



**Coimisiún na Scrúduithe Stáit
State Examinations Commission**

JUNIOR CERTIFICATE EXAMINATION, 2013

**METALWORK
MATERIALS AND TECHNOLOGY**

ORDINARY LEVEL - 100 Marks

Tuesday 18 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(n):</p>	<table border="1"> <tr><td>Ring Spanner</td><td></td></tr> <tr><td>Adjustable Spanner</td><td></td></tr> <tr><td>Box Spanner</td><td></td></tr> <tr><td>Adjustable Wrench</td><td></td></tr> </table>	Ring Spanner		Adjustable Spanner		Box Spanner		Adjustable Wrench	
Ring Spanner										
Adjustable Spanner										
Box Spanner										
Adjustable Wrench										
<p>(b)</p> 	<p>Part 'X' is called the:</p>	<table border="1"> <tr><td>Shank</td><td></td></tr> <tr><td>Tang</td><td></td></tr> <tr><td>Web</td><td></td></tr> <tr><td>Flute</td><td></td></tr> </table>	Shank		Tang		Web		Flute	
Shank										
Tang										
Web										
Flute										
<p>(c)</p> 	<p>This tool is a:</p>	<table border="1"> <tr><td>G-Cramp</td><td></td></tr> <tr><td>Vice Grips</td><td></td></tr> <tr><td>Hand Vice</td><td></td></tr> <tr><td>Machine Vice</td><td></td></tr> </table>	G-Cramp		Vice Grips		Hand Vice		Machine Vice	
G-Cramp										
Vice Grips										
Hand Vice										
Machine Vice										
<p>(d)</p> 	<p>This thread form is a(n):</p>	<table border="1"> <tr><td>Buttress Thread</td><td></td></tr> <tr><td>ISO Metric Thread</td><td></td></tr> <tr><td>Acme Thread</td><td></td></tr> <tr><td>Square Thread</td><td></td></tr> </table>	Buttress Thread		ISO Metric Thread		Acme Thread		Square Thread	
Buttress Thread										
ISO Metric Thread										
Acme Thread										
Square Thread										
<p>(e)</p> 	<p>This technique is called:</p>	<table border="1"> <tr><td>Punching</td><td></td></tr> <tr><td>Bending</td><td></td></tr> <tr><td>Twisting</td><td></td></tr> <tr><td>Scrolling</td><td></td></tr> </table>	Punching		Bending		Twisting		Scrolling	
Punching										
Bending										
Twisting										
Scrolling										
<p>(f)</p> 	<p>This tool is a:</p>	<table border="1"> <tr><td>Die Stocks</td><td></td></tr> <tr><td>Tap Wrench</td><td></td></tr> <tr><td>Split Die</td><td></td></tr> <tr><td>Reamer</td><td></td></tr> </table>	Die Stocks		Tap Wrench		Split Die		Reamer	
Die Stocks										
Tap Wrench										
Split Die										
Reamer										
<p>(g)</p> 	<p>This instrument is a(n):</p>	<table border="1"> <tr><td>Vernier Calipers</td><td></td></tr> <tr><td>Outside Calipers</td><td></td></tr> <tr><td>Combination Set</td><td></td></tr> <tr><td>Inside Calipers</td><td></td></tr> </table>	Vernier Calipers		Outside Calipers		Combination Set		Inside Calipers	
Vernier Calipers										
Outside Calipers										
Combination Set										
Inside Calipers										
<p>(h)</p> 	<p>This tool is a:</p>	<table border="1"> <tr><td>Half-Round File</td><td></td></tr> <tr><td>Square File</td><td></td></tr> <tr><td>Round File</td><td></td></tr> <tr><td>Flat File</td><td></td></tr> </table>	Half-Round File		Square File		Round File		Flat File	
Half-Round File										
Square File										
Round File										
Flat File										
<p>(i)</p> 	<p>This fastener is a:</p>	<table border="1"> <tr><td>Cheese Head Screw</td><td></td></tr> <tr><td>Grub Screw</td><td></td></tr> <tr><td>Round Head Screw</td><td></td></tr> <tr><td>Countersunk Screw</td><td></td></tr> </table>	Cheese Head Screw		Grub Screw		Round Head Screw		Countersunk Screw	
Cheese Head Screw										
Grub Screw										
Round Head Screw										
Countersunk Screw										
<p>(j)</p> 	<p>This lathe part is called a:</p>	<table border="1"> <tr><td>Topslide</td><td></td></tr> <tr><td>Headstock</td><td></td></tr> <tr><td>Three Jaw Chuck</td><td></td></tr> <tr><td>Tailstock</td><td></td></tr> </table>	Topslide		Headstock		Three Jaw Chuck		Tailstock	
Topslide										
Headstock										
Three Jaw Chuck										
Tailstock										
<p>(k)</p> 	<p>This tool is 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 used when:</p>	<table border="1"> <tr><td>Welding</td><td></td></tr> <tr><td>Soldering</td><td></td></tr> <tr><td>Glueing</td><td></td></tr> <tr><td>Brazing</td><td></td></tr> </table>	Welding		Soldering		Glueing		Brazing	
Welding										
Soldering										
Glueing										
Brazing										

