



# Coimisiún na Scrúduithe Stáit State Examinations Commission

*Leaving Certificate Applied, 2013*

## Vocational Specialism – Engineering (240 marks)

Monday, 10 June

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>	
<div style="border: 1px solid black; padding: 10px; text-align: center;"> <i>Centre Stamp</i> </div>	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 applies (3 plus 4)	
	Note: The mark in row 3 (or row 5 if Irish bonus is awarded) must equal the total mark at the end of the paper.	


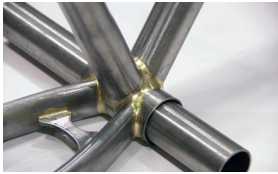
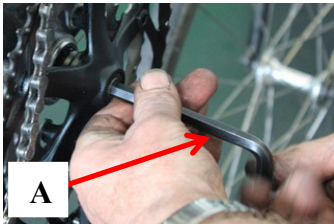
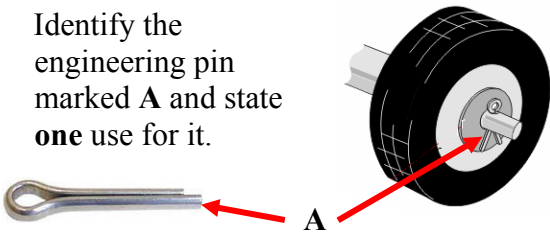
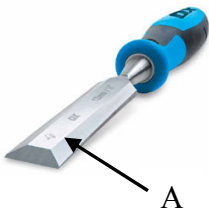
## Section 1 (90 Marks)

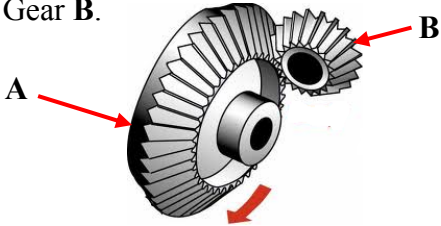


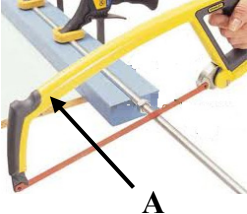



Answer **all three** questions


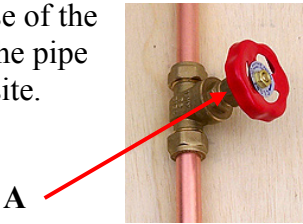
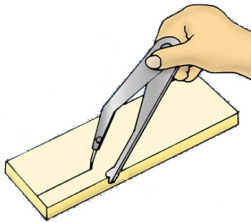


Section 1 Q1.





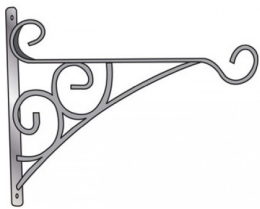
**45 marks**

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

QUESTION	ANSWER
<p>(a) State a suitable use for the tin snips shown opposite.</p> <div style="text-align: center;">  </div>	<p>Use _____</p> <p>_____</p> <p>_____</p>
<p>(b) Identify a suitable process for joining the metals in the frame shown opposite.</p> <div style="text-align: center;">  </div>	<p>Joining Process _____</p> <p>_____</p> <p>_____</p>
<p>(c) Name the tool marked A being used to adjust the bottom bracket of the bicycle.</p> <div style="text-align: center;">  </div>	<p>Name of tool _____</p> <p>_____</p>
<p>(d) Identify the engineering pin marked A and state <b>one</b> use for it.</p> <div style="text-align: center;">  </div>	<p>Name _____</p> <p>Use _____</p> <p>_____</p>
<p>(e) Name a suitable material to make the blade of the chisel marked A and give <b>one</b> reason for your choice of material.</p> <div style="text-align: center;">  </div>	<p>Name of material _____</p> <p>Reason _____</p> <p>_____</p>

