



**Coimisiún na Scrúduithe Stáit
State Examinations Commission**

JUNIOR CERTIFICATE EXAMINATION, 2015

**METALWORK
MATERIALS AND TECHNOLOGY**

ORDINARY LEVEL - 100 Marks

Tuesday 16 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 style="width: 80px; height: 40px;" 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

(a)		This instrument is a(n):	<input type="checkbox"/> Micrometer <input type="checkbox"/> Vernier Calipers <input type="checkbox"/> Outside Calipers <input type="checkbox"/> Inside Calipers	
(b)		This tool is a(n):	<input type="checkbox"/> Adjustable Spanner <input type="checkbox"/> Open Spanner <input type="checkbox"/> Combination Spanner <input type="checkbox"/> Ring Spanner	
(c)		This tool is a:	<input type="checkbox"/> Soft Faced Hammer <input type="checkbox"/> Ball Pein Hammer <input type="checkbox"/> Straight Pein Hammer <input type="checkbox"/> Cross Pein Hammer	
(d)		This tool is a:	<input type="checkbox"/> Machine Vice <input type="checkbox"/> Hand Vice <input type="checkbox"/> Vice Grips <input type="checkbox"/> G-Cramp	
(e)		A gas torch is used when:	<input type="checkbox"/> Brazing <input type="checkbox"/> Riveting <input type="checkbox"/> Threading <input type="checkbox"/> Knurling	
(f)		Part 'X' is called the:	<input type="checkbox"/> Shank <input type="checkbox"/> Flute <input type="checkbox"/> Land <input type="checkbox"/> Flank	
(g)		This fastener is a:	<input type="checkbox"/> Split Pin <input type="checkbox"/> Grub Screw <input type="checkbox"/> Wing Nut <input type="checkbox"/> Lock Nut	
(h)		This cutting tool is a:	<input type="checkbox"/> Reamer <input type="checkbox"/> Centre Drill <input type="checkbox"/> Countersinking Bit <input type="checkbox"/> Twist Drill	
(i)		This instrument is a:	<input type="checkbox"/> Thread Gauge <input type="checkbox"/> Wire Gauge <input type="checkbox"/> Bevel Gauge <input type="checkbox"/> Combination Set	
(j)		This cutting tool is a:	<input type="checkbox"/> Junior Hacksaw <input type="checkbox"/> Senior Hacksaw <input type="checkbox"/> Fret Saw <input type="checkbox"/> Coping Saw	
(k)		Part 'X' is called the:	<input type="checkbox"/> Edge <input type="checkbox"/> Point <input type="checkbox"/> Tang <input type="checkbox"/> Heel	
(l)		This tool is a(n):	<input type="checkbox"/> Tap Wrench <input type="checkbox"/> Stillson Wrench <input type="checkbox"/> Adjustable Wrench <input type="checkbox"/> Channel Wrench	

SECTION B - 20 MARKS
ANSWER ALL QUESTIONS FROM THIS SECTION

(m)



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

1.	
2.	
3.	
4.	

(n)



List **three** advantages of using a smartphone to take photographs.

1.	
2.	
3.	

(o) (i) This device is called a:



Flash Drive	
Memory Card	
Hard Disk	
Floppy Disk	

(ii) This device uses a(n):



Video Connector	
USB Connector	
Network Connector	
Audio Connector	

(p) (i) Digital photographs are normally adjusted using a:



Spreadsheet	
Scanner	
Database	
Photo Editor	

(ii) Computer file size is measured in:



Centimeters	
Bytes	
Kilos	
Litres	

(q) (i) How can you share a digital photograph with a friend?

(ii) Why is it a good idea to use rechargeable batteries?



Question 2.

20 Marks

(a)

(i) Plastic gears are normally made from:

PVC	
Nylon	
Fibreglass	

(v) Cooking foil is made from:

Steel	
Aluminium	
Copper	

(ii) Battery plates are made from:

Lead	
Zinc	
Aluminium	

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

Ductility	
Toughness	
Hardness	

(iii) Bronze is an alloy of:

Copper & Tin	
Copper & Zinc	
Copper & Steel	

(vii) A material is said to be brittle when it can be easily:

Fractured	
Stretched	
Melted	

(iv) Galvanised gates are coated with:

Tin	
Lead	
Zinc	

(viii) Aluminium is a(n):

Ferrous Metal	
Non-Ferrous Metal	
Alloy	

(b) Answer the following by ticking the correct box.

