



Coimisiún na Scrúduithe Stáit
State Examinations Commission

JUNIOR CERTIFICATE EXAMINATION, 2012

METALWORK
MATERIALS AND TECHNOLOGY

ORDINARY LEVEL - 100 Marks

Tuesday 19 June, Afternoon 2:00 - 3:30

Centre
Number



Examination
Number



INSTRUCTIONS

1. Answer **Question 1, Sections A and B** and **any three** other questions.
2. Write your answers in the spaces provided or tick the appropriate box.
3. Hand up this paper at the end of the examination.

For Examiner	
Total Mark	<input type="text"/>
Question	Mark
1A	
1B	
2	
3	
4	
5	
6	
Total	
Grade	


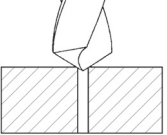
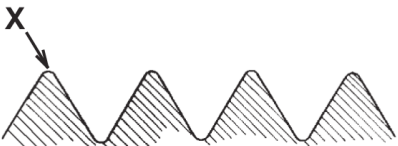
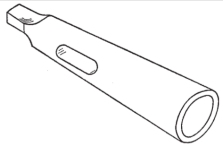
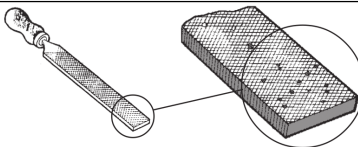
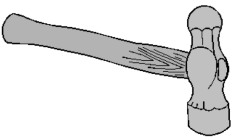
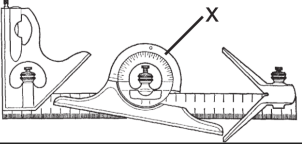
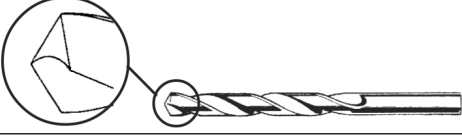

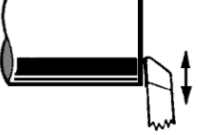
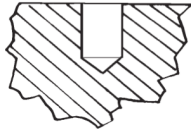
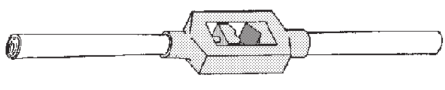
1. Total of end of page totals	
2. Aggregate total marks for all disallowed question(s)	
3. Total mark awarded (1 minus 2)	
4. Bonus mark for answering through Irish (if applicable)	
5. Total mark awarded if Irish Bonus is applied (3+4)	
Note: The mark in row 3 (or row 5 if an Irish Bonus is awarded) must equal the mark in the Total Mark box on the script	

MAKE SURE TO WRITE YOUR EXAMINATION NUMBER IN THE
BOX PROVIDED ON THIS PAGE

Question 1.