SECTION B - 20 MARKS
ANSWER ALL QUESTIONS FROM THIS SECTION

(m)



(i) List **three** materials used in the manufacture of a smartphone.

1.	
2.	
3.	

(ii) List **three** features of a smartphone.

1.	
2.	
3.	

(n) Briefly describe how the use of computers has improved our lives.



(o) (i) Home computers use electricity supplied at:



50 Volts	
75 Volts	
100 Volts	
220 Volts	

(ii) This mouse is a(n):



Input Device	
Output Device	
Printing Device	
Storage Device	

(p) (i) The rating on a light bulb is in:



Watts	
Voltage	
Ohms	
Amps	

(ii) The filament in a bulb is made from:



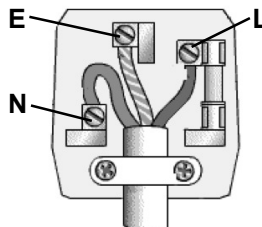
Steel	
Tungsten	
Copper	
Aluminum	

(q) (i) The current supplied by a phone battery is called:



Direct Current	
Alternating Current	
Electrical Energy	

(ii) Name each terminal in the plug shown:



L	
N	
E	

Question 2.

20 Marks

(a)

(i) Brass is an alloy of:

Copper & Lead	<input type="checkbox"/>
Copper & Zinc	<input type="checkbox"/>
Copper & Tin	<input type="checkbox"/>

(v) A material is said to be ductile when it can be easily:

Broken	<input type="checkbox"/>
Stretched	<input type="checkbox"/>
Fractured	<input type="checkbox"/>

(ii) Zinc is a(n):

Ferrous Metal	<input type="checkbox"/>
Non-Ferrous Metal	<input type="checkbox"/>
Alloy	<input type="checkbox"/>

(vi) The melting of a plastic material onto metal is called:

Lacquering	<input type="checkbox"/>
Dip Coating	<input type="checkbox"/>
Enamelling	<input type="checkbox"/>

(iii) Lead is a:

Malleable Metal	<input type="checkbox"/>
Strong Metal	<input type="checkbox"/>
Brittle Metal	<input type="checkbox"/>

(vii) The ability of a material to resist wear is called:

Ductility	<input type="checkbox"/>
Elasticity	<input type="checkbox"/>
Hardness	<input type="checkbox"/>

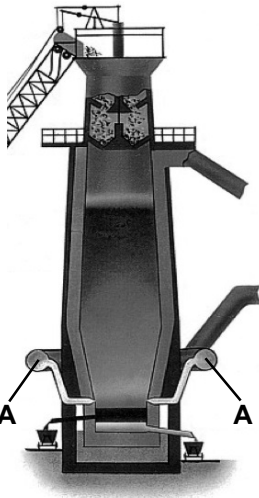
(iv) Electrical wire is normally made from:

Zinc	<input type="checkbox"/>
Lead	<input type="checkbox"/>
Copper	<input type="checkbox"/>

(viii) Gears are normally made from:

PVC	<input type="checkbox"/>
Nylon	<input type="checkbox"/>
Acrylic	<input type="checkbox"/>

(b) Complete the table:



(i) This sketch shows a Blast Furnace.	Yes	<input type="checkbox"/>
	No	<input type="checkbox"/>
(ii) This furnace is used to produce steel.	Yes	<input type="checkbox"/>
	No	<input type="checkbox"/>
(iii) The required heat is generated by an electric arc.	Yes	<input type="checkbox"/>
	No	<input type="checkbox"/>
(iv) Iron ore is smelted in this furnace.	Yes	<input type="checkbox"/>
	No	<input type="checkbox"/>
(v) The nozzles, labelled A, are called tuyeres.	Yes	<input type="checkbox"/>
	No	<input type="checkbox"/>
(vi) This furnace can be rotated to various positions.	Yes	<input type="checkbox"/>
	No	<input type="checkbox"/>

