



Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate Applied, 2013

Vocational Specialism - Technology
(240 Marks)

Wednesday 12th June, Afternoon 2:00 to 4:00

General Directions:

1. Write your examination number in this box:

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2. There are two sections in this paper.
 Section 1– Answer **all three** questions. - 90 marks

Q1. - Short answer questions
Q2. - Graphical Communication
Q3. - Health and safety

Section 2– Five questions, answer **any three** - 150 marks

Q1. - Introducing Technology
Q2. - Design and Manufacture
Q3. - Water Technology
Q4. - Electrical Understanding and Basic Electronics
Q5. - Tools and Equipment

3. Write your answers in the spaces provided and include sketches (in pencil) where appropriate.

Centre Stamp

1.	Total of end of page totals	
2.	Aggregate total of all disallowed question(s)	
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)	
	<u>Note:</u> The mark in row 3 (or row 5 if Irish bonus is awarded) must equal the mark in the Total mark box on the script.	

Section	No.	Mark
Section 1	1	
	2	
	3	
Section 2	1	
	2	
	3	
	4	
	5	
Total		

Question 1

Compulsory

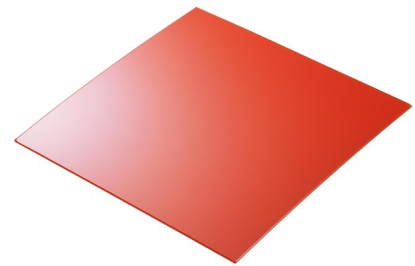
(40 marks)

1. Answer **any Ten** of the following fifteen short questions.

(a) High Impact Polystyrene (HIPS) is very suited to vacuum forming. Suggest **two** reasons for this.

Reason 1 _____

Reason 2 _____



High Impact Polystyrene

(b) Charles and Ray Eames's famous moulded chair, launched in 1946 is made from plywood. Suggest **two** reasons why they used plywood to achieve this design.



Eames LCW chair

Reason 1 _____

Reason 2 _____

(c) The success of electric cars depends on many things one of which is recharging the batteries. List **two** important considerations that must be taken into account in the design of electric charging points.

1 _____

2 _____



Electric car charging point

(d) The lopping shears shown uses levers to obtain a *mechanical advantage*. Explain what you understand by the term 'mechanical advantage' in the context of this shears.

Answer _____



Lopping Shears

(e) List **two** metals suitable for turning on a lathe such as that shown.

1 _____

 2 _____



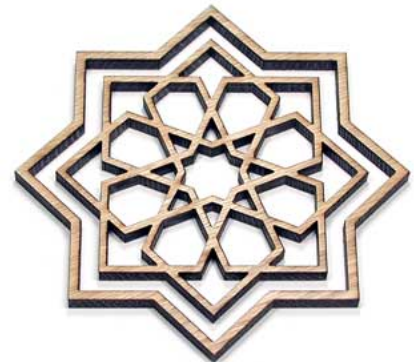
Lathe

(f) Complete the table below by naming the quantity measured using each of the given units.

Units	Metres	Kilograms	Newtons	Kilowatt
Quantity				

(g) Name a machine suitable for cutting intricate patterns in wood or plastic and give a reason for your choice.

Machine _____
 Reason _____



Geometric pattern

- (h) Touch screen computers are a recent innovation. Suggest **one** advantage and **one** disadvantage of this technology.

Advantage _____

Disadvantage _____



Touch screen computer

- (i) State where the plumbing fittings shown are used and say why one fitting is red and one is blue.

Use _____

Red _____

Blue _____



Plumbing fittings

- (j) Name the plumbing fitting shown and say where it is used.

Name _____

Where used _____



Plumbing fitting

- (k) Shown is a DPDT relay switch. Explain DPDT and give **one** use for a relay.

DPDT _____

Relay use _____



Relay switch

- (l) Calculate the cost of running a 1.2kW electric lawnmower for 2 hours if a unit of electricity costs 18 cent.