(i) Does a self-centering lathe chuck have three jaws?	Yes	
	No	
(ii) Is copper a good conductor of electricity?	Yes	
	No	
(iii) Can thermosetting plastics be re-shaped?	Yes	
	No	
(iv) Can brittle materials bend easily?	Yes	
	No	
(v) Is copper a ferrous metal?	Yes	
	No	
(vi) Is a Blast Furnace used to make steel?	Yes	
	No	

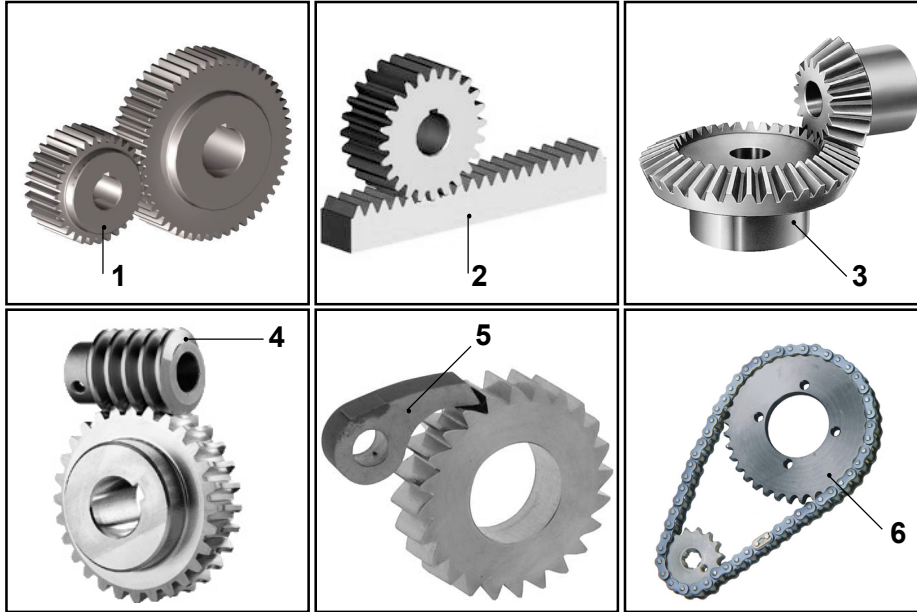
(c) Complete the chart by listing a tool for each task.

Task	Tool
To bend a piece of acrylic sheet.	<i>Strip Heater</i>
To cut a thin sheet of copper by hand.	
To draw a line on a piece of mild steel.	
To hold a tap while cutting a thread.	
To draw a line at right angles to a straight edge.	
To mark the centre of a hole before drilling.	
To clean a pinned file.	

Question 3.

20 Marks

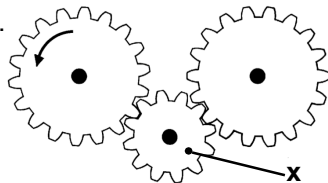
(a) (i) Match the number to the correct mechanism part in the given table.



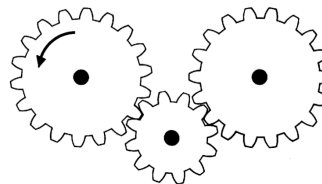
Mechanism Part	No.
Bevel Gear	
Sprocket Wheel	
Worm Wheel	
Pawl	
Spur Gear	
Rack	

(ii) Which one of these mechanisms is used in a Hand Drill?

(b) (i) Use an arrow to indicate the direction of gear 'X'.

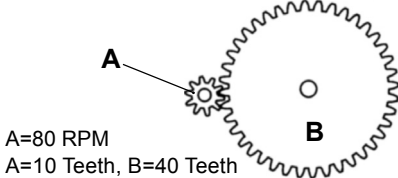


(iv) This mechanism is called a gear:



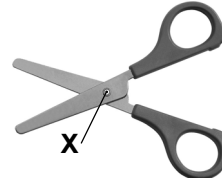
Train	
Mesh	
Rack	

(ii) Gear 'B' rotates at:



20 RPM	
10 RPM	
80 RPM	

(v) Point 'X' is called the:



Linkage	
Lever	
Fulcrum	

(iii) The motion of the cam follower is:



Reciprocating	
Linear	
Oscillating	

(vi) The door handle is an example of a:



Lever	
Strut	
Linkage	

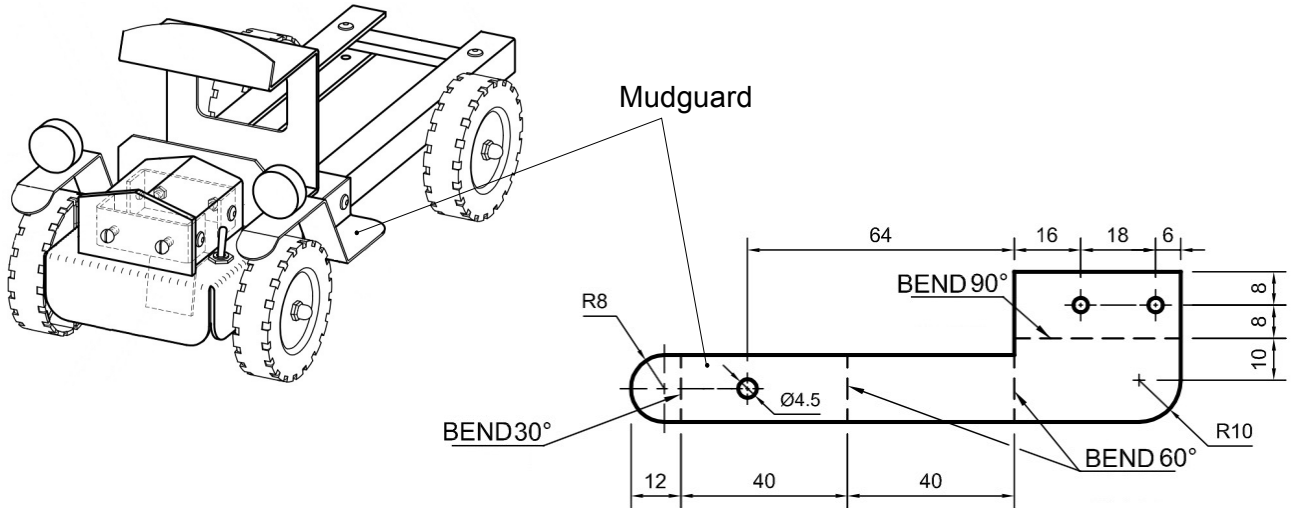
(c) Complete the table by naming devices that use the following mechanisms.

Mechanism	Device
Pulley	<i>Washing machine</i>
Bevel Gears	
Lever	
Screw Thread	
Sprocket	
Clutch	
Bell Crank	

Question 4.

20 Marks

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



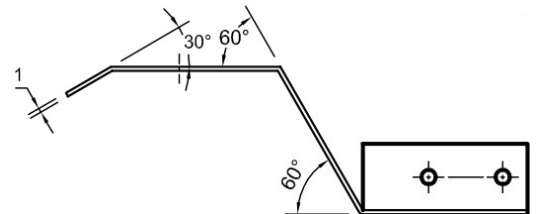
(i) What is the overall length and width of the piece of metal used to make the mudguard?

Length: _____
 Width: _____

(ii) What does 'Ø4.5' refer to in the drawing?

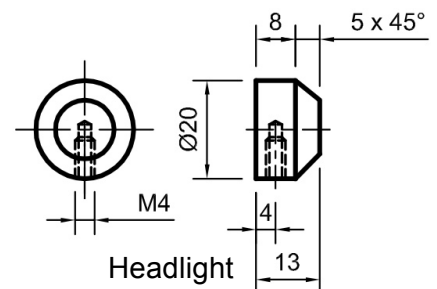
(iii) List the steps involved in producing the R8 curve.

(iv) Describe how you would bend the mudguard to shape.



(v) Describe how you would make the 5 x 45° chamfer in the headlight shown below.

(vi) What does 'M4' refer to in the drawing of the headlight?

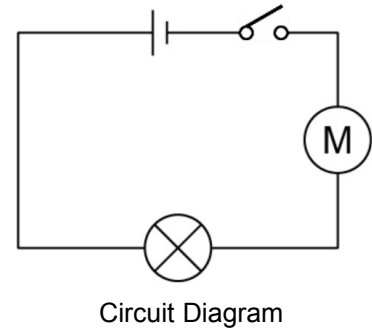
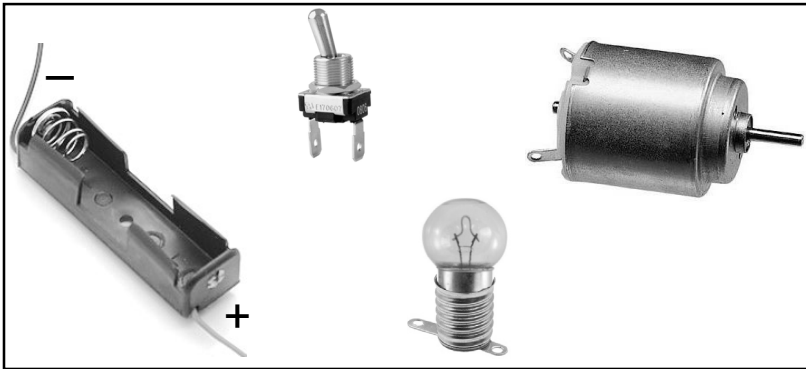


(vii) What safety precautions should you take when operating a lathe?