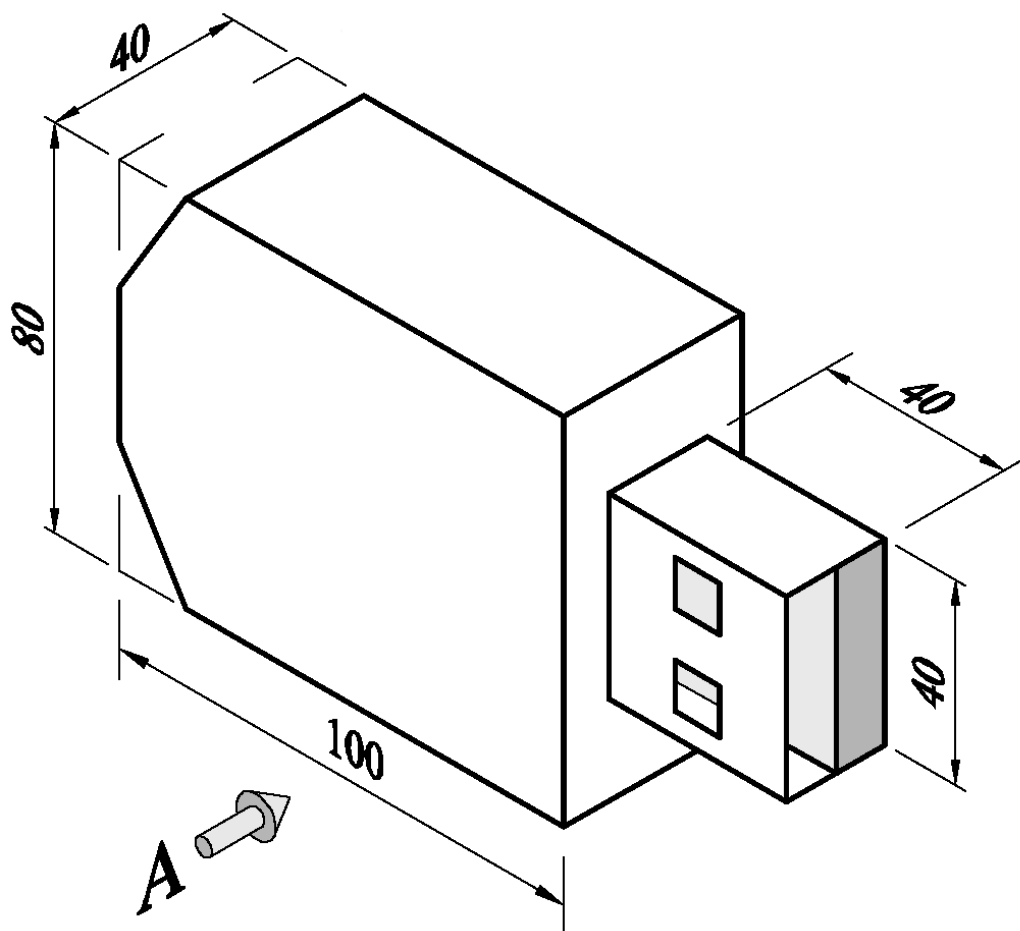
QUESTION	ANSWER
<p>(f) Gear A is moving in the direction shown. Tick the correct box to show the direction of Gear B.</p> 	<p>Tick the correct box to show the direction of Gear B.</p> <div style="display: flex; align-items: center; margin-bottom: 10px;">  <input style="width: 60px; height: 30px; margin-left: 10px;" type="checkbox"/> </div> <div style="display: flex; align-items: center;">  <input style="width: 60px; height: 30px; margin-left: 10px;" type="checkbox"/> </div>
<p>(g) Identify the cutting tool marked A and give <b>one</b> safety precaution that should be observed when using this tool.</p> 	<p>Name _____</p> <p>Safety precaution _____</p> <p>_____</p>
<p>(h) Name the special nut shown and give a suitable use for it.</p> 	<p>Name _____</p> <p>Use _____</p> <p>_____</p>
<p>(i) Suggest a suitable material that could be used to manufacture the mudguard marked A, on the motorbike shown opposite.</p> 	<p>Suitable material</p> <p>_____</p> <p>_____</p>
<p>(j) Tick the correct box to indicate the <b>two</b> metals used to make the alloy brass in the door knocker shown opposite.</p> 	<div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div> <p>Lead and Tin</p> <p>Copper and Zinc</p> <p>Copper and Tin</p> </div> <div style="display: flex; flex-direction: column; align-items: center;"> <input style="width: 60px; height: 30px; margin-bottom: 10px;" type="checkbox"/> <input style="width: 60px; height: 30px; margin-bottom: 10px;" type="checkbox"/> <input style="width: 60px; height: 30px;" type="checkbox"/> </div> </div>

