Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate Applied, 2015

Vocational Specialism – Engineering
(240 marks)

Monday, 8 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.

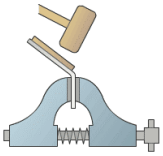
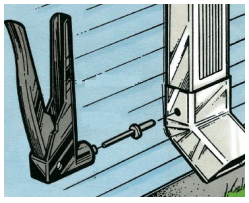
For the Superintendent only	*For the Examiner only*	
Centre Stamp	1. Total of end of page totals	
	2. Aggregate total of all disallowed questions	
	3. Total mark awarded (1 minus 2)	
	4. Bonus mark for answering through Irish (if applicable)	
	5. Total mark awarded if Irish bonus applies (3 plus 4)	
	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.	

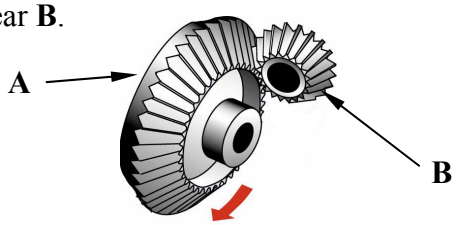
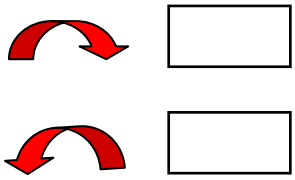
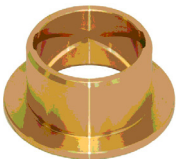
Section 1 (90 Marks)

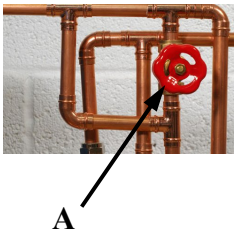
Answer **all three** questions.

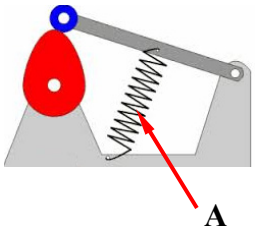
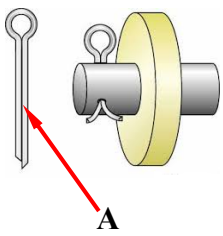
Section 1 **Q1.** **45 marks**

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

QUESTION	ANSWER
(a) Please tick the correct box to indicate the most suitable type of plastic that the strip heater shown can be used to bend. 	Thermosetting plastic ☐ Thermoplastic ☐
(b) State a reason why a mallet is being used to bend the metal as shown. 	Reason: _____ _____
(c) Identify the tool shown below and give a suitable use for it in the engineering room. 	Name: _____ Use: _____ _____
(d) Name the joining process shown opposite and give **one** advantage for its use. 	Name: _____ Advantage: _____ _____
(e) Identify the nut shown and state a reason for its use. 	Name:_____ Reason: _____ _____

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) Identify the engineering component shown opposite and suggest **one** suitable use for it. 	Name: _____ Suitable use: _____ _____
(h) Name a suitable material to make the body of the toy car marked **A** and give a reason for your choice of material.  	Suitable material: _____ Reason: _____ _____
(i) Suggest a suitable material that could be used to manufacture the outside casing marked **A**, on the mobile device shown opposite.  	Suitable material: _____ _____
(j) Tick the correct box to indicate the **two** metals used to make the alloy brass. 	Tin and Lead ☐ Copper and Zinc ☐ Copper and Tin ☐

QUESTION	ANSWER
(k) Name the filing technique shown and suggest **one** safety precaution to be observed when filing. 	Name of technique: _____ Safety precaution: _____ _____
(l) Identify the item marked **A** in the pipe network shown and give a reason for using it when plumbing. 	Name: _____ Reason: _____ _____
(m) Identify **one** safety feature included when designing the garden strimmer shown below. 	Safety feature: _____ _____ _____
(n) Suggest a reason why the front wheels on the wheelchair shown opposite are smaller than the back wheels. 	Reason: _____ _____ _____
(o) Identify the type of screw marked **A** that would be used to secure the cleat shown to the bottom of a cycling shoe. 	Type of screw: _____ _____

