



Coimisiún na Scrúduithe Stáit State Examinations Commission

Leaving Certificate Applied, 2009

Vocational Specialism – Engineering (240 marks)

Monday 8 June, 2009

Morning 9:30 – 11:00

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.

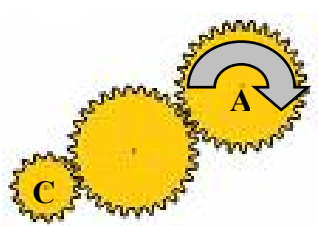
45 marks

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


QUESTION	ANSWER
<p>(a) Name a suitable material that could be used to make the bicycle gear cassette shown opposite.</p> 	<p>Name of material _____</p>
<p>(b) Identify the hand tool shown and state a suitable use for it.</p> 	<p>Name _____</p> <p>Suitable use _____</p>
<p>(c) Name the joining process shown opposite.</p> 	<p>Name of process _____</p>
<p>(d) Identify the tool shown and state a suitable use for it.</p> 	<p>Tool _____</p> <p>Use _____</p>
<p>(e) Name the material used in the pipes shown below and suggest a reason for its suitability.</p> 	<p>Name _____</p> <p>Reason _____</p>


QUESTION	ANSWER
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(f) Gear A is moving in a clockwise direction. Tick the correct box to show the direction of gear C.




Tick the box which indicates the correct direction of Gear C.






(g) Name the hand tool shown and state a suitable use for it.



Name _____

Suitable use _____

(h) Tick the correct box to indicate the two metals used to make the alloy brass.




Copper + Tin

Copper + Zinc


Tin + Lead

(i) Suggest a suitable material that could be used to manufacture the car wheel shown below.



Suitable material

(j) Identify the tool shown and state a suitable use for it.




Name _____

Use _____

QUESTION	ANSWER
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(k) Name a suitable material used to make the engineer's bench vice shown, and give **one** reason for your choice of material.



Material _____

Reason _____

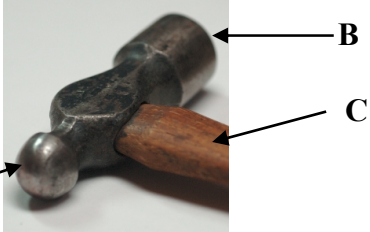
(l) Tick the box which indicates the correct type of plastic that the strip heater shown can be used to bend.



Thermosetting plastic

Thermoplastic

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

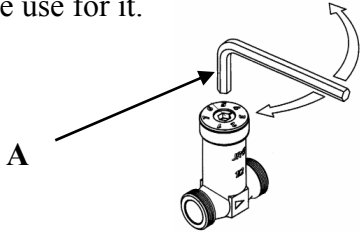


A _____

B _____

C _____


(n) Identify the tool shown marked **A** and state a suitable use for it.



Name _____

Use _____

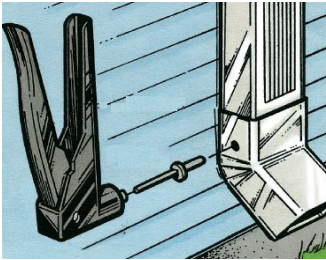
(o) Suggest a suitable material for the part labelled **A** on the mini digger shown below.



Material for part A


QUESTION	ANSWER
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(p) Identify the joining process shown here.



Name of joining process _____


(q) Name and give a use for the special nut shown below.



Name of nut _____


Use _____

(r) Identify **one** safety precaution that should be used when hacksawing metal.




Safety precaution _____

(s) State a suitable use for the clip shown.



Use _____

(t) Name the tool shown and give a use for it in the engineering room.