QUESTION	ANSWER
<p>(k) Name the tool shown opposite and state <b>one</b> use for it in the Engineering room.</p> 	<p>Tool _____</p> <p>Use _____</p> <p>_____</p>
<p>(l) Explain the purpose of the part marked A in the pipe work shown opposite.</p> 	<p>Purpose of part A</p> <p>_____</p> <p>_____</p>
<p>(m) Identify the marking-out tool shown.</p> 	<p>Name of marking-out tool</p> <p>_____</p> <p>_____</p>
<p>(n) Name the engineering item shown opposite and state a suitable metal that could be used in manufacturing it.</p> 	<p>Name of item _____</p> <p>Suitable metal _____</p> <p>_____</p>
<p>(o) Identify the screw shown and state <b>one</b> advantage of using this type of screw.</p> 	<p>Name of screw _____</p> <p>Advantage _____</p> <p>_____</p>

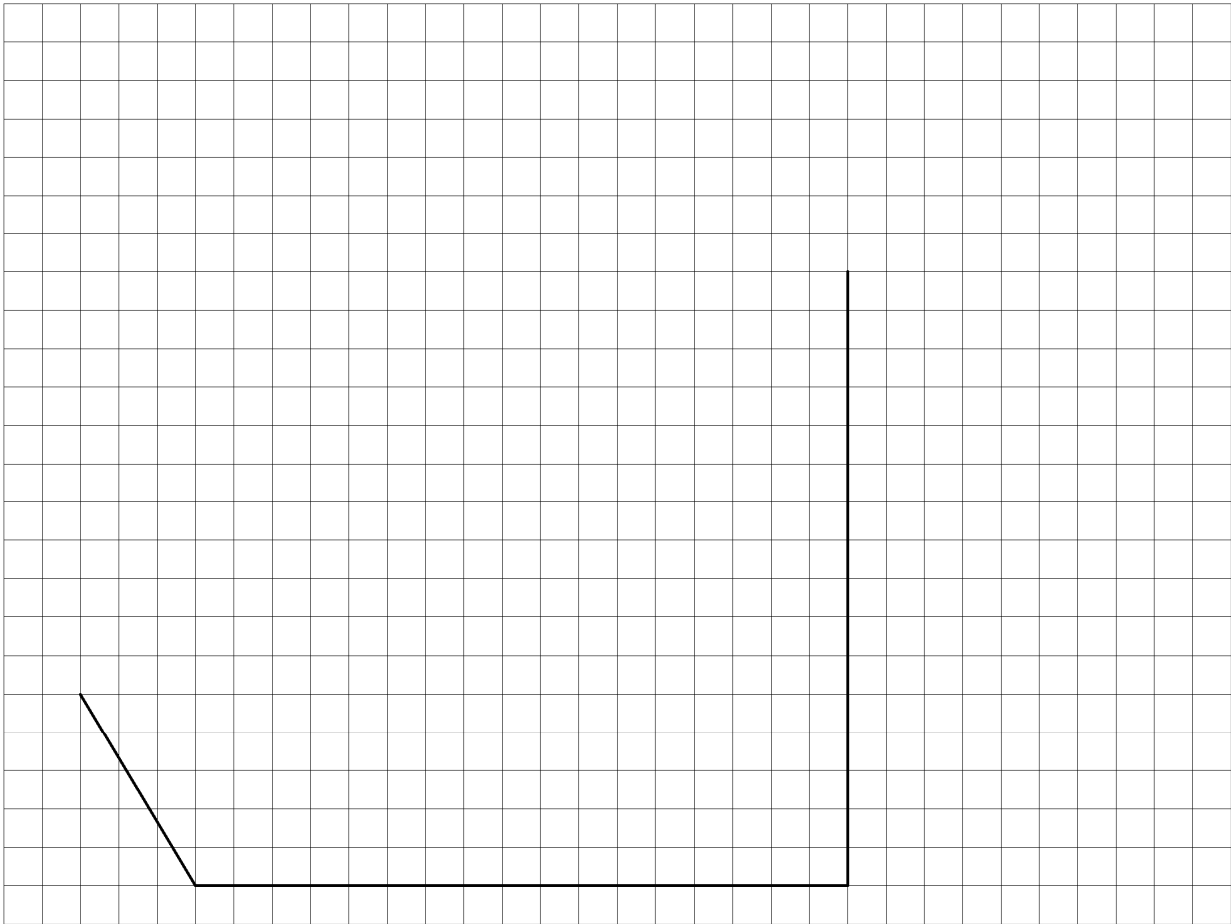
QUESTION	ANSWER
<p>(p) Outline a suitable method for putting a name in the space marked <b>A</b> on the key ring shown opposite.</p> 	<p>Suitable method _____</p> <p>_____</p> <p>_____</p>
<p>(q) Name and give a use for the tool shown below.</p> 	<p>Name of tool _____</p> <p>Use _____</p> <p>_____</p> <p>_____</p>
<p>(r) Identify <b>one</b> major difference between the portable drilling machines shown below.</p> 	<p>Major difference _____</p> <p>_____</p> <p>_____</p>
<p>(s) Give a suitable use for the needle files shown below.</p> 	<p>Use _____</p> <p>_____</p> <p>_____</p> <p>_____</p>
<p>(t) Suggest a suitable finish for the external wall pot hanger shown opposite and give <b>one</b> reason for your choice.</p> 	<p>Suitable finish _____</p> <p>Reason _____</p> <p>_____</p>