SECTION A - 20 MARKS
ANSWER ANY TEN QUESTIONS FROM THIS SECTION

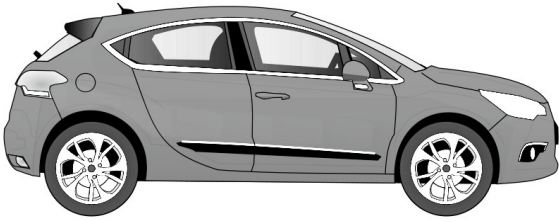
40 Marks

<p>(a)</p> 	<p>This tool is a:</p>	<table border="1"> <tr><td>Chisel</td><td></td></tr> <tr><td>Soldering Iron</td><td></td></tr> <tr><td>Centre Punch</td><td></td></tr> <tr><td>Drill Drift</td><td></td></tr> </table>	Chisel		Soldering Iron		Centre Punch		Drill Drift	
Chisel										
Soldering Iron										
Centre Punch										
Drill Drift										
<p>(b)</p> 	<p>This drill bit is guided by a:</p>	<table border="1"> <tr><td>Clearance Hole</td><td></td></tr> <tr><td>Countersink Hole</td><td></td></tr> <tr><td>Pilot Hole</td><td></td></tr> <tr><td>Punch Mark</td><td></td></tr> </table>	Clearance Hole		Countersink Hole		Pilot Hole		Punch Mark	
Clearance Hole										
Countersink Hole										
Pilot Hole										
Punch Mark										
<p>(c)</p> 	<p>Part 'X' on a thread is called the:</p>	<table border="1"> <tr><td>Flank</td><td></td></tr> <tr><td>Pitch</td><td></td></tr> <tr><td>Crest</td><td></td></tr> <tr><td>Lead</td><td></td></tr> </table>	Flank		Pitch		Crest		Lead	
Flank										
Pitch										
Crest										
Lead										
<p>(d)</p> 	<p>This tool is used when:</p>	<table border="1"> <tr><td>Filing</td><td></td></tr> <tr><td>Drilling</td><td></td></tr> <tr><td>Threading</td><td></td></tr> <tr><td>Riveting</td><td></td></tr> </table>	Filing		Drilling		Threading		Riveting	
Filing										
Drilling										
Threading										
Riveting										
<p>(e)</p> 	<p>This file should be cleaned using a:</p>	<table border="1"> <tr><td>Dividers</td><td></td></tr> <tr><td>Double Cut</td><td></td></tr> <tr><td>File Card</td><td></td></tr> <tr><td>Centre Punch</td><td></td></tr> </table>	Dividers		Double Cut		File Card		Centre Punch	
Dividers										
Double Cut										
File Card										
Centre Punch										
<p>(f)</p> 	<p>This bench tool is a:</p>	<table border="1"> <tr><td>Cross Pein Hammer</td><td></td></tr> <tr><td>Ball Pein Hammer</td><td></td></tr> <tr><td>Claw Hammer</td><td></td></tr> <tr><td>Mallet</td><td></td></tr> </table>	Cross Pein Hammer		Ball Pein Hammer		Claw Hammer		Mallet	
Cross Pein Hammer										
Ball Pein Hammer										
Claw Hammer										
Mallet										
<p>(g)</p> 	<p>Part 'X' is called the:</p>	<table border="1"> <tr><td>Ruler</td><td></td></tr> <tr><td>Centre Square</td><td></td></tr> <tr><td>Bevel</td><td></td></tr> <tr><td>Protractor</td><td></td></tr> </table>	Ruler		Centre Square		Bevel		Protractor	
Ruler										
Centre Square										
Bevel										
Protractor										
<p>(h)</p> 	<p>The point angle of a standard twist drill is:</p>	<table border="1"> <tr><td>30°</td><td></td></tr> <tr><td>60°</td><td></td></tr> <tr><td>118°</td><td></td></tr> <tr><td>210°</td><td></td></tr> </table>	30°		60°		118°		210°	
30°										
60°										
118°										
210°										
<p>(i)</p> 	<p>This fastener is a:</p>	<table border="1"> <tr><td>Spring Washer</td><td></td></tr> <tr><td>Split Pin</td><td></td></tr> <tr><td>Grub Screw</td><td></td></tr> <tr><td>Set Screw</td><td></td></tr> </table>	Spring Washer		Split Pin		Grub Screw		Set Screw	
Spring Washer										
Split Pin										
Grub Screw										
Set Screw										
<p>(j)</p> 	<p>This technique is called:</p>	<table border="1"> <tr><td>Parallel Turning</td><td></td></tr> <tr><td>Knurling</td><td></td></tr> <tr><td>Taper Turning</td><td></td></tr> <tr><td>Facing</td><td></td></tr> </table>	Parallel Turning		Knurling		Taper Turning		Facing	
Parallel Turning										
Knurling										
Taper Turning										
Facing										
<p>(k)</p> 	<p>The depth of a hole is measured using a:</p>	<table border="1"> <tr><td>Micrometer</td><td></td></tr> <tr><td>Drill Gauge</td><td></td></tr> <tr><td>Depth Gauge</td><td></td></tr> <tr><td>Surface Gauge</td><td></td></tr> </table>	Micrometer		Drill Gauge		Depth Gauge		Surface Gauge	
Micrometer										
Drill Gauge										
Depth Gauge										
Surface Gauge										
<p>(l)</p> 	<p>This tool is a(n):</p>	<table border="1"> <tr><td>Open Spanner</td><td></td></tr> <tr><td>Tap Wrench</td><td></td></tr> <tr><td>Adjustable Spanner</td><td></td></tr> <tr><td>Box Spanner</td><td></td></tr> </table>	Open Spanner		Tap Wrench		Adjustable Spanner		Box Spanner	
Open Spanner										
Tap Wrench										
Adjustable Spanner										
Box Spanner										

SECTION B - 20 MARKS
ANSWER ALL QUESTIONS FROM THIS SECTION

(m)

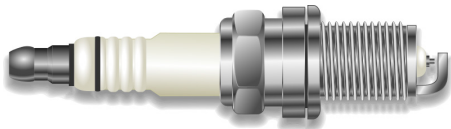
Name **any four** materials used in the manufacture of modern cars.



