



Coimisiún na Scrúduithe Stáit State Examinations Commission

Leaving Certificate Applied, 2016

Vocational Specialism – Engineering (240 marks)

Monday, 13 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>	
Centre Stamp	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 script.	

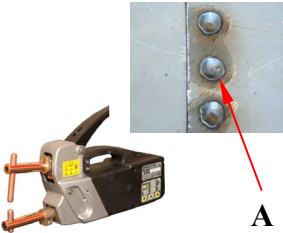
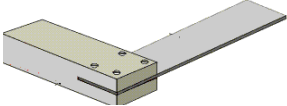
Section 1 (90 Marks)

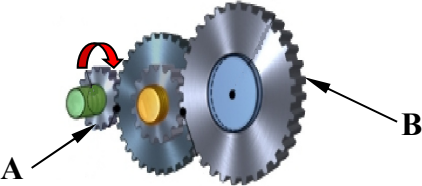
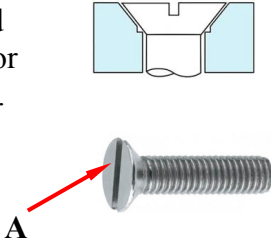
Answer **all three** questions.

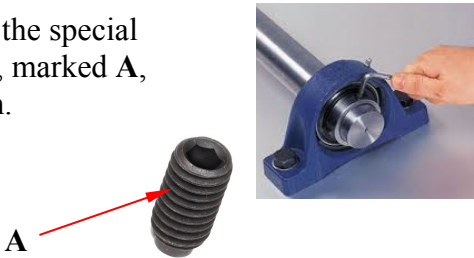
Section 1 Q1.

45 marks

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

QUESTION	ANSWER
(a) Identify a suitable material that could be used to manufacture the mudguard, marked A, on the quad bike. 	Material: _____
(b) State one purpose of the vice clamps shown. 	Purpose: _____ _____
(c) Name the joining process shown at A and give one advantage of using this joining method. 	Name: _____ Advantage: _____ _____
(d) Identify the tool shown and give a suitable use for it in the engineering room. 	Name: _____ Use: _____ _____
(e) Identify the nut shown and give a suitable use for it. 	Name: _____ Use: _____ _____

QUESTION	ANSWER
(f) Gear A is moving in the direction shown. Tick the correct box to show the direction of gear B. 	Tick the correct box to show the direction of gear B.  
(g) Suggest a suitable material to manufacture the exhaust pipe shown and give a reason for your choice of material. 	Material: _____ Reason: _____ _____
(h) Name the bolt marked A and give a reason for using this type of bolt. 	Name of bolt: _____ Reason: _____ _____
(i) Suggest a suitable finish that could be used in manufacturing the clothesline marked A. 	Suitable finish: _____ _____
(j) Tick the correct box to indicate the two metals used to make the alloy solder. 	Tin and Lead Copper and Zinc Copper and Lead

QUESTION	ANSWER
(k) Identify one design difference between the two hacksaws, marked A and B. 	Design difference: _____ _____ _____
(l) State the purpose of the item, marked A, on the hose fitting shown. 	Purpose: _____ _____ _____
(m) Identify one safety precaution to be observed when using the car polisher shown. 	Safety precaution: _____ _____ _____
(n) Suggest a suitable material to make the propeller of the drone shown at A below. 	Material: _____ _____ _____
(o) Name the special screw, marked A, shown. 	Name of screw: _____ _____

QUESTION	ANSWER
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- (p) Outline a suitable use for the mechanism shown opposite.



Use: _____

- (q) Outline **one** major difference between the two hand drilling machines, labelled **A** and **B**, shown below.



Difference: _____

- (r) Identify the engineering process shown opposite and state **one** safety precaution to be observed during the process.



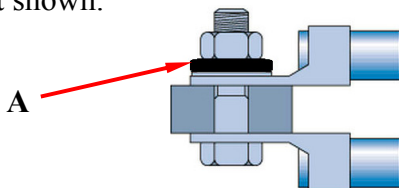
Name of process: _____
 Safety precaution: _____

- (s) Outline **one** method of fixing the metal part shown to a concrete surface.



Method: _____

- (t) Identify the purpose of the washer marked **A** in the machine component shown.