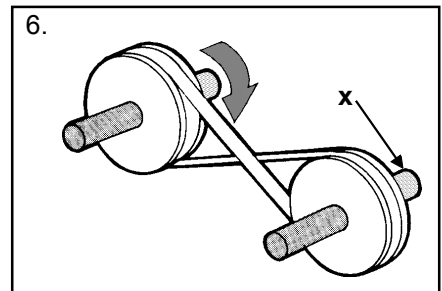
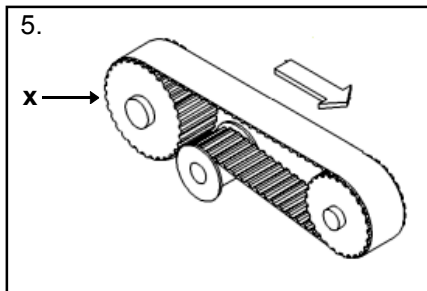
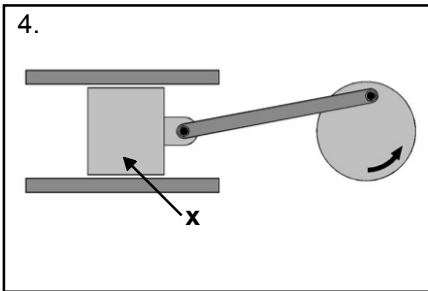
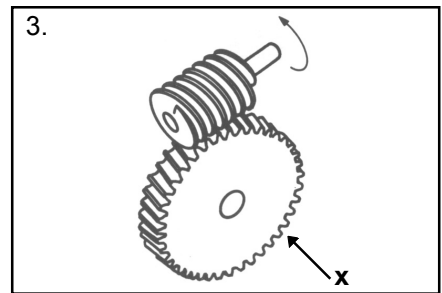
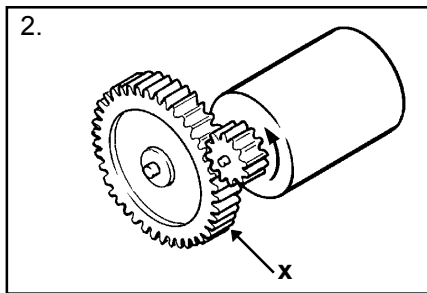
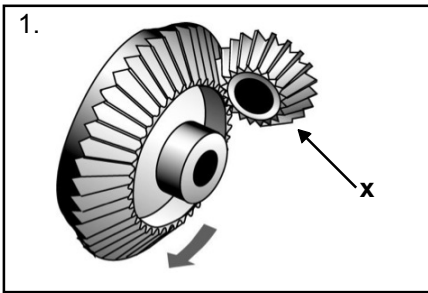
(c) Complete the chart by listing a tool for each task.

Task	Tool
To draw a circle on a piece of metal.	Dividers
To fold a small piece of thin sheet metal.	
To cut thin sheet metal.	
To join two pieces of thin sheet metal.	
To cut an internal thread.	
To mark the position of a hole centre.	
To measure the depth of a hole.	

Question 3.

20 Marks

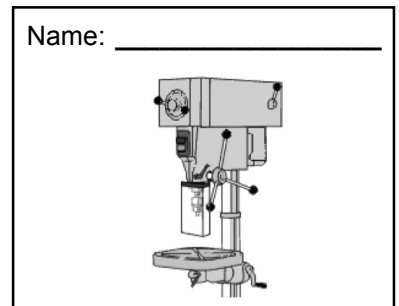
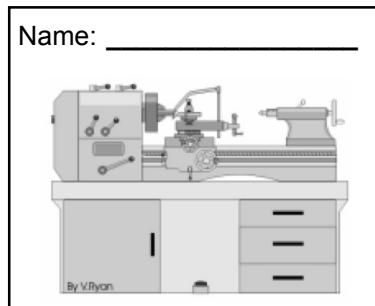
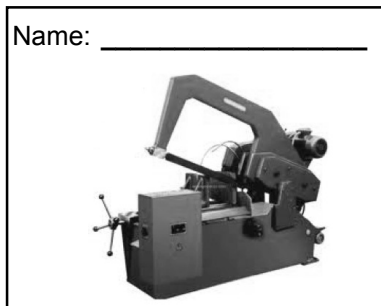
(a) (i) Indicate with an arrow the direction of movement of part **X** in each of the following.