Question 5.

20 Marks

(a) (i) Using the circuit diagram as a reference, draw the connecting wires between the components in the box below.



(ii) Answer the following by ticking the correct box.

Does a battery convert chemical energy directly into electrical energy?	Yes	<input type="checkbox"/>
	No	<input type="checkbox"/>
Is the current supplied by a battery called Direct Current (DC)?	Yes	<input type="checkbox"/>
	No	<input type="checkbox"/>
Is PVC a good insulator?	Yes	<input type="checkbox"/>
	No	<input type="checkbox"/>
Does solder, used for electronics, contain flux?	Yes	<input type="checkbox"/>
	No	<input type="checkbox"/>

(b) (i) This device is a:



Toggle Switch	<input type="checkbox"/>
Push Switch	<input type="checkbox"/>
Slide Switch	<input type="checkbox"/>

(iv) A mouse is a(n):



Input Device	<input type="checkbox"/>
Output Device	<input type="checkbox"/>
Process Device	<input type="checkbox"/>

(ii) Electrical resistance is measured in:



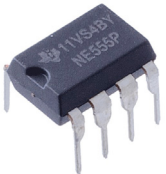
Volts	<input type="checkbox"/>
Ohms	<input type="checkbox"/>
Current	<input type="checkbox"/>

(v) This device is a:



Transistor	<input type="checkbox"/>
Fuse	<input type="checkbox"/>
Capacitor	<input type="checkbox"/>

(iii) This device is a(n):



Integrated Circuit	<input type="checkbox"/>
Resistor	<input type="checkbox"/>
Transistor	<input type="checkbox"/>

(vi) A speaker converts electrical energy into:



Sound Energy	<input type="checkbox"/>
Light Energy	<input type="checkbox"/>
Chemical Energy	<input type="checkbox"/>

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

Inventors: Thomas Edison, Henry Maudslay, Wright Brothers, James Watt.

Achievement	Inventors
1. Steam Engine	
2. Lathe	
3. Electric Lamp	
4. Aeroplane	

(ii) Name a famous Irish inventor and write a brief note about this person's invention.

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Question 6.

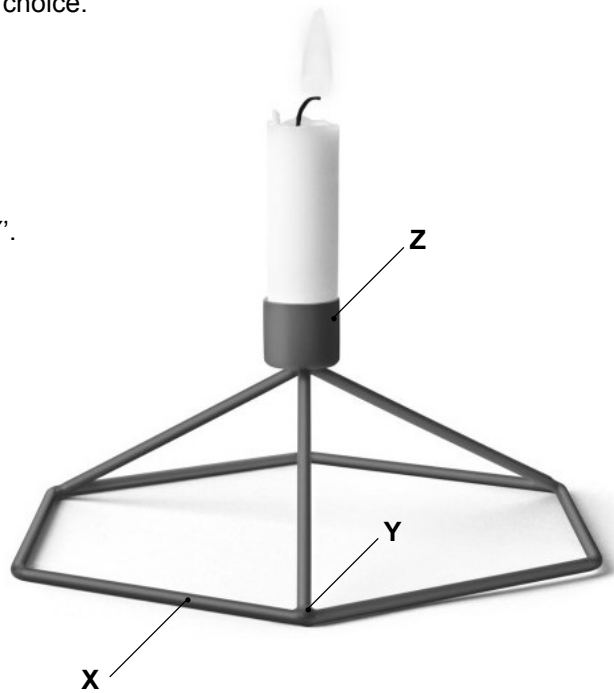
20 Marks

- (i) This design shows a candle stand. Name a suitable metal to make the base 'X' and give a reason for your choice.

Metal:
Reason:

- (ii) Describe how you would join the metal rods at point 'Y'.

- (iii) What information would you need to know before making part 'Z'?



- (iv) Describe how you would make part 'Z'.

- (v) Describe how would you would apply a finish to the stand.

- (vi) Draw a plan view of the candle stand in the grid below.