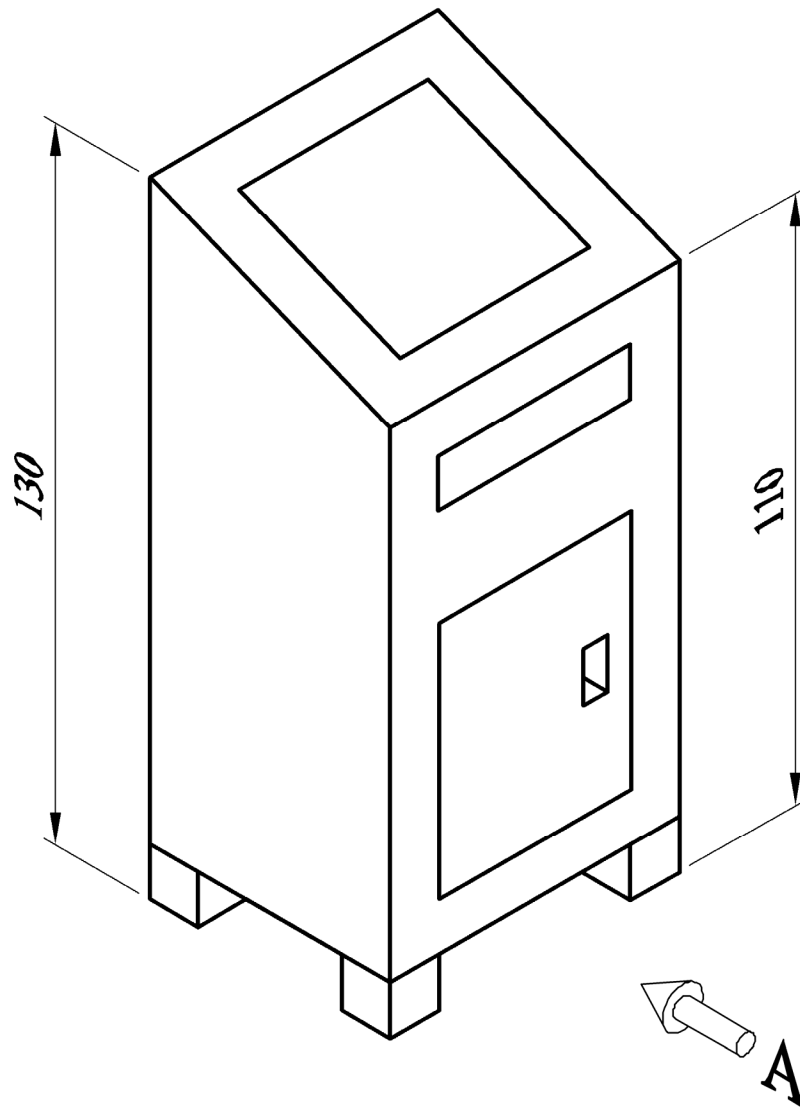


Name _____

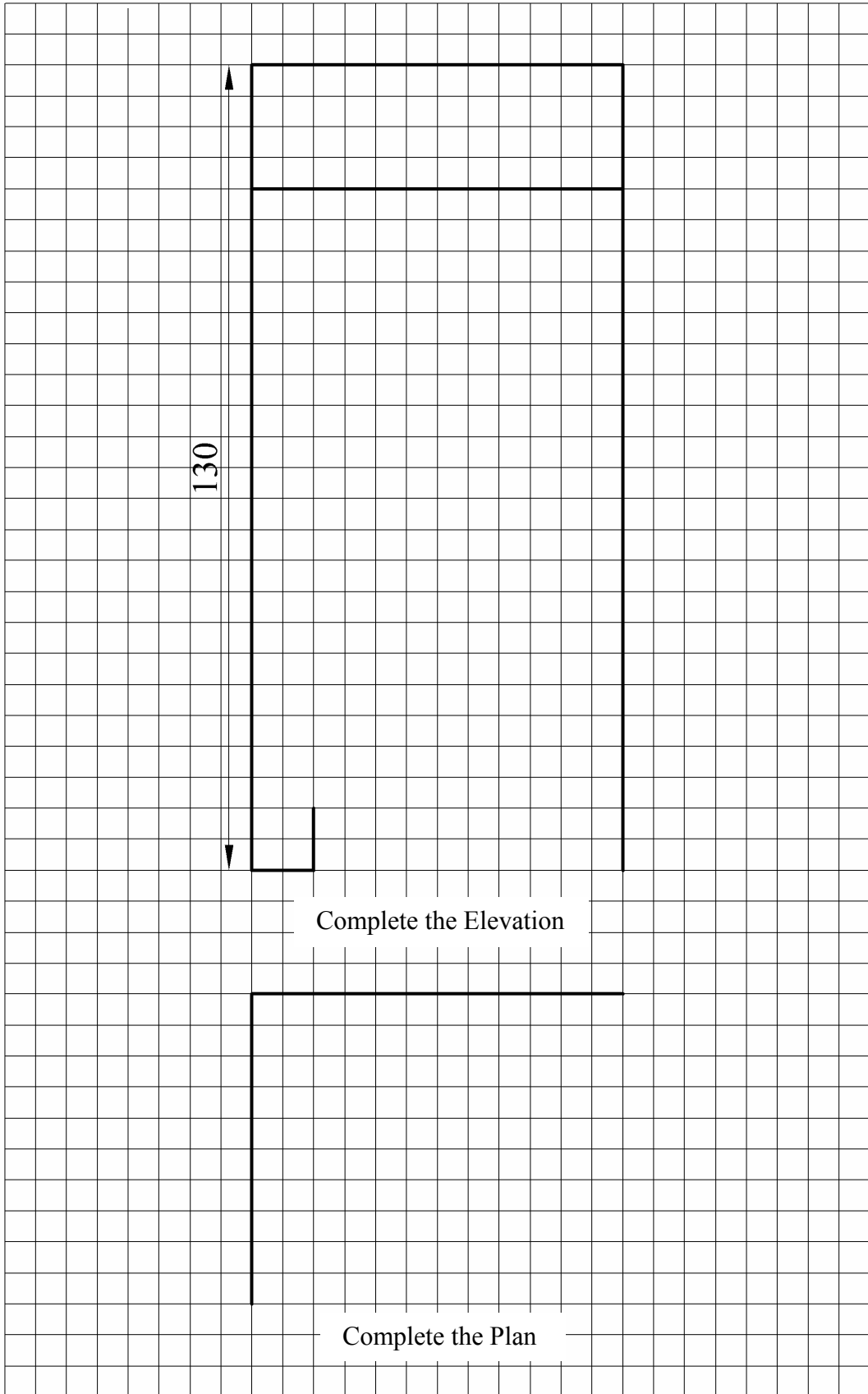
Use _____

A pictorial view of a design for a post box is shown below.
Draw the following **two** views of the post box on the grid paper opposite:

- (a) A front elevation in the direction of arrow A.
- (b) A plan projected from view (a).



Note: Each grid square is 5 mm long



(a) Name the **two** engineering processes shown at **A** and **B** below. State **two** examples of good safety precautions being observed in **each** case.

A



B



A - Name of engineering process

Safety Precaution 1

Safety Precaution 2

B - Name of engineering process

Safety Precaution 1

Safety Precaution 2

(b) The diagram shows a school engineering workshop. Identify **two** safety precautions that should be observed by students when working in this type of classroom environment.

Safety Precaution 1 _____

Safety Precaution 2 _____



(c) Describe **any two** safety precautions that are being observed by the operator using the angle grinder shown.

Safety Precaution 1 _____

Safety Precaution 2 _____



(d) State **one** safety precaution that should be observed when using the jigsaw shown.



(e) The safety symbols below may be found in an engineering workshop. Give a brief explanation for **each** of the symbols shown.