A pictorial view of a logo for a USB flash drive is shown below.  
Draw the following **two** views of the logo on the grid paper opposite:

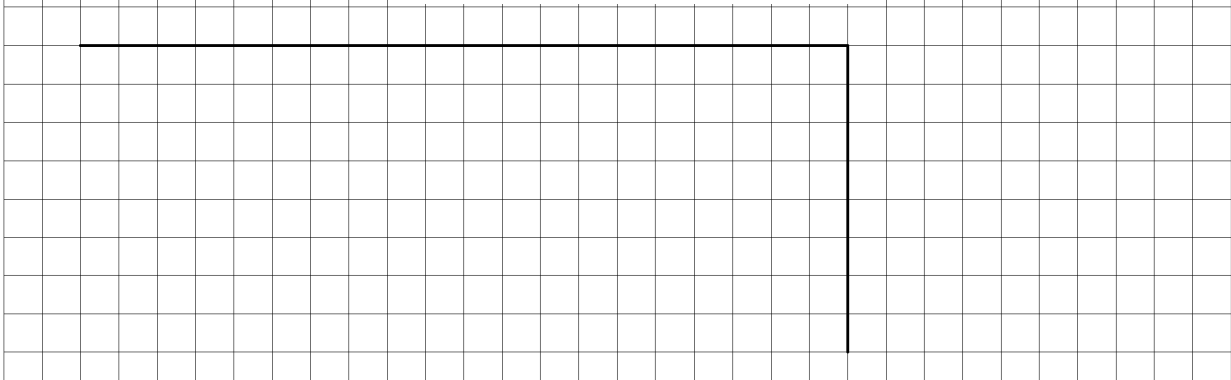
- (a) A front elevation in the direction of arrow A.
- (b) A plan projected from view (a).



Note: Each grid square represents 5 mm




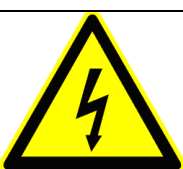



Complete the Elevation



Complete the Plan

- (a) Describe in the spaces provided the '*danger*' represented by **each** of the **five** safety symbols shown below.

	Symbol	Description
(i)		<hr/> <hr/>
(ii)		<hr/> <hr/>
(iii)		<hr/> <hr/>
(iv)		<hr/> <hr/>
(v)		<hr/> <hr/>

- (b) Identify **two** safety precautions that should be observed by students when welding metals.

Safety Precaution 1 \_\_\_\_\_

\_\_\_\_\_

Safety Precaution 2 \_\_\_\_\_

\_\_\_\_\_





(c) Describe **any two** safety precautions to be observed when using the scroll saw.

Safety Precaution 1 \_\_\_\_\_

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Safety Precaution 2 \_\_\_\_\_

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(d) State **one** safety requirement for the safe operation of the electric angle grinder shown.

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(e) The diagram opposite demonstrates a weight being lifted by two different methods, one of these methods is correct and one is incorrect.

Tick **one** of the boxes below to indicate the correct method for lifting the weight and then give **one** reason for your answer.