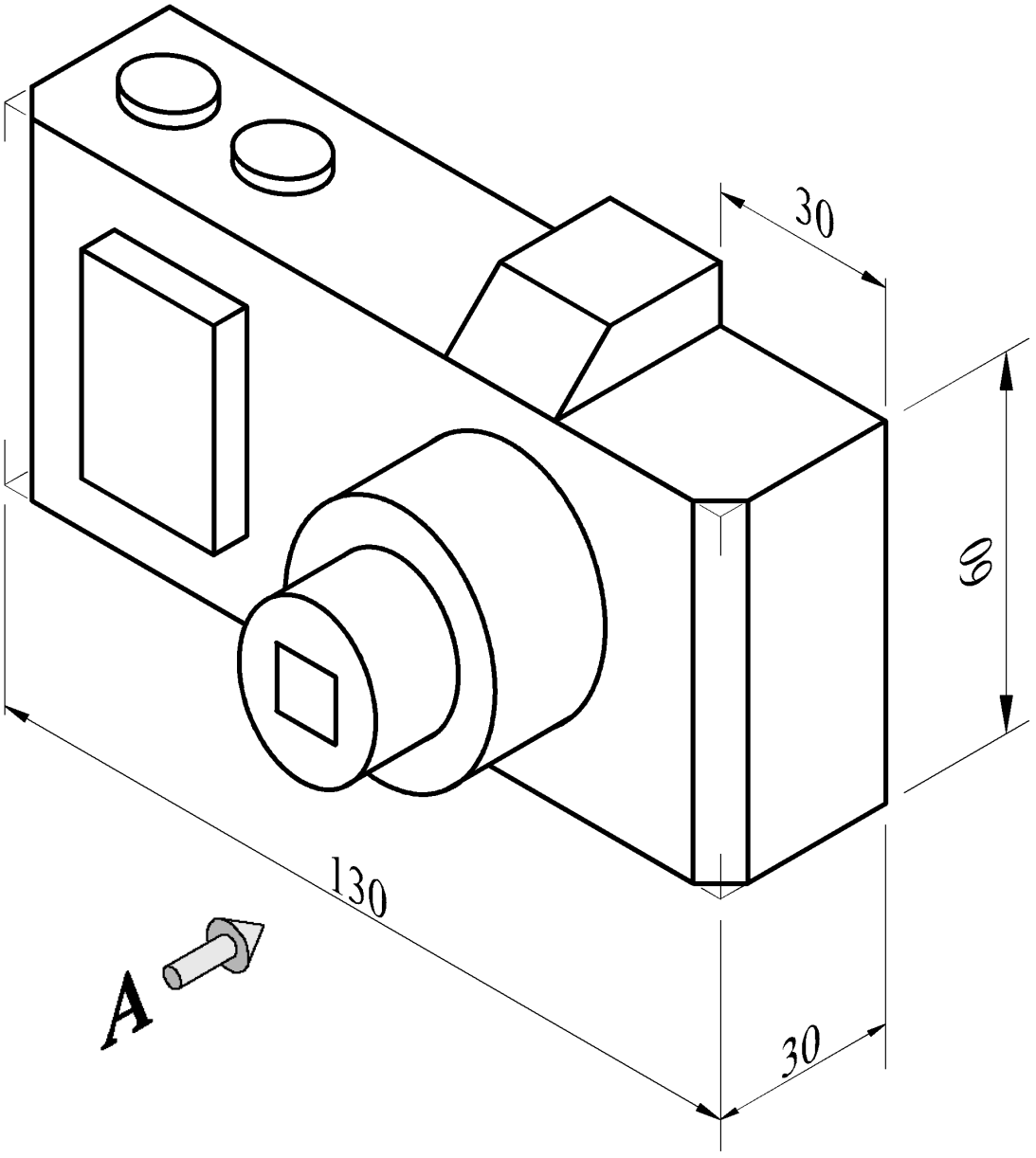
QUESTION	ANSWER
(p) Outline the purpose of the spring marked **A** in the mechanism shown opposite. 	Purpose: _____ _____ _____
(q) Name the piece of electrical equipment shown below and give a suitable use for it. 	Name: _____ Use: _____ _____
(r) Identify the tool shown below and give a suitable material for manufacturing the blade of the tool. 	Name of tool: _____ Material for blade: _____ _____
(s) Outline **one** safety precaution that should be observed when using aerosol paint. 	Safety precaution: _____ _____ _____
(t) Identify the item marked **A** and suggest a suitable use for it. 	Name: _____ Use: _____ _____