A



Symbol A _____

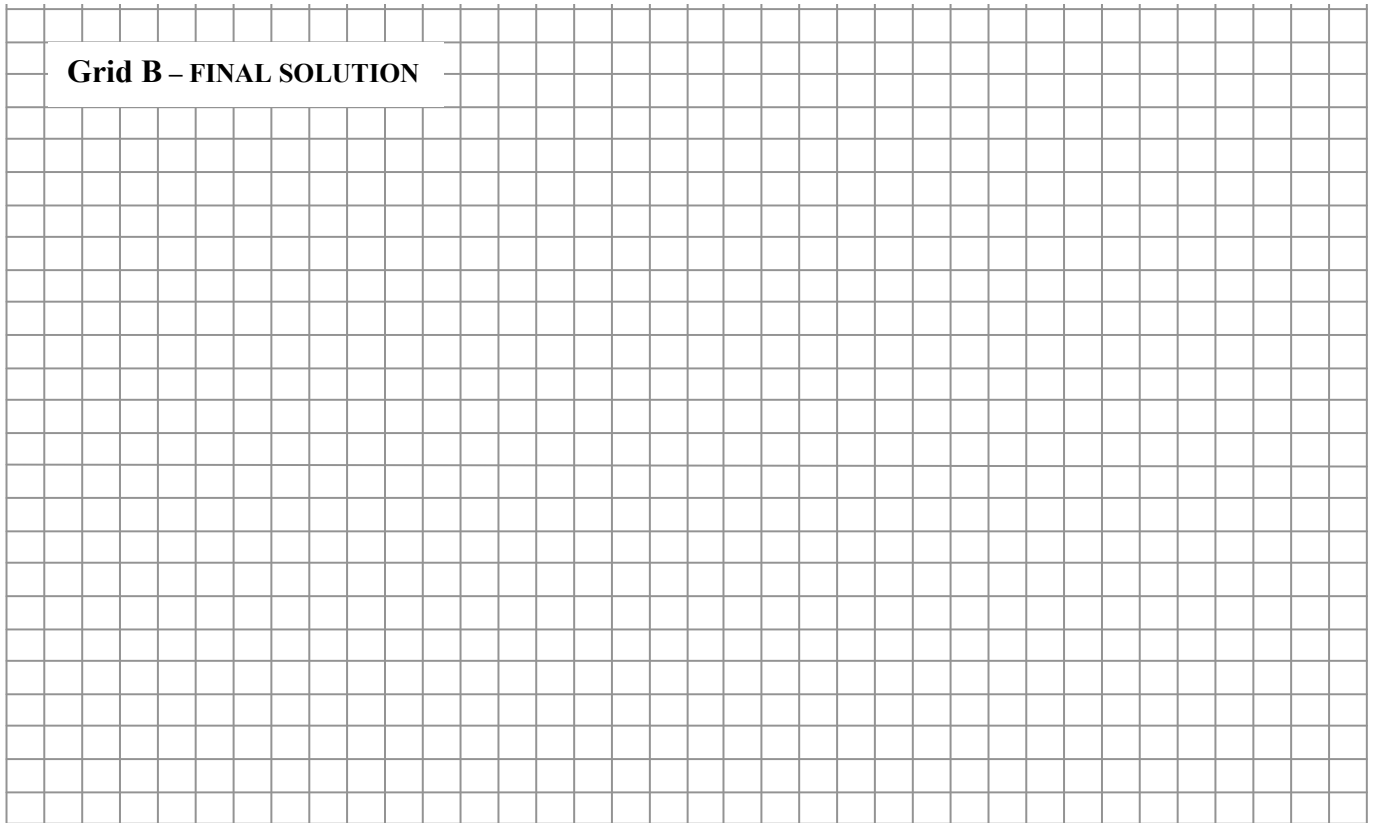
B



Symbol B _____

A sketch of the **final solution** for the bracket should be drawn below in **Grid B**.

Grid B – FINAL SOLUTION



- (b) A quick release mechanism for attaching a bicycle wheel is shown opposite.