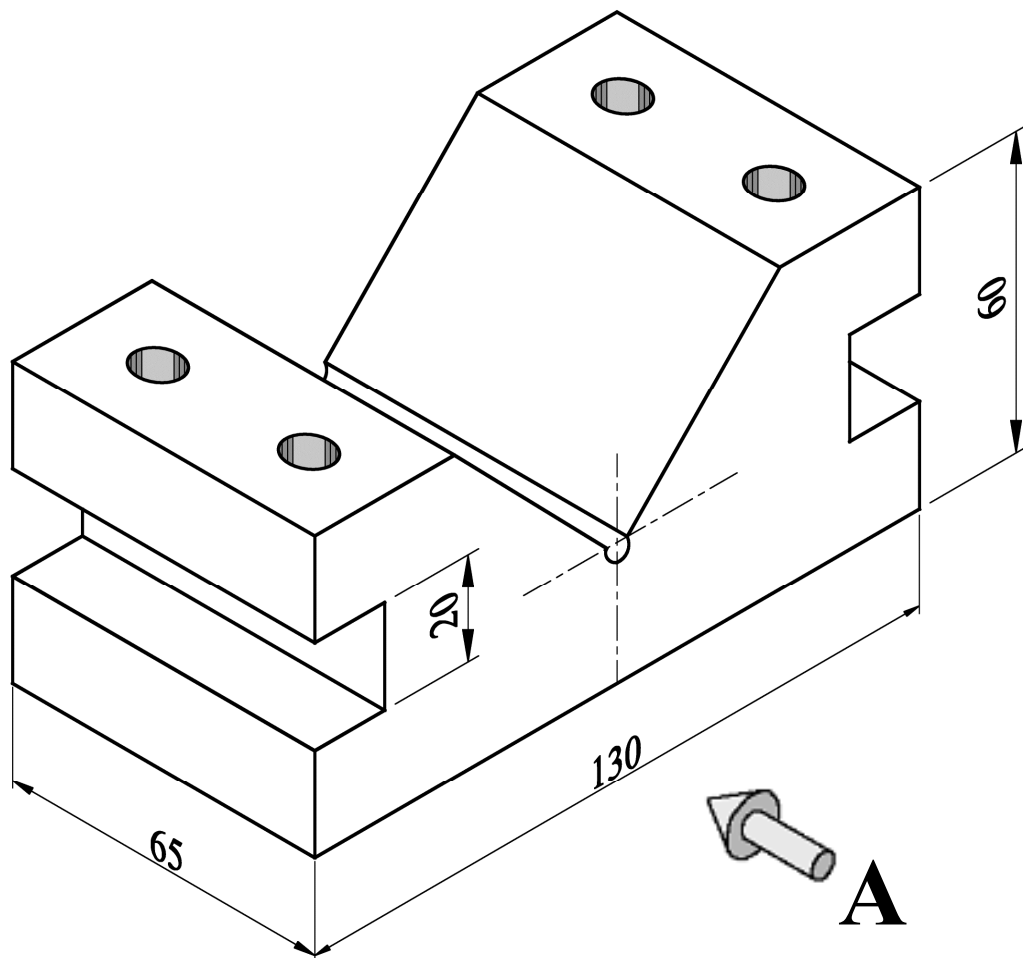


Purpose: _____

A pictorial view of a v-block is shown below.

Draw the following **two** views of the v-block on the grid paper opposite:

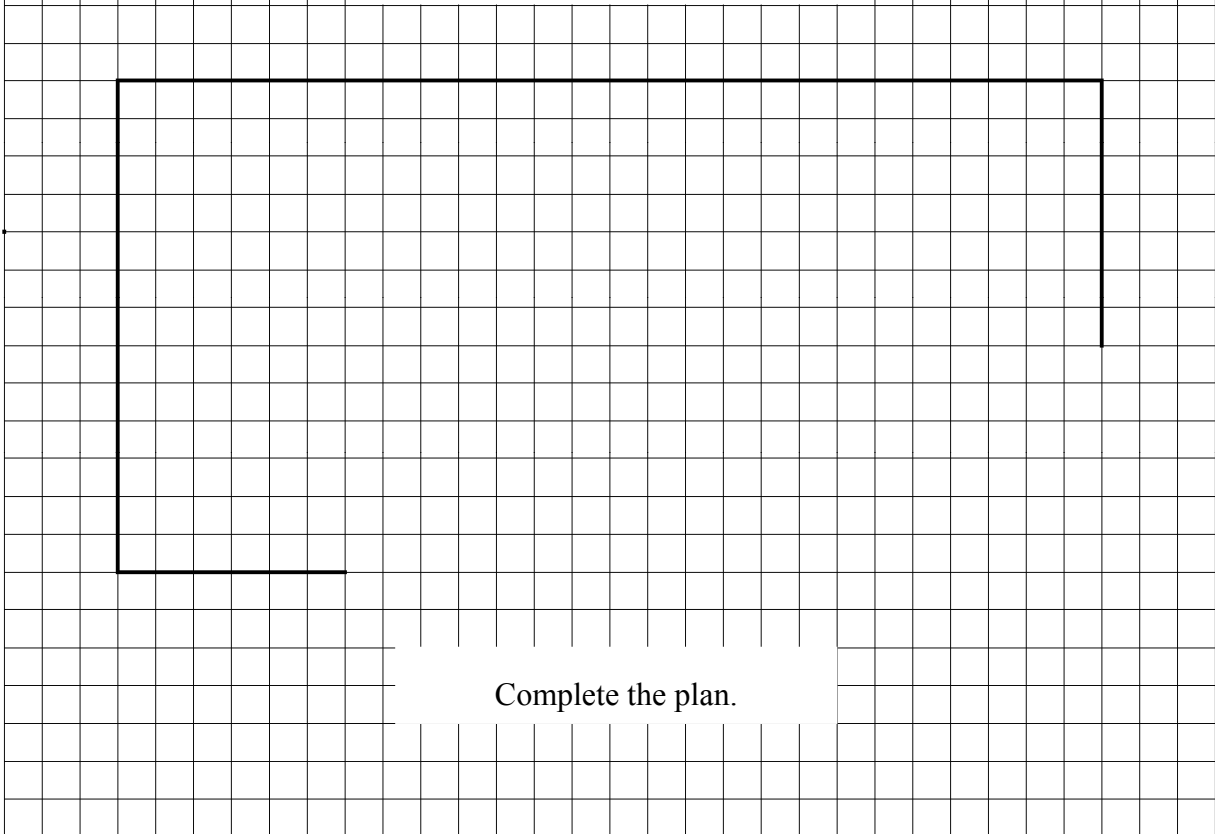
- (a) A front elevation in the direction of arrow A;
- (b) A plan projected from view (a).



Note: Each grid square represents 5 mm.

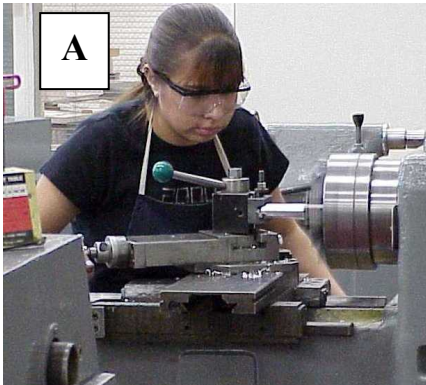


Complete the front elevation.



Complete the plan.

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



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 student using a bench mounted drilling machine in an engineering room. Identify **two** safety features that should be included in a drilling machine.

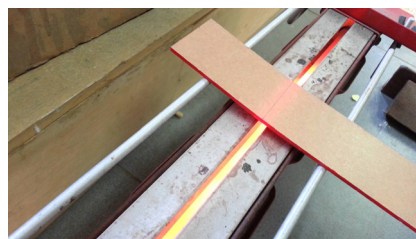
Safety Feature 1: _____

Safety Feature 2: _____

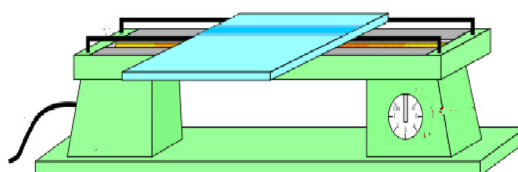


- (c) Identify **any two** safety precautions that should be observed for the safe operation of a strip heater in order to bend plastics.

Safety Precaution 1: _____



Safety Precaution 2: _____



- (d) Identify the safety symbols shown below and give a brief description of **each** symbol in the table below.



W



X



Y

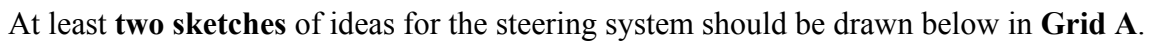
Symbol	Name of symbol	Brief description of symbol
W		
X		
Y		

Section 2 Q4.

(a) Design, in the spaces provided, a suitable steering system for the wooden buggy shown.

- (i) A suitable method used to turn the wheels;
- (ii) A method to control the steering when in use.