Section 1 **Q2.** **25 marks**

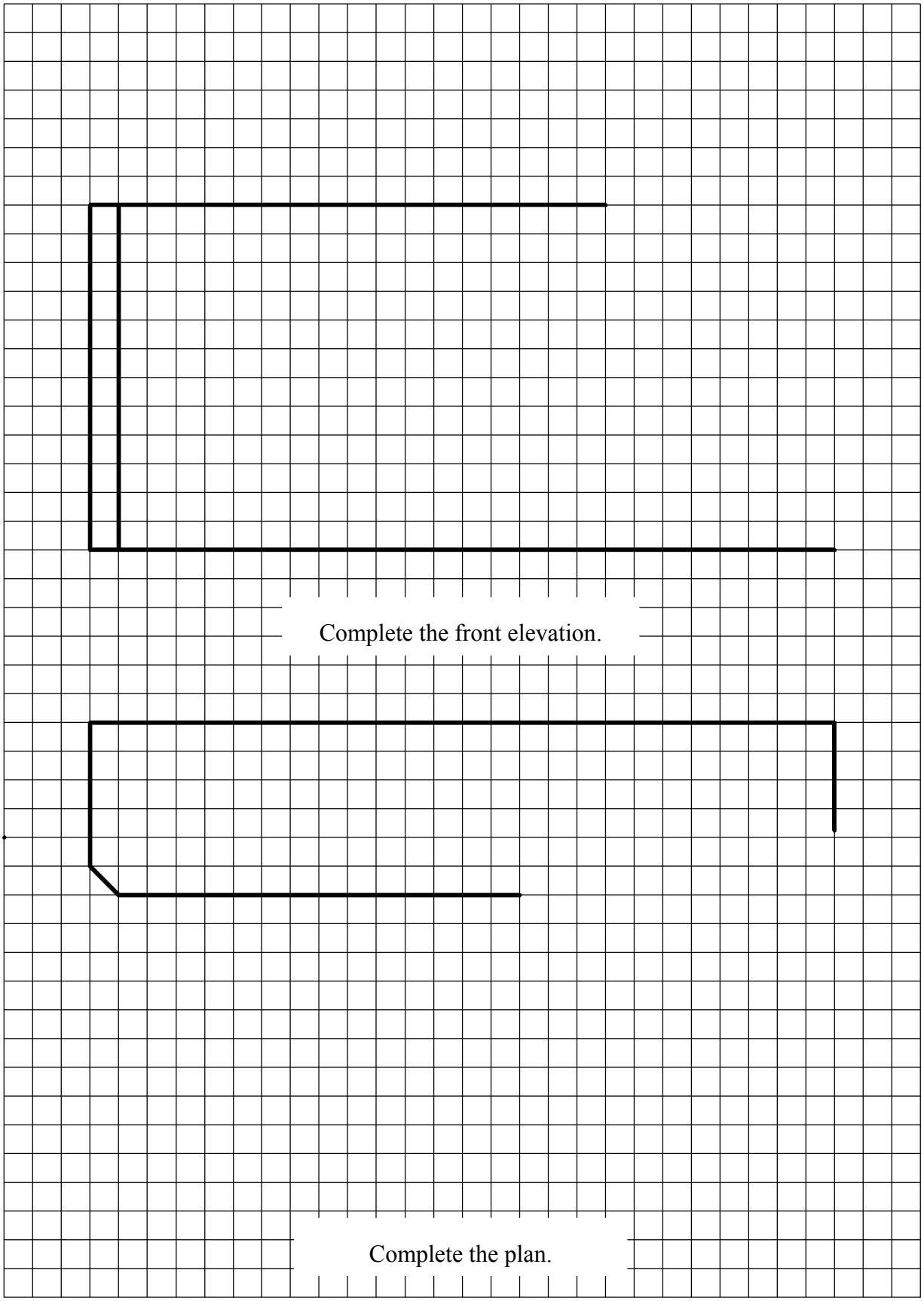
A pictorial view of a camera is shown below.
Draw the following **two** views of the camera on the grid paper opposite:

(a) A front elevation in the direction of arrow **A**;

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

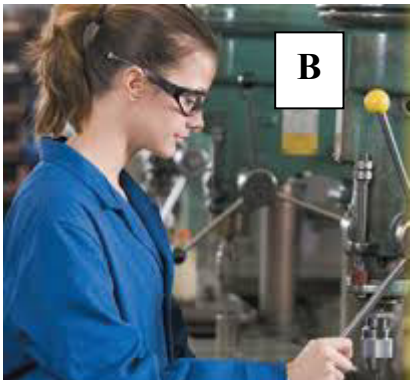


Note: Each grid square represents 5 mm.



Section 1 **Q3.** **20 marks**

(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 school engineering room. Identify **two** safety precautions that should be observed when working in this type of classroom environment.