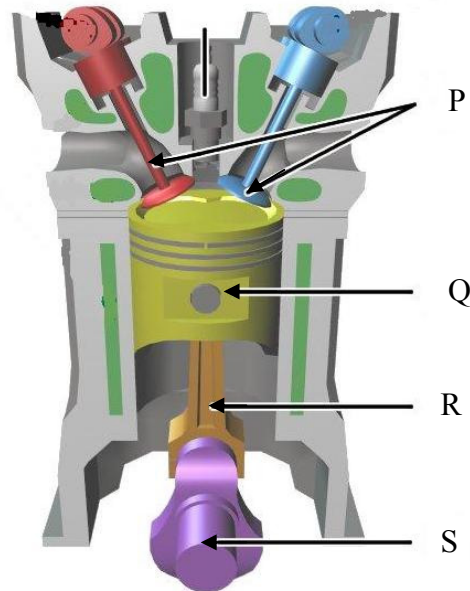
Quick release mechanism lever

- (i) Suggest a suitable material for manufacturing the lever of the mechanism.

- (ii) Give a reason for your choice of material.

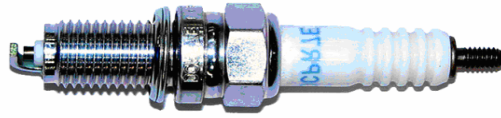
- (iii) Outline **one** reason why the lever is manufactured to the shape shown.

- (a) A cross sectional diagram of a four stroke engine is shown below.
 Identify and describe the function of **each** of the parts labelled **P**, **Q**, **R** and **S**.



Part	Name of Part	Function
P		
Q		
R		
S		

(b) Identify and explain the function in an engine of the part shown.



Name _____

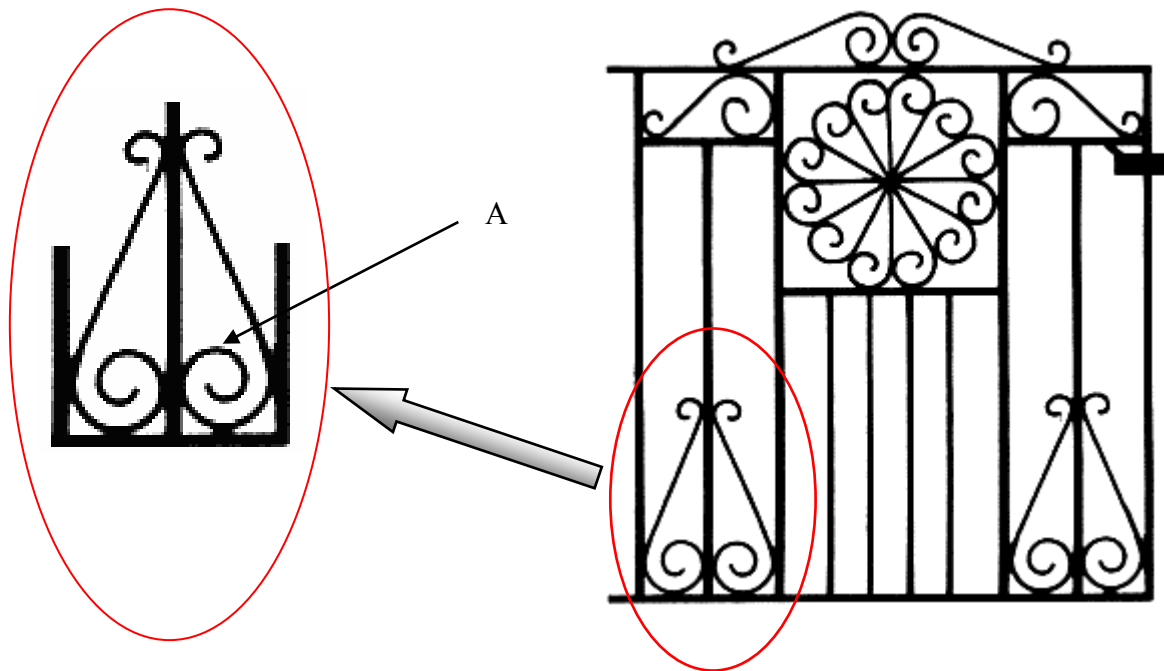
Function _____

(c) A quad bike used on many farms is shown with three parts labelled X, Y and Z. Identify the **three** parts and explain the function of **each**.