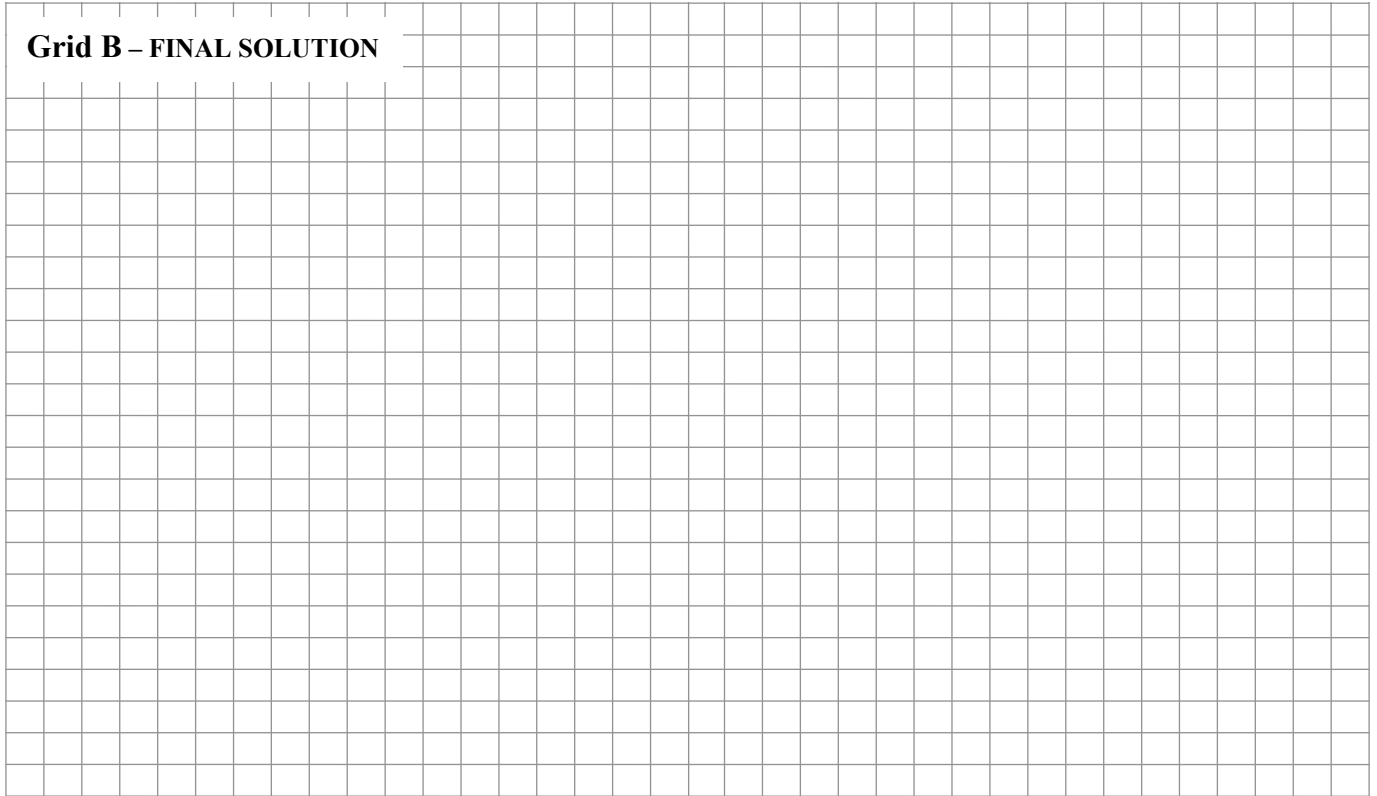
Draw in **Grid B** a sketch of the **final solution** for the steering system.



Grid A - IDEAS

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

Grid B – FINAL SOLUTION



- (b) Two different types of cabin luggage suitable for air travel are shown at **A** and **B**. Outline **three** main differences in the design features of the two items of luggage.