Safety Precaution 1:_____

_____

Safety Precaution 2:_____

_____

(c) Identify **any two** safety features required for the safe operation of the centre lathe shown.

Safety Feature 1:_____

_____

_____

_____

_____

Safety Feature 2:_____

_____

_____

_____

_____

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

Symbol	Name	Description
	_____ _____	_____ _____
	_____ _____	_____ _____
	_____ _____	_____ _____
	_____ _____	_____ _____
	_____ _____	_____ _____

Section 2 (150 Marks)

Answer **any three** questions.

Section 2 **Q4.** **50 marks**

(a) Design, in the spaces provided, a suitable bracket for attaching the stabiliser wheels to the child's bicycle.

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

(i) A method to attach the stabiliser wheel to the bracket;

(ii) A method to enable the stabiliser wheel bracket to be attached to the bicycle.

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

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

Stabiliser wheels

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

Grid A - IDEAS

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

Grid B – FINAL SOLUTION

(b) Two mobile phones are shown at **A** and **B**. Outline **three** main differences in the design features of the two mobile phones.

1._____

_____

2._____

_____

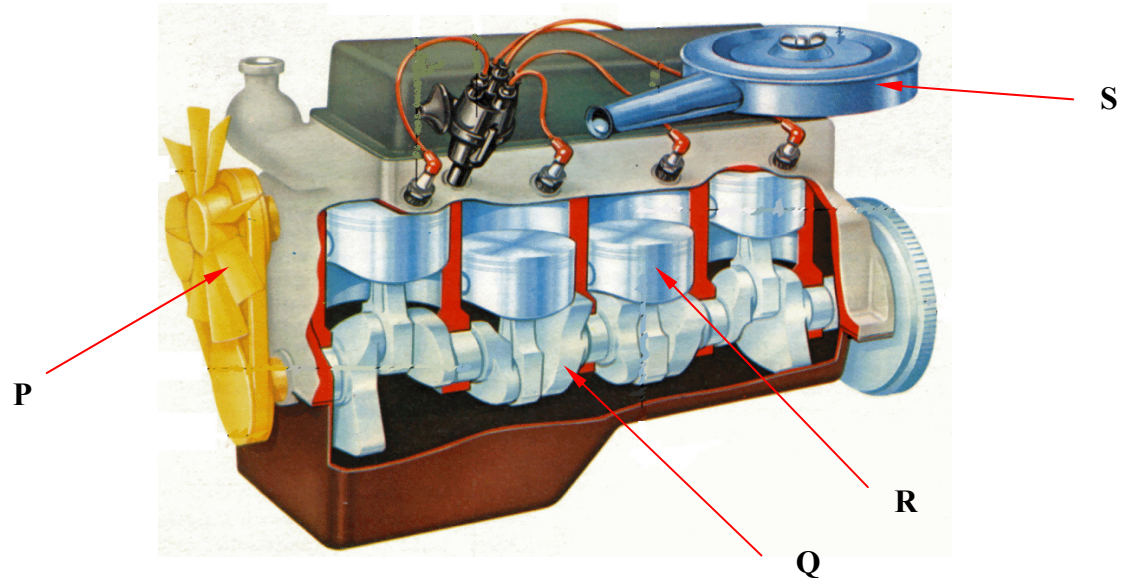
3._____

_____

Mobile Phone A

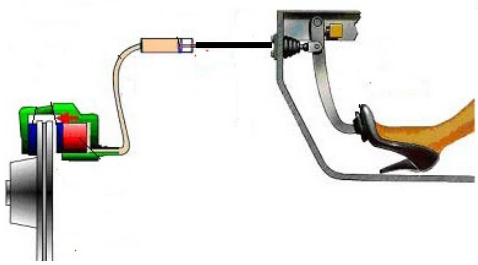
Mobile Phone B

(a) A diagram of a model four-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.

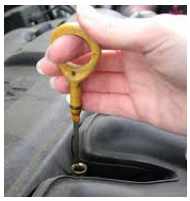
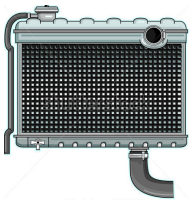


Name: _____

Function: _____

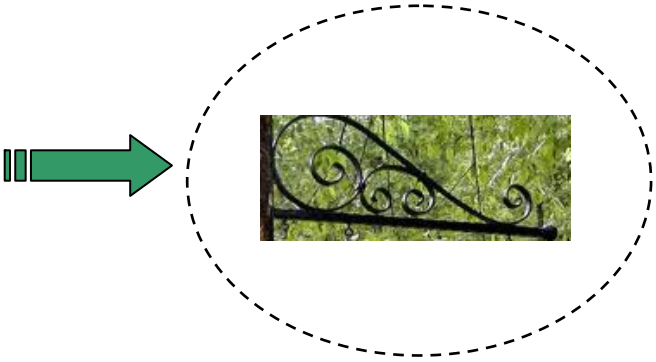
_____

(c) Name and describe the purpose of **each** of the car parts shown.