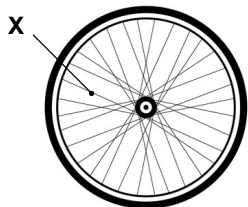
1.	
2.	
3.	
4.	

(n)

What is the function of a spark plug in a petrol engine?

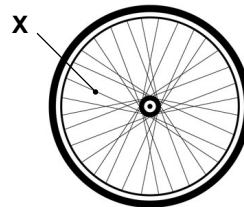


(o) (i) Part 'X' is called a(n):



Hub	
Spoke	
Rim	
Axle	

(ii) Part 'X' is normally in:



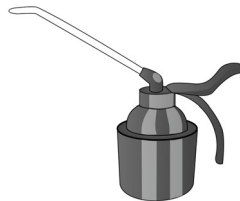
Tension	
Torsion	
Compression	
Shear	

(p) (i) Part 'Y' is called a:

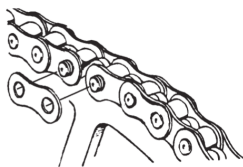


Brake	
Lever	
Fork	
Shock Absorber	

(ii) Why are bicycle chains lubricated?

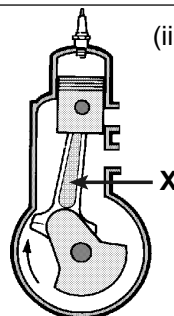


(q) (i) The links of this chain are joined by:



Soldering	
Brazing	
Riveting	
Screwing	

(ii) Part 'X' is called the:



Valve	
Connecting Rod	
Piston	
Crankshaft	

Question 2.

20 Marks

(a)

(i) Cooking foil is made from:

Zinc	
Aluminium	
Steel	

(v) The furnace used to produce steel is called a(n):

Blast Furnace	
Cupola Furnace	
Electric Arc Furnace	

(ii) Aluminium is a(n):

Ferrous Metal	
Non-Ferrous Metal	
Alloy	

(vi) Metal gates are usually made from:

Steel	
Lead	
Zinc	

(iii) Steel is produced by combining iron with:

Lead	
Carbon	
Ore	

(vii) Which one of these metals is the best conductor of heat?

Steel	
Lead	
Copper	

(iv) Cast Iron is:

Ductile	
Brittle	
Malleable	

(viii) Which one of these metals is the hardest?

High Carbon Steel	
Aluminium	
Silver	

(b) Complete the table:

(i) Is copper a hard material?	Yes	
	No	
(ii) Is copper a malleable material?	Yes	
	No	
(iii) Is copper ore called bauxite?	Yes	
	No	
(iv) Is nylon a good conductor?	Yes	
	No	
(v) Is lime used in the production of steel?	Yes	
	No	
(vi) Is galvanised iron coated with zinc?	Yes	
	No	

(c)

(i) After moulding thermosetting plastics soften when reheated:

Always	
Never	
Sometimes	

(iv) The main raw material for plastic is:

Gas	
Oil	
Iron Ore	

(ii) Another name for glass reinforced polyester is:

Polyvinyl Chloride	
Fibre Glass	
Acrylic	

(v) Disposable cups are usually made from:

Nylon	
Polystyrene	
PVC	

(iii) A strip heater is usually used to bend:

Acrylic	
Foam	
Bakelite	

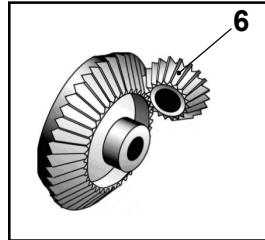
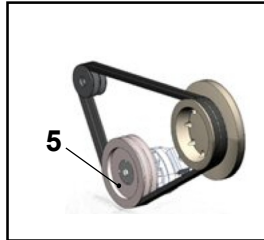
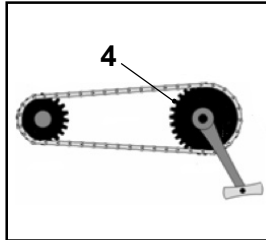
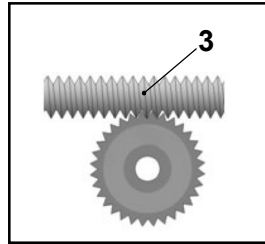
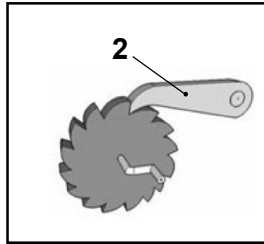
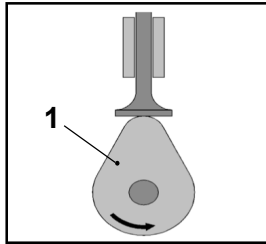
(vi) Which one of these is a Thermoplastic?

Polyester	
Nylon	
Bakelite	

Question 3.

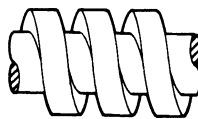
20 Marks

(a) (i) Match the number to the correct mechanism part.

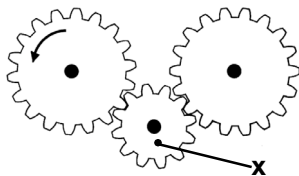


Mechanism Part	No.
Bevel Gear	
Sprocket Wheel	
Pawl	
Cam	
Pulley	
Worm Gear	

(ii) Name a machine that uses this thread:

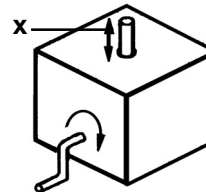


(b) (i) Gear 'X' is the:



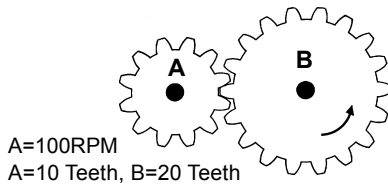
Driver Gear	
Driven Gear	
Idler Gear	

(iv) The motion at 'X' is:



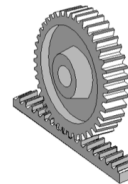
Linear	
Oscillating	
Reciprocating	

(ii) Gear 'B' rotates at:



200 RPM	
100 RPM	
50 RPM	

(v) This mechanism is used in a:



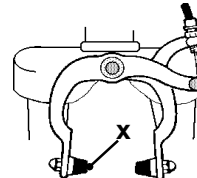
Pillar Drill	
Forge	
Bench Shears	

(iii) This device is a:



Bearing	
Shaft	
Clutch	

(vi) The material used to make 'X' is called:



Lead	
Aluminium	
Rubber	

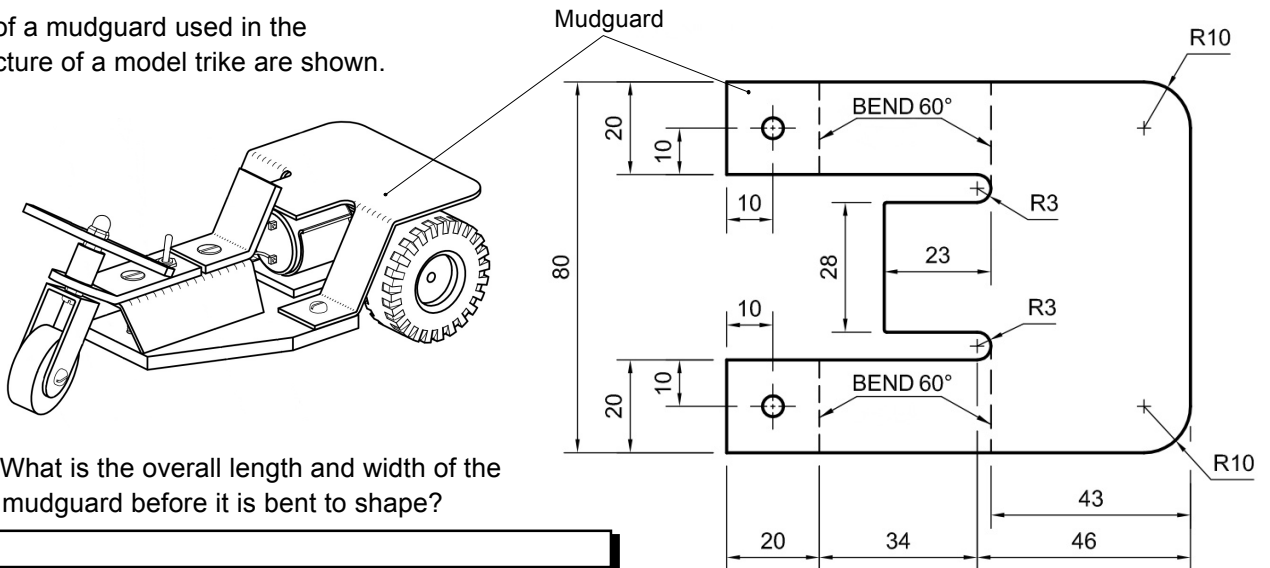
(c) Complete the table by naming devices that use the following mechanisms. The first row has been completed for you, as an example.