Part	Name of Part	Function
X		
Y		
Z		

(a) Describe briefly, in the spaces below, **any three** stages used to produce the decorative scroll shown at A. This scroll is part of the gate shown.
(Use sketches as appropriate).



Stage 1 _____

Stage 2 _____

Stage 3 _____

(b) Describe briefly, in the spaces below, **any four** stages used to make the decorative copper leaf shown. The piece is made from a flat piece of copper of dimensions 200 mm × 100 mm × 0.75 mm. (Use sketches as appropriate).

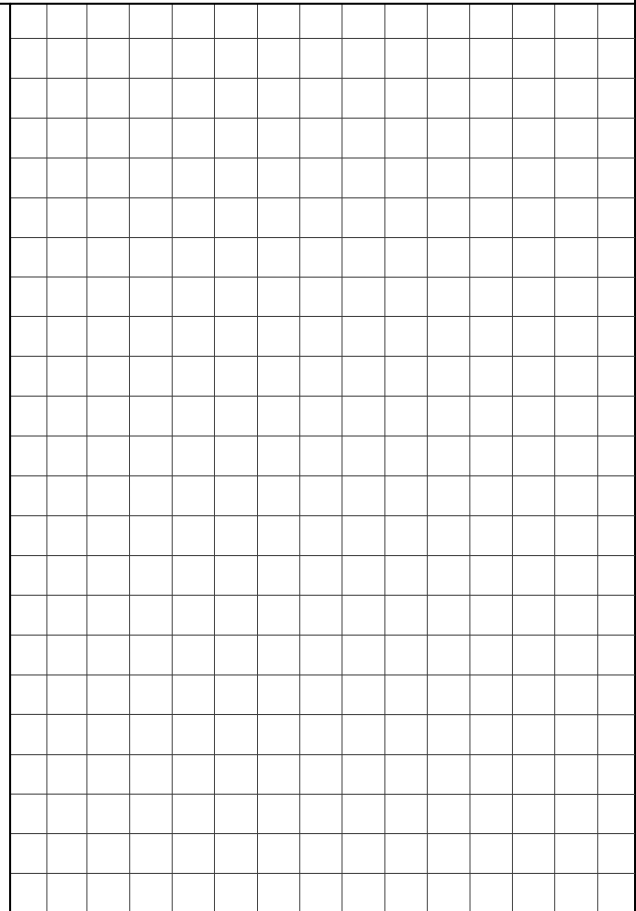


Stage 1 _____

Stage 2 _____

Stage 3 _____

Stage 4 _____



(c) State **two** safety precautions to be observed during the manufacture of the decorative copper leaf.

Precaution 1 _____

Precaution 2 _____

Systems Module

(Any two topics comprise a full module)

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

Topic (a) – Computer Aided Design (CAD)

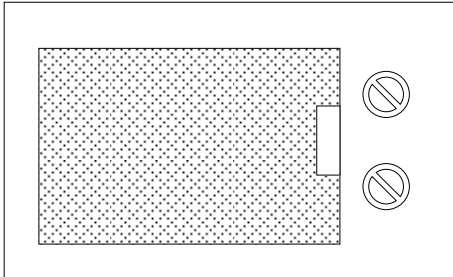
Topic (b) – Electricity

Topic (c) – Electronics

Topic (d) – Mechanisms

Topic (e) – Pneumatics

- (a) A CAD drawing of a microwave oven is shown below. List any **four** CAD commands necessary to produce the drawing.



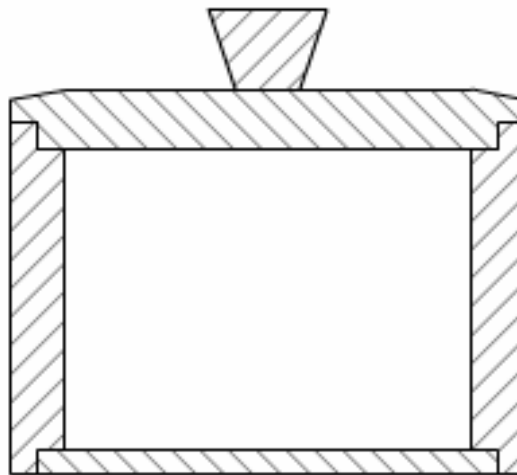
Command 1 _____

Command 2 _____

Command 3 _____

Command 4 _____

- (b) The cross sectional view of a wooden box with some hatching is produced by a CAD package. Explain the procedure involved in hatching an area on a CAD drawing.