(i)		Name:_____ Purpose:_____ _____
(ii)		Name:_____ Purpose:_____ _____
(iii)		Name:_____ Purpose:_____ _____
(iv)		Name:_____ Purpose:_____ _____
(v)		Name:_____ Purpose:_____ _____

(a) Describe, in the spaces below, **any three** stages used to produce the decorative scroll in the bed and breakfast sign 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: _____

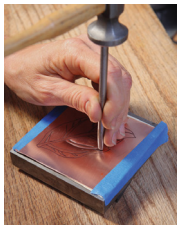
_____

_____

_____

(b) A number of decorative metalwork processes are shown below.

In the spaces provided give a brief description of **each** process.

Name of Process	Example of Process	Description of Process
Etching		
Repoussé		
Hollowing		
Enamelling		

(c) State **two** safety precautions to be observed when using acid to clean copper.

Safety Precaution 1:_____

_____

Safety 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)

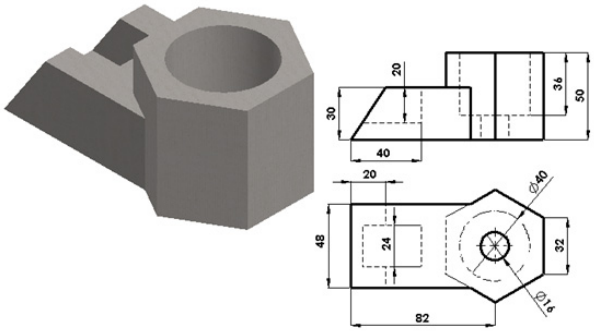
Topic (b) – Electricity

Topic (c) – Electronics

Topic (d) – Mechanisms

Topic (e) – Pneumatics.

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



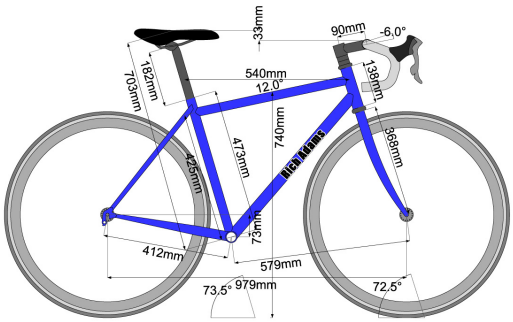
Command 1:_____

Command 2:_____

Command 3:_____

Command 4:_____

(b) The CAD drawing of a modern racing bicycle is shown. List **three** advantages of using CAD drawings over conventional pencil drawings.



Advantage 1: _____

_____

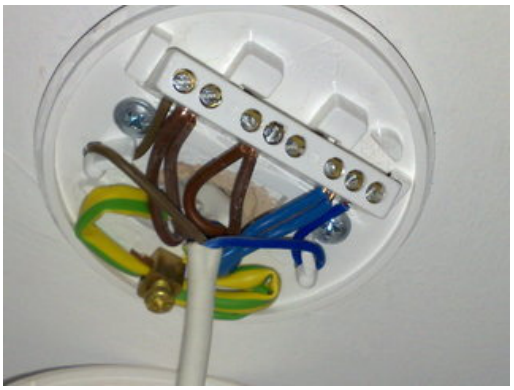
Advantage 2: _____

_____

Advantage 3: _____

_____

(a) The diagrams below show a typical ceiling rose for a light fitting. Complete the table below listing the correct colour of wire for each connection.