Method A

☐

Method B

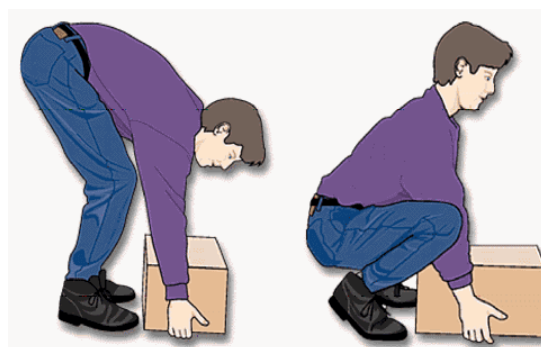
☐

Reason \_\_\_\_\_

\_\_\_\_\_

Method A

Method B



- (a) Design, in the spaces provided, a suitable bracket for attaching the closed circuit television camera (cctv) to the gable wall of a house.

The design should clearly show **each** of the following:

- (i) A method to enable the bracket to be attached to the gable wall;
- (ii) A method to enable the camera to be attached to the bracket.

Draw in **Grid A** at least **two** sketches of different ideas you considered for the design of the bracket for the camera.

Draw in **Grid B** a sketch of the **final solution** for the bracket for the camera.



At least **two sketches of ideas** for the camera bracket should be drawn below in **Grid A**.

Grid A - IDEAS

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

**Grid B – FINAL SOLUTION**

- (b) A traditional bicycle is shown at **A** and a modern bicycle is shown at **B**. Outline **three** main differences in the design features of the two bicycles.

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

\_\_\_\_\_

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

\_\_\_\_\_

3. \_\_\_\_\_

\_\_\_\_\_

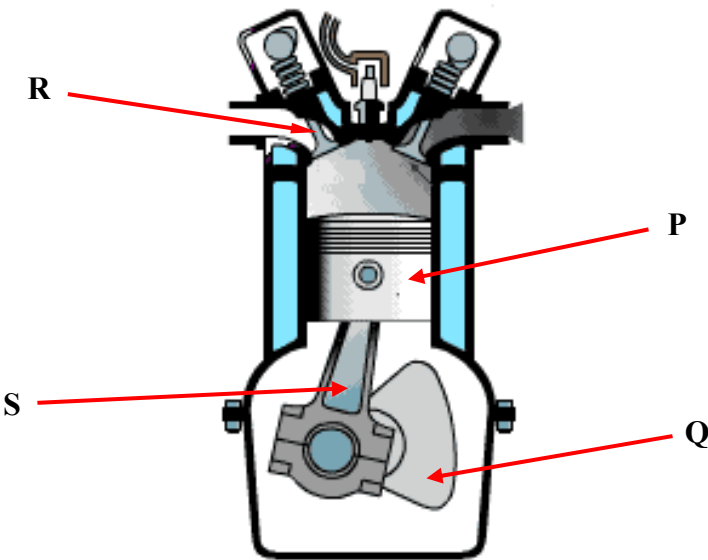
**Bicycle A**  
(Traditional Bicycle)



**Bicycle B**  
(Modern Bicycle)



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



Part	Name of Part	Function
P		
Q		
R		
S		

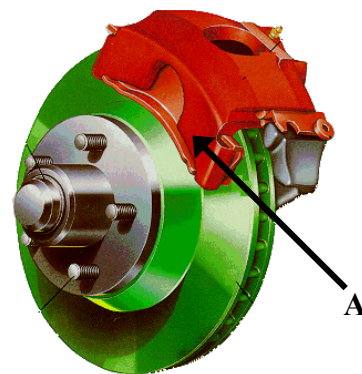
(b) Identify the car mechanism labelled **A** in the diagram opposite and describe the function of it.

Name \_\_\_\_\_


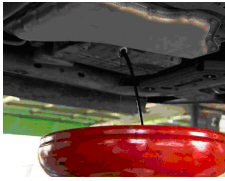



Function \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



(c) Describe in the spaces below the key steps involved in changing the oil in a car engine. The photographs shown may assist you in answering the question.

	Steps	Description
1		<p>_____</p> <p>_____</p> <p>_____</p>
2		<p>_____</p> <p>_____</p> <p>_____</p>
3		<p>_____</p> <p>_____</p> <p>_____</p>
4		<p>_____</p> <p>_____</p> <p>_____</p>
5		<p>_____</p> <p>_____</p> <p>_____</p>

- (a) Describe briefly, in the spaces below, **any three** stages used to produce the decorative scroll in the safety rail shown. Your description can refer to a hot **or** a cold treatment method of forming the scroll.