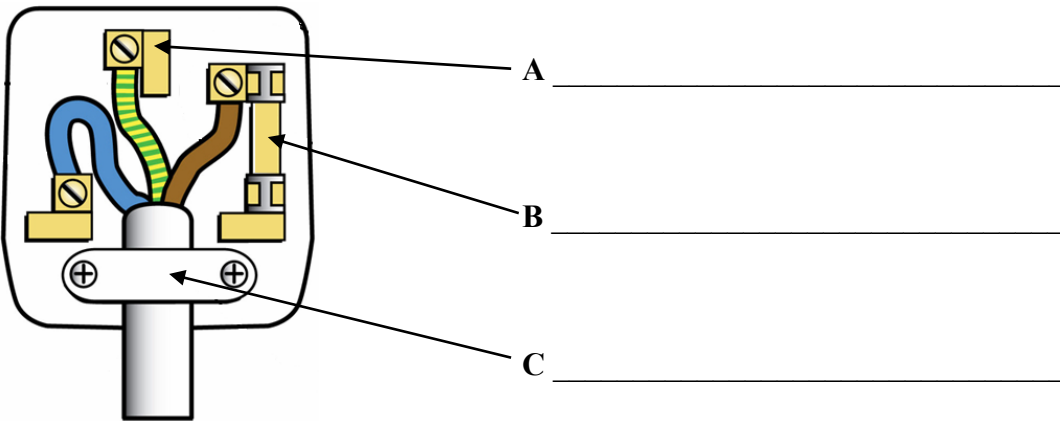
Procedure _____

- (a) A section of mains cable with the wires coloured is shown opposite. Complete the table below giving the correct name for each coloured wire.

Colour	Name of Wire
Blue	
Green/Yellow	
Brown	



- (b) The cable is to be fitted to a mains plug, shown below. Name the parts A, B and C of the plug shown.



- (c) Explain the function that **each** part, indicated on the diagram above, has for electrical safety.

Part	Function for Electrical Safety
A	
B	
C	

- (d) Name and state a suitable use for **each** of the components shown below.

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

(a) Name and state a suitable use for **each** of the components shown below.



Name _____

Use _____



Name _____

Use _____



Name _____

Use _____

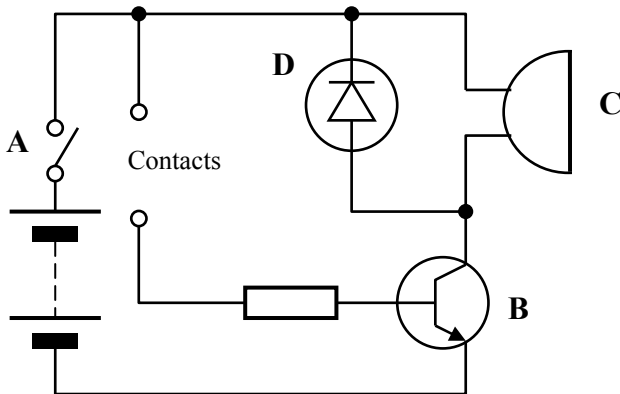
(b) Identify the tool shown and explain its use in electronics.



Name _____

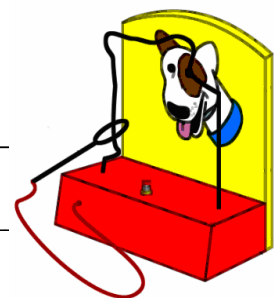
Use _____

(c) Identify **any two** of the electronic components, labelled **A**, **B**, **C** and **D**, used in the electronic circuit for the steady hand game shown. Write your answers in the table provided.