Connection	**Colour of wire**
Earth (E)	
Live (L)	
Neutral (N)	

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

Name: _____

Use: _____

_____

_____

_____

(c) Name and state a suitable use for **each** of the items 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: _____

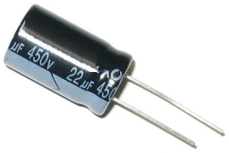
Use: _____

_____

Name: _____

Use: _____

_____



Name: _____

Use: _____

_____

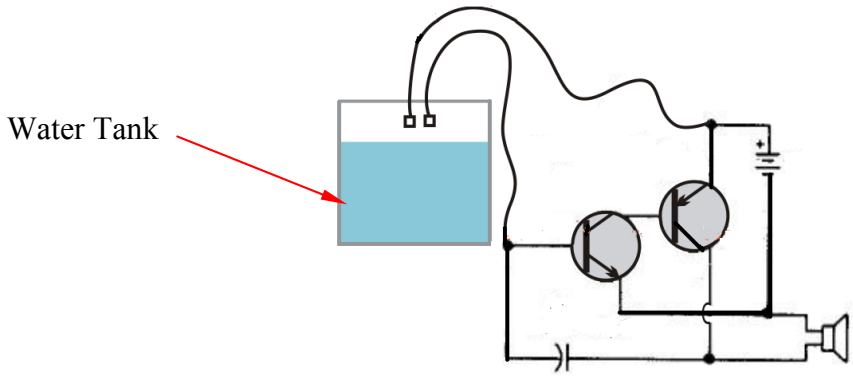
(b) Identify the electronic component and explain the purpose of the colour bands shown.

Name: _____

Purpose of colour bands: _____

_____

(c) An electronic circuit for a low level water indicator alarm is shown below.
Describe in the space provided how the electronic circuit works.



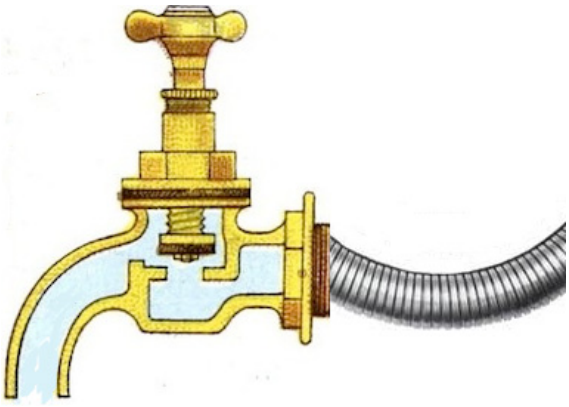
Description: _____

_____

_____

_____

(a) The diagram below shows a cross section of an external water tap.
Explain how the tap mechanism works.



Explanation: _____

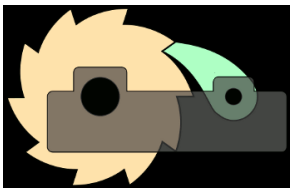
_____

_____

_____

(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) Fill in the **two** missing words in the statement below.

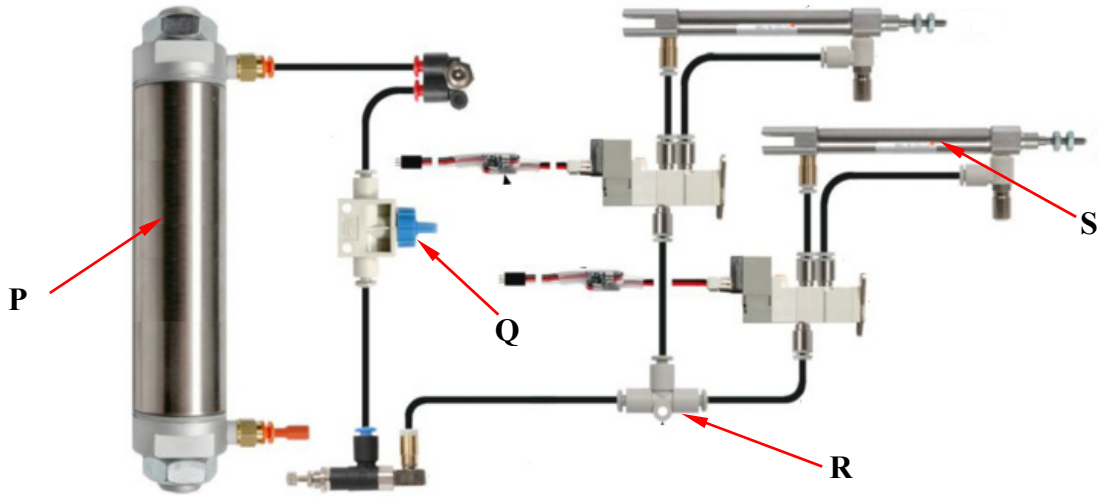
A pneumatic system uses pressurised _____ *while a hydraulic system uses pressurised* _____ *in controlling or harnessing power.*

(b) Give **one** advantage of using a pneumatic system rather than a hydraulic system in engineering.

Advantage: _____

_____

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



	Name	Function
P		
Q		
R		
S		

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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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