*(Use sketches as appropriate.)*



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

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

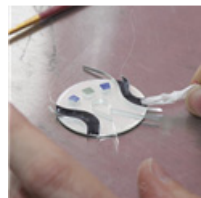
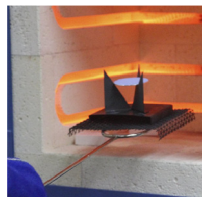
Stage 3 \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

- (b) The necklace at **A** below is produced using the enamelling process. Briefly describe, in the spaces below, any **four** key stages used to produce the necklace. The photographs shown may assist you in answering the question.  
(Use sketches as appropriate.)



**A**

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

\_\_\_\_\_

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

\_\_\_\_\_

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

\_\_\_\_\_

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

\_\_\_\_\_

\_\_\_\_\_

- (c) State **two** safety precautions to be observed during the enamelling process.

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

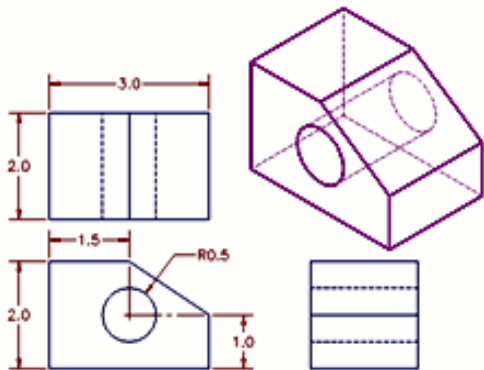
Topic (c) – Electronics

Topic (d) – Mechanisms

Topic (e) – Pneumatics



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



Command 1 \_\_\_\_\_

Command 2 \_\_\_\_\_

Command 3 \_\_\_\_\_

Command 4 \_\_\_\_\_

- (b) In the table below list **three** advantages of using CAD drawings compared to traditional pencil drawings.

Advantage 1	<hr/> <hr/> <hr/>
Advantage 2	<hr/> <hr/> <hr/>
Advantage 3	<hr/> <hr/> <hr/>

(a) The diagrams opposite show a typical electrical meter box and readings. Answer the questions in the spaces provided.

(i) What is the number 24621 shown at A measuring?

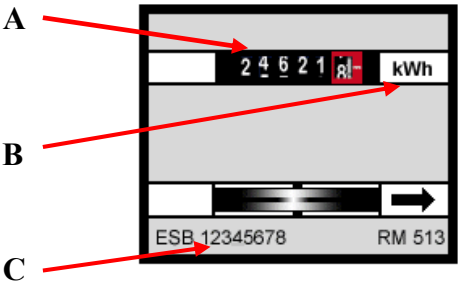
\_\_\_\_\_

(ii) What is the meaning of kWh shown at B?

\_\_\_\_\_

(iii) Why is the number shown at C important?

\_\_\_\_\_



(b) Explain why three pin-plugs are used in some appliances while other appliances use two-pin plugs.



Explanation \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

(c) Name and state a suitable use for **each** of the tools shown, which are used by an electrician.



Name \_\_\_\_\_

Use \_\_\_\_\_

\_\_\_\_\_



Name \_\_\_\_\_

Use \_\_\_\_\_

\_\_\_\_\_



Name \_\_\_\_\_

Use \_\_\_\_\_

\_\_\_\_\_

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



Name \_\_\_\_\_

Use \_\_\_\_\_

\_\_\_\_\_



Name \_\_\_\_\_

Use \_\_\_\_\_

\_\_\_\_\_



Name \_\_\_\_\_

Use \_\_\_\_\_

\_\_\_\_\_

(b) Identify the electronic component shown and explain the function of the coloured bands on the body of the component.



Name \_\_\_\_\_

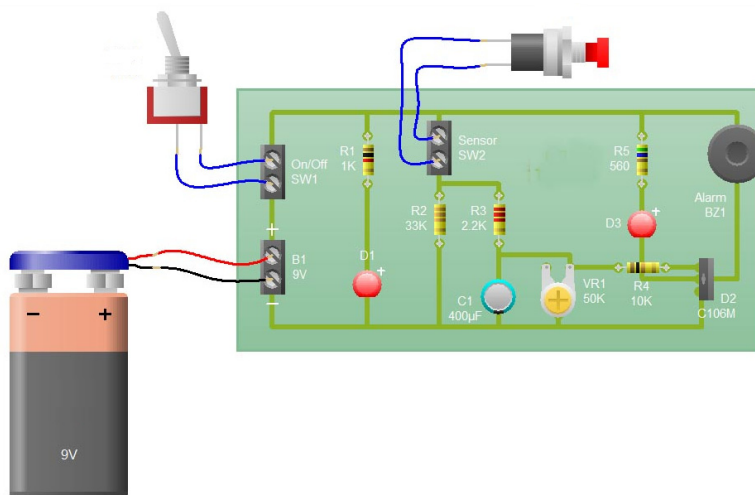
Function of bands \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