1. _____

2. _____

3. _____

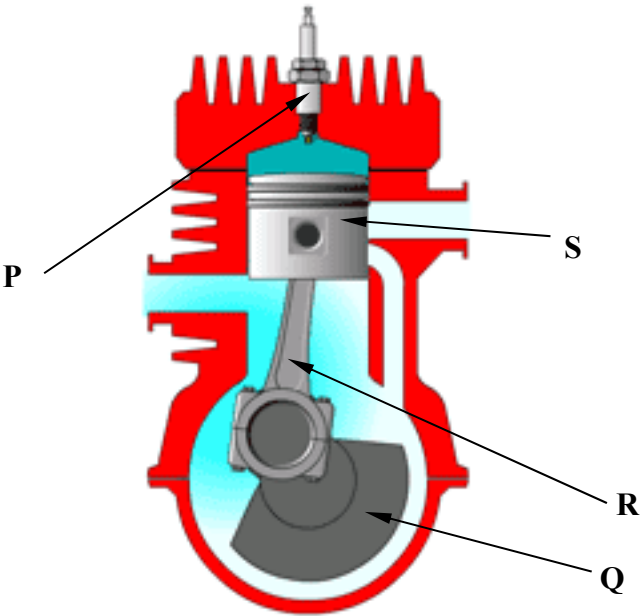


A



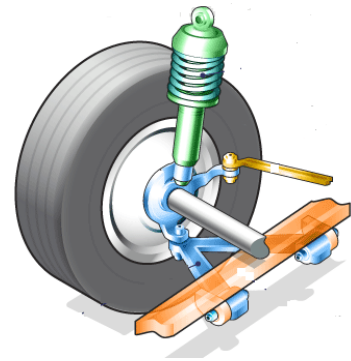
B

- (a) A diagram of a model two-stroke 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)** The system shown opposite is found in a modern car.
Identify the system and describe its function.



Name: _____

Function: _____

- (c)** Briefly describe, in the spaces provided, the necessary steps in successfully changing the wheel of a car. Some photographs are shown to assist you.

(i)



Step 1: _____

(ii)



Step 2: _____

(iii)



Step 3: _____

(iv)



Step 4: _____

(v)



Step 5: _____

- (b) Describe the stages, shown below, involved in enamelling a decorative piece suitable for a necklace pendant.

Stage	Example of Process	Description of Process
1		
2		
3		
4		
5		

- (c) State **one** safety precaution to be observed when enamelling the necklace pendant shown above.

Safety Precaution: _____

Systems Module

(**Any two** topics comprise a full module.)

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

Topic (a) – Computer Aided Design (CAD)

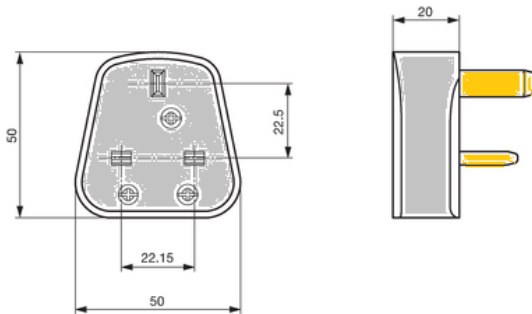
Topic (b) – Electricity

Topic (c) – Electronics

Topic (d) – Mechanisms

Topic (e) – Pneumatics.

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



Command 1: _____

Command 2: _____

Command 3: _____

Command 4: _____

- (b) The CAD drawing of a model jeep is shown. Describe **three** steps necessary when adding shading to a CAD drawing.

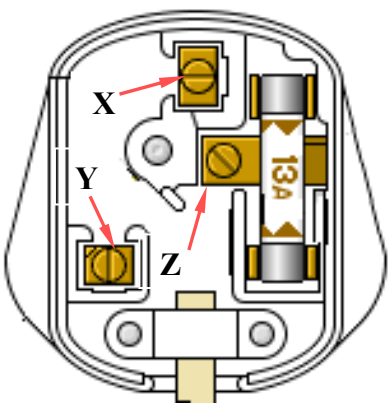
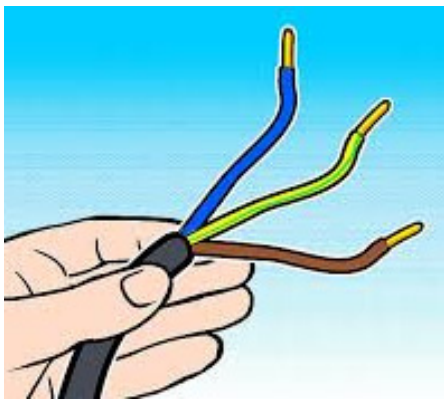


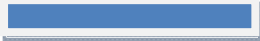
Step 1: _____

Step 2: _____

Step 3: _____

(a) The diagrams below show a person about to wire a three pin plug. Complete the table below listing the name and correct position of **each** wire for **each** connection.



Colour of wire	Name of wire	Position in plug (X, Y or Z)
		
		
		

(b) Identify the electrical equipment shown below and describe a suitable use for it.