	Name of Electronic Component
A	
B	
C	
D	

(d) Explain how the circuit of the steady hand game shown works.

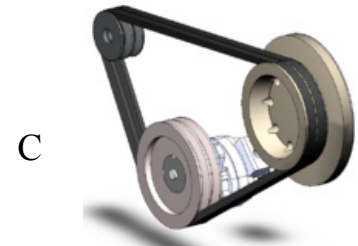
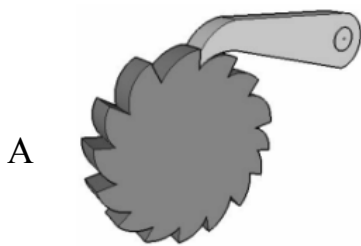


- (a) The diagram below shows an egg beater commonly found in kitchens. Explain how the mechanism works.



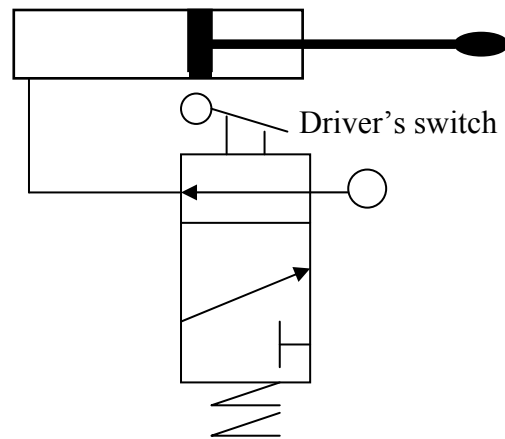
Explanation _____

- (b) Identify the **three** mechanisms A, B and C, shown below, and state **one** use of each.



	Name	Use
Mechanism A		
Mechanism B		
Mechanism C		

- (a) The door of the school bus is operated using pneumatic control. The pneumatic circuit diagram is shown opposite.



The driver requires the door to open slowly and smoothly when the switch is activated. From the list below select **any two** devices which could make the door operate the way the driver wants.

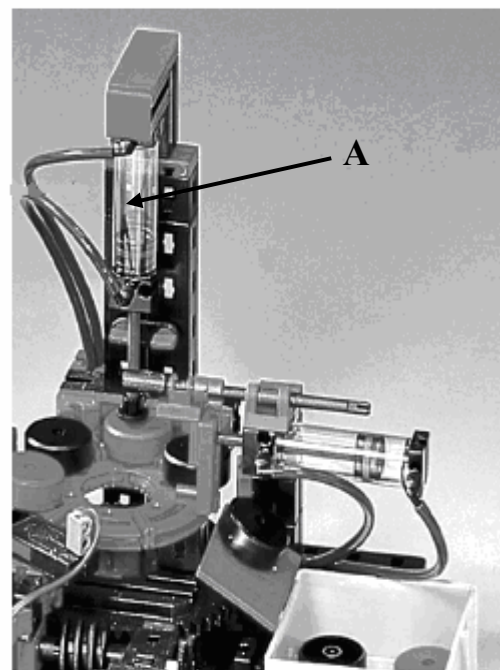
- | | | | | | |
|--------------|--------------------------|------------|--------------------------|------------|--------------------------|
| 3-Port valve | <input type="checkbox"/> | Compressor | <input type="checkbox"/> | Reservoir | <input type="checkbox"/> |
| Solenoid | <input type="checkbox"/> | Spring | <input type="checkbox"/> | Restrictor | <input type="checkbox"/> |

- (b) A pneumatic system with cylinder A operating a press is shown below.

- (i) Cylinder A is a double acting cylinder. What is the benefit of this over a single acting cylinder?

- (ii) Suggest a suitable material for the manufacture of the cylinder.

- (iii) Why do you think this material is suitable?



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For Examiners use only		
Question	Mark	Total
Section 1	 	
1	 	
2	 	
3	 	
Section 2	 	
4		
5		
6		
7 (a)		
7 (b)		
7 (c)		
7 (d)		
7 (e)		
Total	 	