Solution

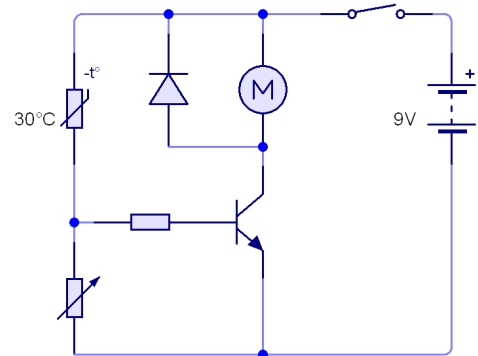


Electric Lawnmower

- (m) A sensing circuit using a thermistor is shown. State the physical condition this circuit is sensing and give **one** use for it.

Physical condition _____

Use _____



Sensing circuit

- (n) Hang gliding is an extreme sport. List **two** important properties of the fabric used in the wings of the hang glider.

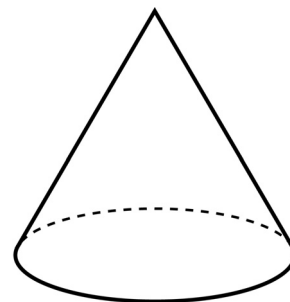
1 _____

2 _____



Hang Glider

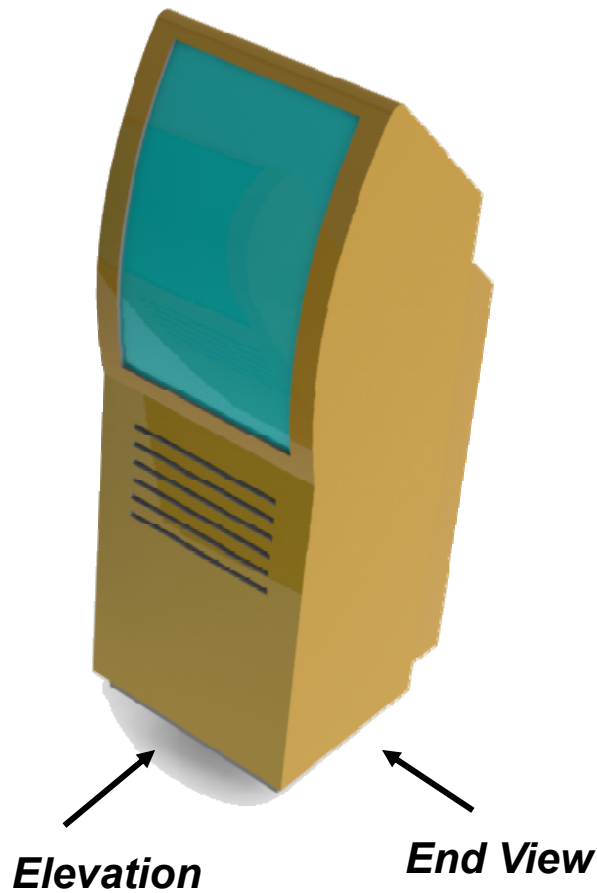
- (o) Apply shading to the drawing of the cone shown. The shading should help to convey the shape of the cone.