Name: _____

Use: _____

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



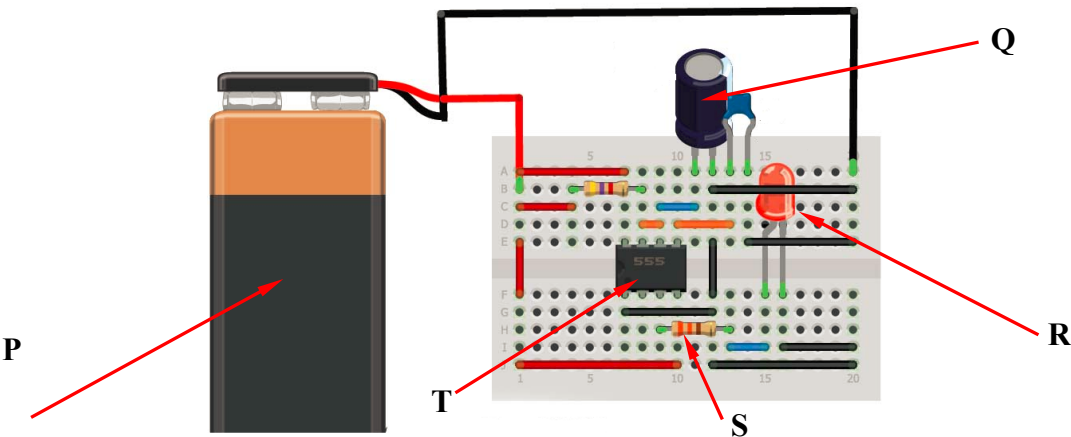
Name: _____

Use: _____

Name: _____

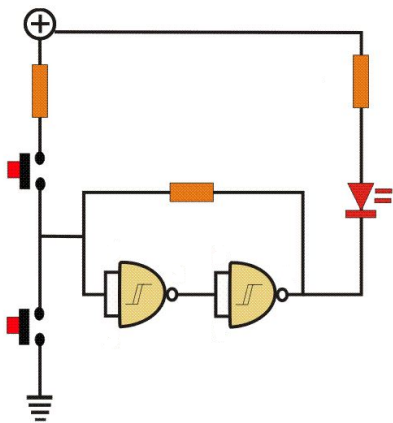
Use: _____

(a) Name and state the function for **each** of the components **P**, **Q**, **R**, **S** and **T** shown below.



	Name	Function
P		
Q		
R		
S		
T		

(b) A simple electronic circuit is shown below.
Describe in the space provided how the electronic circuit works.



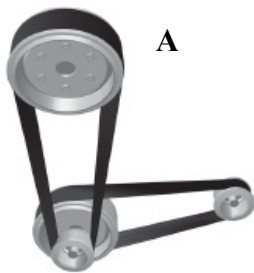
Description: _____

- (a) The diagram below shows a common household tin opener. Explain how this mechanism works.



Explanation: _____

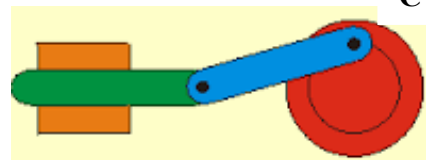
- (b) Identify the mechanisms shown below and give a suitable use for **each** of them.



A



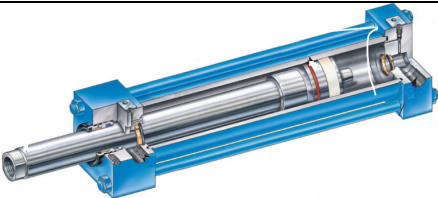
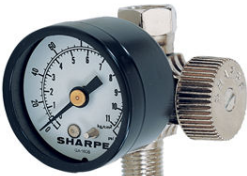
B



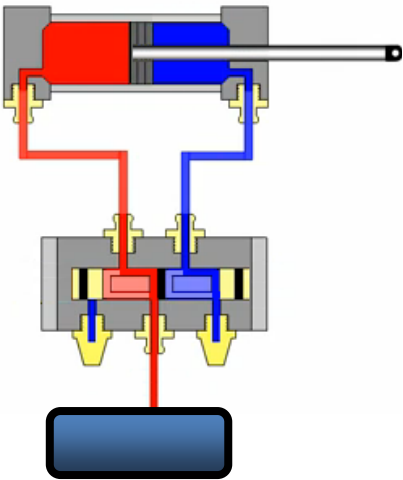
C

	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.

	Component	Name and Function
P		Name:
		Function:
Q		Name:
		Function:
R		Name:
		Function:
S		Name:
		Function:

(b) A simple pneumatic setup is shown opposite. Describe how this pneumatic circuit works.



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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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