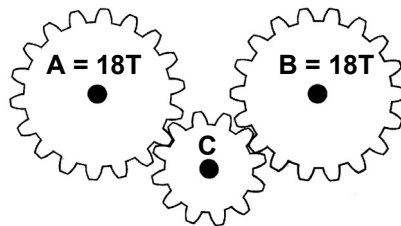
(ii) Which one of these mechanisms is a worm and wormwheel?

Number:

(b) (i) Name a mechanism used by each of these machines.



(ii) If gear **A** rotates at 200 RPM how fast will gear **B** rotate?



100 RPM	
180 RPM	
200 RPM	
360 RPM	

(iii) What is gear **C** called?

(c) (i) The motion in a moving clock pendulum is:



Rotary	
Oscillating	
Linear	

(ii) Guitar strings are normally in:



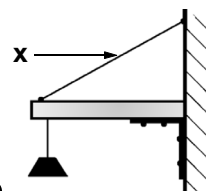
Tension	
Compression	
Torsion	

(iii) Part **X** is the:



Fulcrum	
Lever	
Link	

(iv) Part **X** is a:

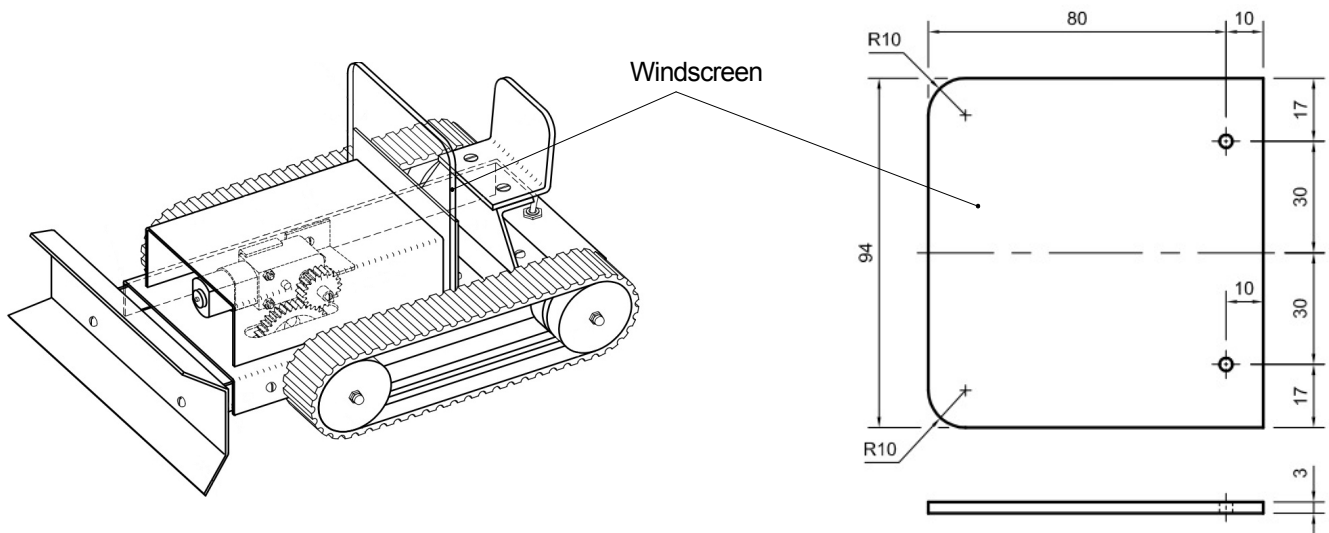


Strut	
Tie	
Lever	

Question 4.

20 Marks

Details of a windscreen used in the manufacture of a model bulldozer are shown.



(i) List the tools and processes used to make the windscreen.

Tools:	Processes:

(ii) In the drawing what does R10 mean?

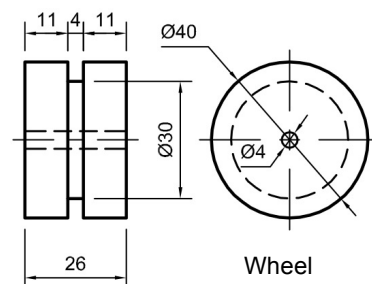
(iii) What is the overall length and width of the windscreen?