Mechanism	Device
Lever	<i>Nutcracker</i>
Chain	
Pulley	
Cam	
Gears	
Spring	
Linkage	

Question 4.

20 Marks

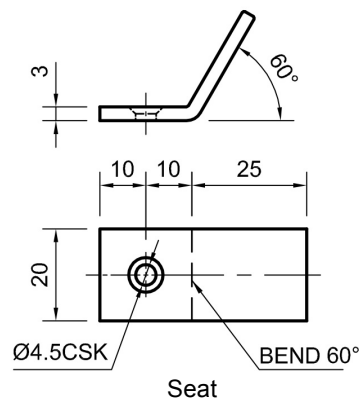
Details of a mudguard used in the manufacture of a model trike are shown.



(i) What is the overall length and width of the mudguard before it is bent to shape?

(ii) Describe the stages involved in bending the mudguard to shape.

(iii) What precautions should be taken when working with acrylic?

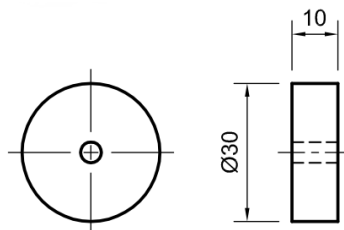


(iv) What does 'Ø4.5CSK' refer to in this drawing?

(v) List **four** tools used in the manufacture of the seat.

1.	_____
2.	_____
3.	_____
4.	_____

(vi) Describe the stages involved in making the nylon wheel shown.

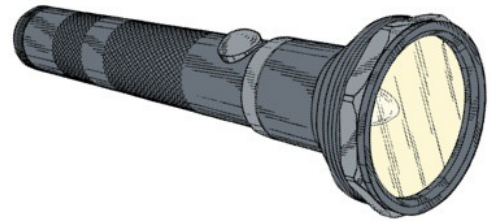


(vii) What safety precautions should you take when operating a lathe?

Question 5.

20 Marks

- (a)** (i) Using the symbols from the table below draw the circuit diagram for the torch.

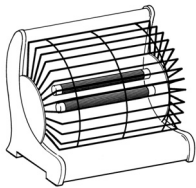


Draw the circuit in this box

Component	Symbol

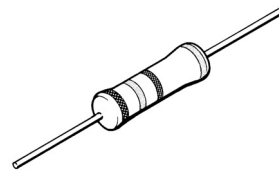
- (ii) What energy conversion takes place when a torch is switched on?
- _____

- (b)** (i) Electrical power is measured in:



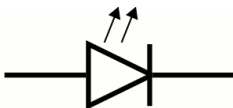
Ohms	
Watts	
Amps	

- (iv) This is a(n):



LED	
LDR	
Resistor	

- (ii) This is the symbol for a(n):



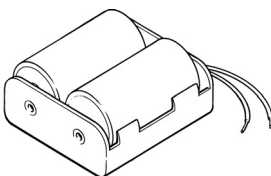
Motor	
LED	
Buzzer	

- (v) A scanner is a(n):



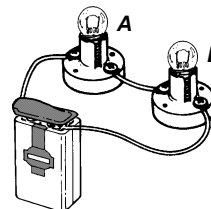
Output Device	
Input Device	
Process Device	

- (iii) Batteries convert chemical energy directly into:



Electrical energy	
Mechanical energy	
Kinetic energy	

- (vi) When this circuit is connected:



Bulb A will light	
Bulb B will light	
Both will light	

- (c)** Complete the table by matching the inventors listed to their achievement.