(c) An electronic diagram of a sensor alarm is shown below. Describe in the space provided how the electronic circuit works.



Description \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

- (a) The diagram below shows a hand-operated pipe cutter. Explain how the pipe cutter mechanism works.



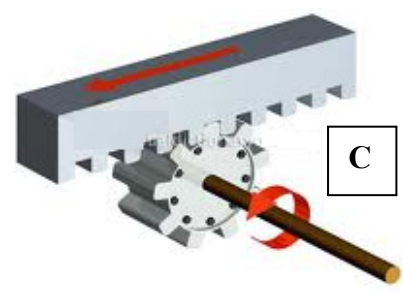
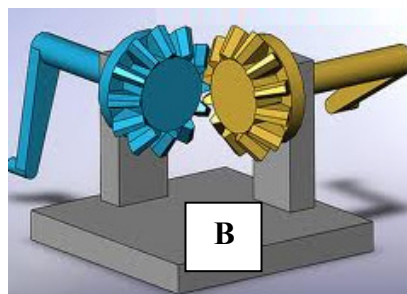
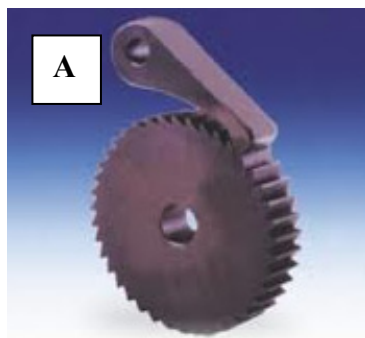
Explanation \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

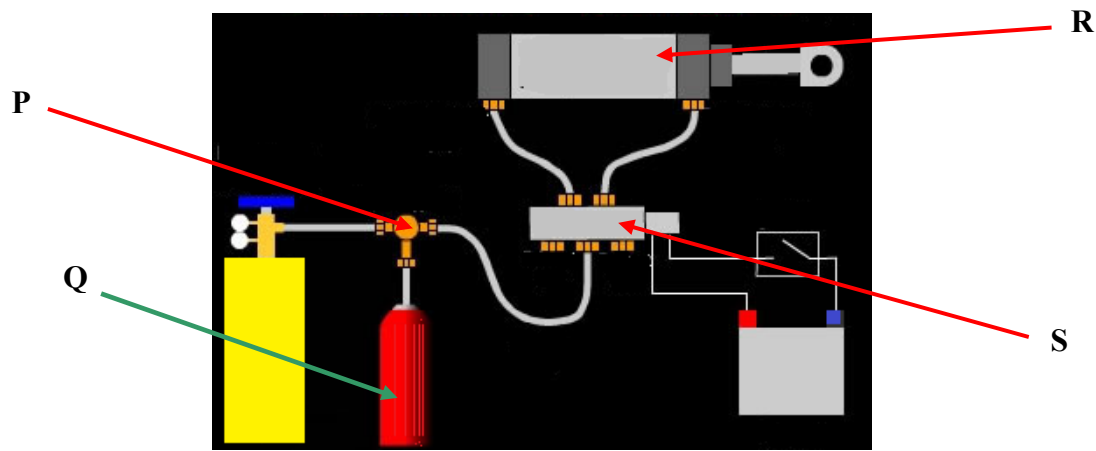
\_\_\_\_\_

- (b) Identify the mechanisms shown below and give a suitable use for **each** of them.



	Name	Use
Mechanism A		_____
Mechanism B		_____
Mechanism C		_____

(a) Identify the pneumatic components **P**, **Q**, **R** and **S** shown below and state the function of **each**.



	Name	Function
P		
Q		
R		
S		

(b) A pneumatic drill (jackhammer) is shown opposite. Describe briefly the role of pneumatics in the operation of the jackhammer.



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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		

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