Compulsory

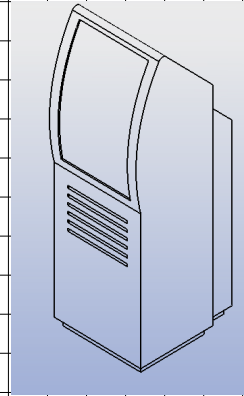
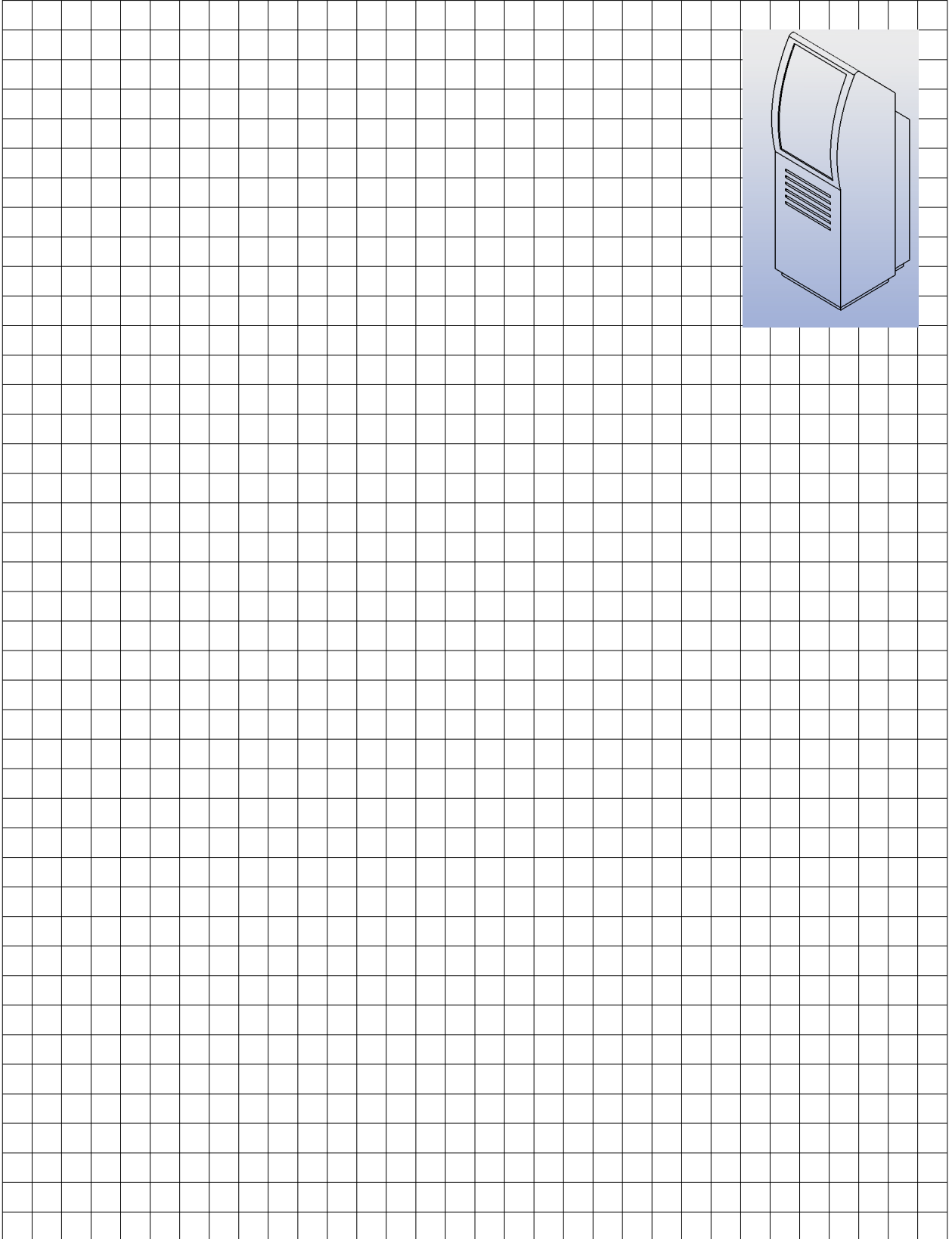
2. Graphical Communication

- (a) A pictorial view of a public information kiosk is shown below.
In the space opposite draw a well proportioned Elevation and End View of the kiosk.
- (b) Estimate and include 4 dimensions on your completed drawing.



Information Kiosk

Estimate and include 4 dimensions on your completed drawing.



Compulsory

3. Health and Safety

(a) (i) Suggest **two** safety precautions that should be observed when using corded power tools such as the saw shown.

1 _____

2 _____



Power saw

(ii) List **two** safety precautions that should be observed when using a band saw.