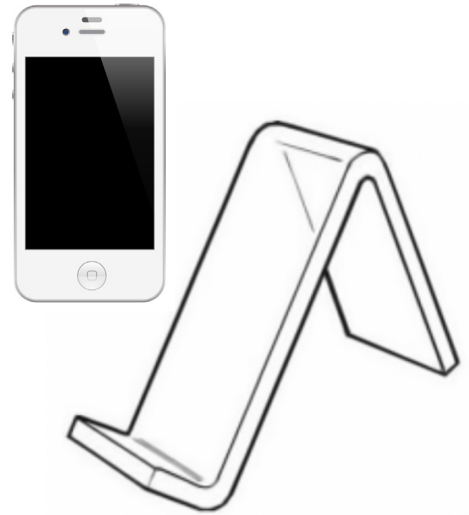
Inventors: Rudolf Diesel, John Dunlop, John P. Holland, James Watt.

Achievement	Inventors
1. Steam Engine	
2. Submarine	
3. Pneumatic Tyre	
4. Diesel Engine	

Question 6.

20 Marks

(i) The design shows a mobile phone holder made from acrylic. Why is acrylic a good choice of material to make the holder?

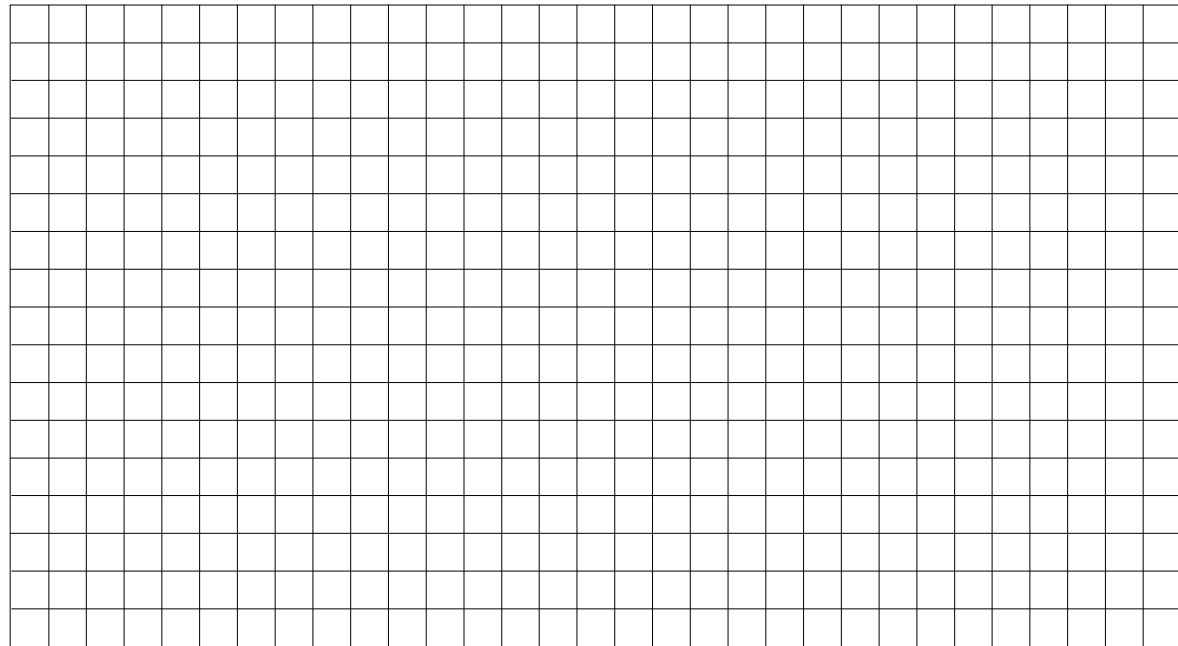


(ii) State **any one** change that you would make to improve the given design of the mobile phone holder.

(iii) Describe how you would polish the edges of the mobile phone holder.

(iv) How would you make sure that the mobile phone holder was not damaged during manufacture?

(v) Draw, in the grid below, the acrylic strip before it was bent to form the mobile phone holder shown above. Show on your drawing the position of the bend lines.



(vi) Briefly describe how you would bend the mobile phone holder to the required shape.
