any two** of the pneumatic symbols shown below.



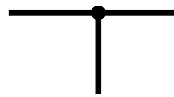
Name \_\_\_\_\_

\_\_\_\_\_

Use \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



Name \_\_\_\_\_

\_\_\_\_\_

Use \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



Name \_\_\_\_\_

\_\_\_\_\_

Use \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

(b) A common type of pneumatic cylinder, controlled by a valve, is shown below.

(1) Name the type of cylinder shown.

\_\_\_\_\_

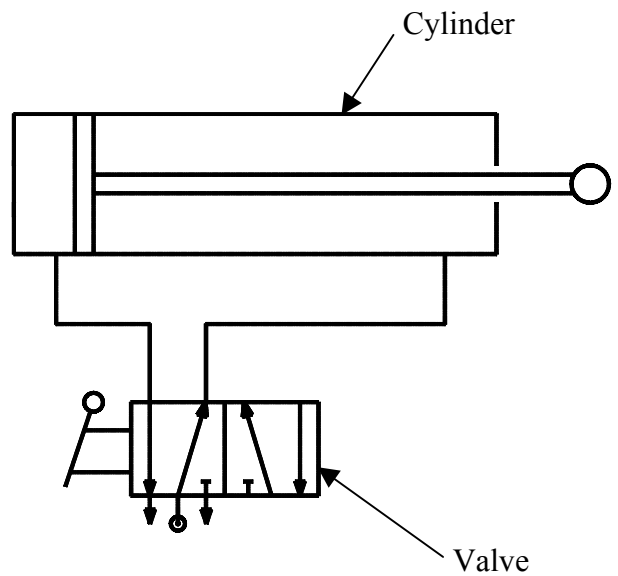
(2) Name the type of valve shown.

\_\_\_\_\_

(3) Give a practical application of its use.

\_\_\_\_\_

\_\_\_\_\_



(c) Give **two** safety precautions when using compressed air.

1 \_\_\_\_\_

\_\_\_\_\_

2 \_\_\_\_\_

\_\_\_\_\_