Length:
Width:

(iv) Describe how you would get a smooth finish on the edge of the windscreen.

(v) What safety precautions should be observed when drilling acrylic?

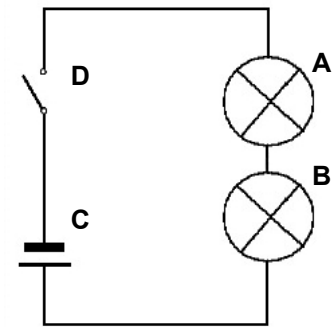
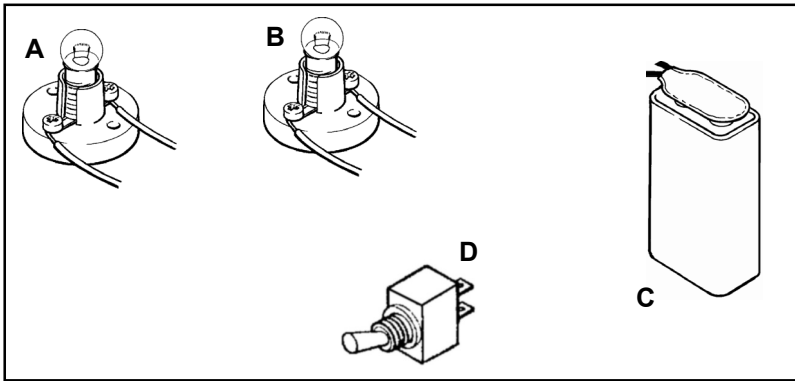
(vi) Describe how you would make the wheel shown opposite.



Question 5.

20 Marks

(a) (i) Using the circuit diagram as a reference, draw the connecting wires between the components **A**, **B**, **C** and **D** in the box below.



Circuit Diagram

(ii) Is this component an LED?



Yes	<input type="checkbox"/>
-----	--------------------------

No	<input type="checkbox"/>
----	--------------------------

(iii) Is this component an integrated circuit?



Yes	<input type="checkbox"/>
-----	--------------------------

No	<input type="checkbox"/>
----	--------------------------

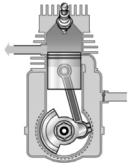
(iv) Is this component a transistor?



Yes	<input type="checkbox"/>
-----	--------------------------

No	<input type="checkbox"/>
----	--------------------------

(b) (i) A car engine converts chemical energy to:



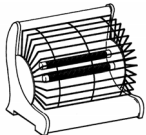
Kenetic and Heat Energy	<input type="checkbox"/>	<input type="checkbox"/>
Light Energy	<input type="checkbox"/>	<input type="checkbox"/>
Heat Energy	<input type="checkbox"/>	<input type="checkbox"/>

(iv) This symbol represents a(n):



Motor	<input type="checkbox"/>	<input type="checkbox"/>
LDR	<input type="checkbox"/>	<input type="checkbox"/>
Fuse	<input type="checkbox"/>	<input type="checkbox"/>

(ii) An heater converts electrical energy to:



Kenetic Energy	<input type="checkbox"/>	<input type="checkbox"/>
Heat and Light Energy	<input type="checkbox"/>	<input type="checkbox"/>
Sound Energy	<input type="checkbox"/>	<input type="checkbox"/>

(v) This symbol represents a:



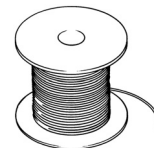
Battery	<input type="checkbox"/>	<input type="checkbox"/>
Switch	<input type="checkbox"/>	<input type="checkbox"/>
Buzzer	<input type="checkbox"/>	<input type="checkbox"/>

(iii) A solar powered calculator converts light energy to:



Kenetic Energy	<input type="checkbox"/>	<input type="checkbox"/>
Heat Energy	<input type="checkbox"/>	<input type="checkbox"/>
Electrical Energy	<input type="checkbox"/>	<input type="checkbox"/>

(vi) Electrical solder has a core of:



Copper	<input type="checkbox"/>	<input type="checkbox"/>
Lead	<input type="checkbox"/>	<input type="checkbox"/>
Flux	<input type="checkbox"/>	<input type="checkbox"/>

(c) Name **any two** inventors associated with engineering and state what they invented.

Inventor 1

Name:	Invention:
<input type="text"/>	<input type="text"/>

Inventor 2

Name:	Invention:
<input type="text"/>	<input type="text"/>