1 _____

2 _____

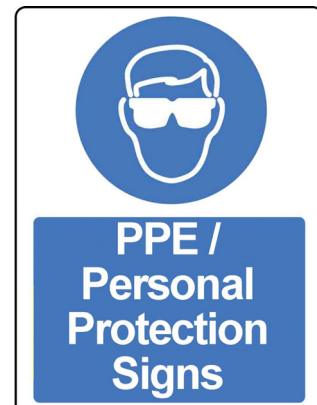


Band saw

(iii) Describe **two** personal protection equipment signs (other than the one shown here) that are in common use in a workshop.

1 _____

2 _____



Section 2 (150 marks)

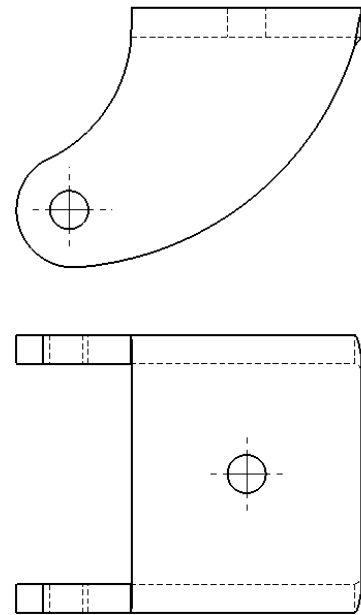
Answer **ANY THREE** Questions from this section.

1. Introducing Technology

(50 marks)

- (a) An elevation and plan of a bracket for a castor wheel are shown.
Make a 3D sketch of the bracket in the space provided.

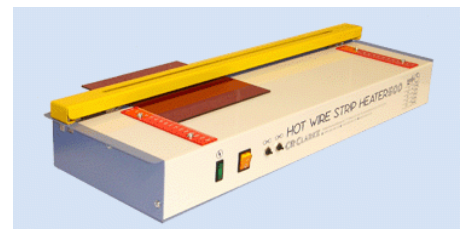
3D Sketch



- (b) The bracket in part (a) above was bent using a hot wire strip heater. Name a suitable plastic for the bracket and describe the bending process..

Suitable plastic _____

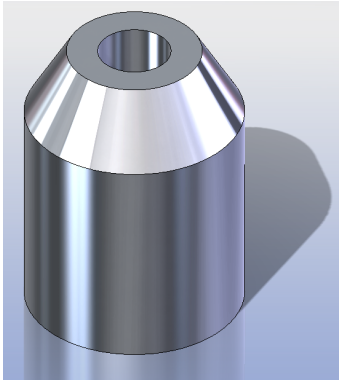
Bending process _____



Hot wire strip heater

(c) Outline the steps used to turn the machine part shown on a lathe.

Answer _____



Machine part with *taper* and *through hole*

(d) (i) As part of the movement towards a greener environment we are encouraged to ‘Reduce, Reuse and Recycle’. Explain each of these terms.

Reduce _____

Reuse _____

Recycle _____

(ii) Explain the meaning of the following terms associated with the environment:

Carbon Footprint _____

Global Warming _____

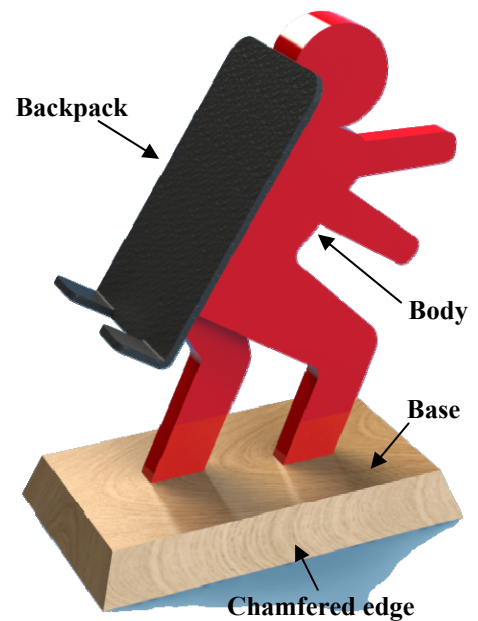
2. Design and Manufacture

(50 marks)

- (a) A design for a mobile phone holder is shown.
The backpack and body are made from plastic and the base is made from oak.

- (i) Name a suitable method of joining the backpack to the body and describe how this technique is carried out.

Answer _____



Mobile Phone Holder

- (ii) A suitable finish is to be applied to the wooden base.
Name a suitable finish and describe how the wood should be prepared before applying this finish.

Finish _____

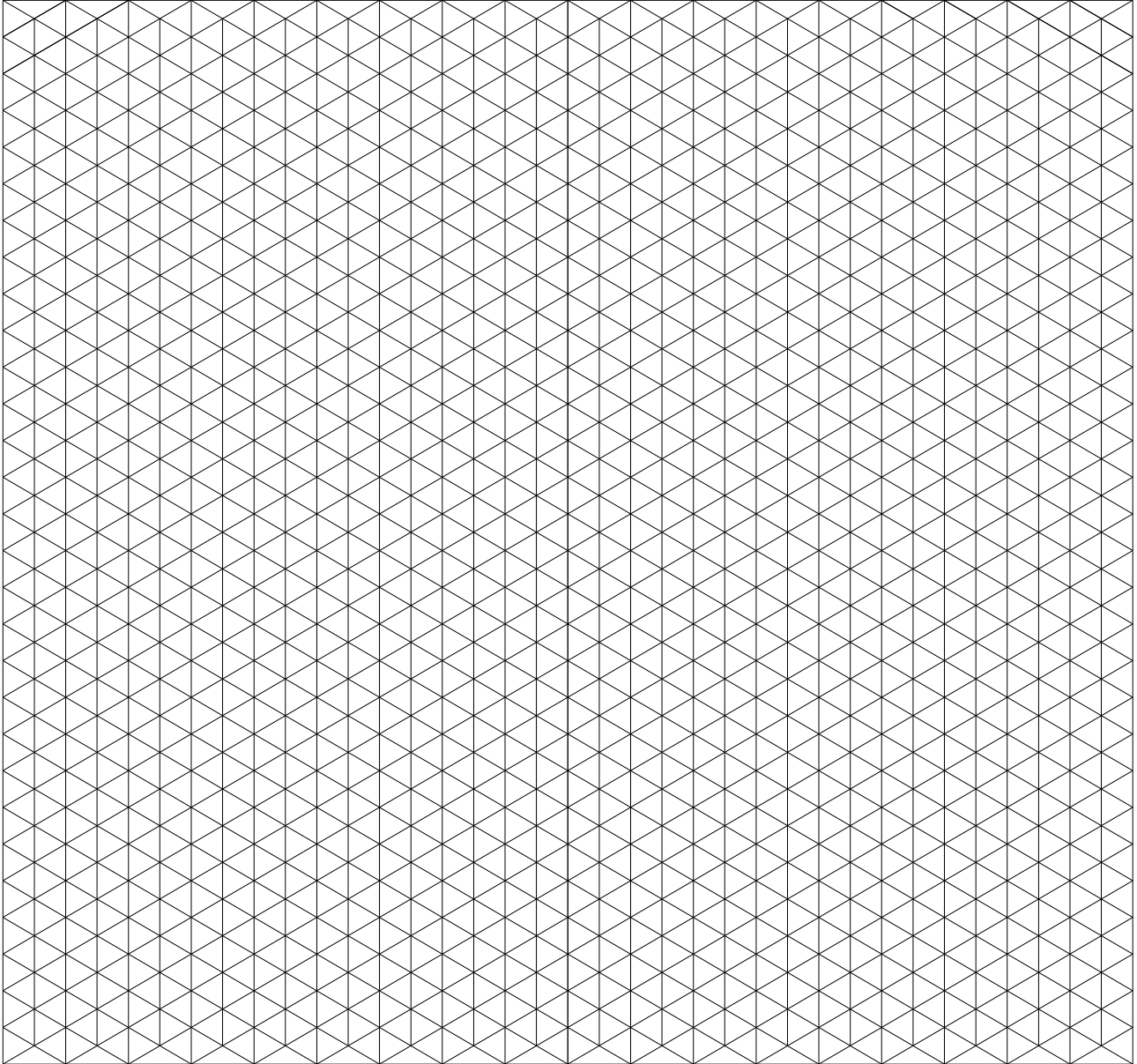
Preparation _____

- (iii) Describe using sketches a method of chamfering the wooden base as shown above.

Answer

- (b) (i) In the *Design and Manufacture* module you designed and manufactured a product. Name the product you made and make an isometric sketch of it on the grid below.

Product Name _____



- (ii) Describe **two** new skills you learned when doing this project.

1 _____

2 _____

3. Water Technology

(50 marks)

- (a) (i) A solar panel for heating water is shown. List **two** important factors that need to be considered when installing solar panels.

1 _____

2 _____



Solar panel

- (ii) Solar panels are generally used for heating water in the hot water cylinder. Outline **two** measures that a householder can take to minimise heat loss from this hot water system.

1 _____

2 _____

- (b) Explain, step-by-step, how you would replace a faulty hot water tap on a bathroom sink.

Answer _____



Typical bathroom sink

(c) Compare copper plumbing pipes with plastic plumbing pipes under the following headings:

Available lengths _____

Cost _____

Flexibility _____

Insulation _____

(d) Explain the function of **each** of the plumbing fittings shown.

Float ball valve _____



Water pressure vessel _____



Non return valve _____



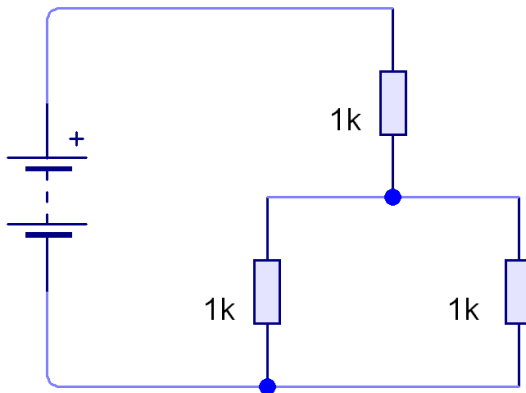
P Trap _____



4. Electrical Understanding and Electronics

(50 marks)


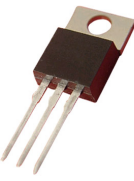


- (a) Determine the total resistance in the circuit below.



Answer

- (b) The table below shows some of the components required for a motor speed-control circuit.

- (i) Name the components in the spaces provided.

Component				
Name				

- (ii) The speed-control circuit is to be used to control the speed of a cooling fan such as that shown opposite. The power supply for the fan is to be either a battery **or** a mains power supply unit.

State which power supply you would use giving two valid reasons for your choice.

Power supply _____

Reason 1 _____

Reason 2 _____



Small cooling fan



Mains power supply unit

- (c) (i) The device opposite is used to monitor the running cost of any appliance that is plugged into it. What is the advantage of using this type of “Smart” technology?

Answer _____



- (ii) Calculate the cost of running a 500 Watt security light for 12 hours at 20 cent per unit of electricity.

Solution



- (iii) Calculate the current passing through the element of a 240V 24W soldering iron.

Solution *Note: Power = Voltage × Current*



- (iv) A photograph of an electricity generator that harnesses energy from waves is shown.

Describe **two** other devices that generate electricity from renewable energy sources.

1 _____

 2 _____



Electricity generation using wave energy

5. Tools & Equipment

(50 marks)

(a) A range of equipment found in workshops is shown.

1.



2.



3.



4.



Name each piece of equipment and give its use.

No.	Name	Use
1		
2		
3		
4		

(b) Describe **four** main steps in the process of vacuum forming.

- 1 _____
- _____
- 2 _____
- _____
- 3 _____
- _____
- 4 _____
- _____



Vacuum-forming machine

(c) Make sketches of **any 4** of the following tools in the spaces below.

Spring dividers	Claw hammer	Stock and die	Wood chisel	Bullnose pliers

(d) PCBs are widely used in the electronics industry.

(i) Explain the term PCB.

Answer _____

(ii) *Flux* is generally applied to circuit boards. Explain why this is necessary.

Answer _____



Flux being applied to a PCB

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