



Coimisiún na Scrúduithe Stáit
State Examinations Commission

JUNIOR CERTIFICATE EXAMINATION, 2018

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	





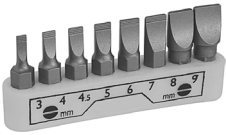



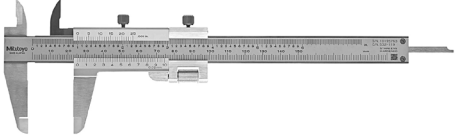
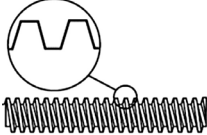


1. Total of end of page totals	
2. Aggregate total marks for all disallowed question(s)	
3. Total mark awarded (1 minus 2)	
4. Bonus mark for answering through Irish (if applicable)	
5. Total mark awarded if Irish Bonus is applied (3+4)	
Note: The mark in row 3 (or row 5 if an Irish Bonus is awarded)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

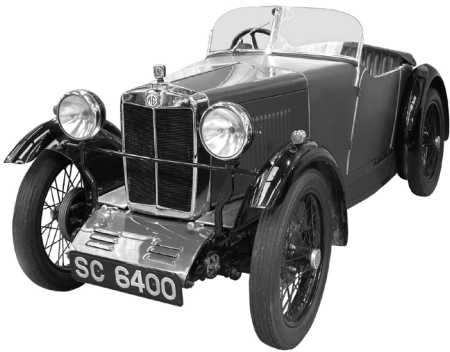
SECTION A - 20 MARKS
ANSWER **ANY TEN** QUESTIONS FROM THIS SECTION

40 Marks

(a)		This instrument is a(n):	<input type="checkbox"/> Odd-Leg Calipers <input type="checkbox"/> Vernier Calipers <input type="checkbox"/> Outside Calipers <input type="checkbox"/> Inside Calipers
(b)		This cutting tool is a:	<input type="checkbox"/> Bench Shears <input type="checkbox"/> Straight Shears <input type="checkbox"/> Curved Shears <input type="checkbox"/> Snips
(c)		This tool is used for:	<input type="checkbox"/> Drilling <input type="checkbox"/> Counterboring <input type="checkbox"/> Countersinking <input type="checkbox"/> Reaming
(d)		This tool is a:	<input type="checkbox"/> G-Cramp <input type="checkbox"/> Hand Vice <input type="checkbox"/> Vice Grips <input type="checkbox"/> Machine Vice
(e)		These tool bits are:	<input type="checkbox"/> Allen Bits <input type="checkbox"/> Phillips Bits <input type="checkbox"/> Square Bits <input type="checkbox"/> Slotted Bits
(f)		This tool is a:	<input type="checkbox"/> Scriber <input type="checkbox"/> Centre Punch <input type="checkbox"/> Parallel Punch <input type="checkbox"/> Chisel
(g)		This fastener is a:	<input type="checkbox"/> Set Screw <input type="checkbox"/> Split Pin <input type="checkbox"/> Washer <input type="checkbox"/> Lock Nut
(h)		Part 'X' is called the:	<input type="checkbox"/> Tang <input type="checkbox"/> Edge <input type="checkbox"/> Point <input type="checkbox"/> Face
(i)		A Vernier calipers can measure to an accuracy of:	<input type="checkbox"/> 10 mm <input type="checkbox"/> 1 mm <input type="checkbox"/> 0.1 mm <input type="checkbox"/> 0.01 mm
(j)		The thread form is a(n):	<input type="checkbox"/> ISO Metric Thread <input type="checkbox"/> Buttress Thread <input type="checkbox"/> Acme Thread <input type="checkbox"/> Square Thread
(k)		This tool is a(n):	<input type="checkbox"/> Open Spanner <input type="checkbox"/> Adjustable Spanner <input type="checkbox"/> Socket Wrench <input type="checkbox"/> Ring Spanner
(l)		This tool is a:	<input type="checkbox"/> Split Die <input type="checkbox"/> Tap Wrench <input type="checkbox"/> Die Stocks <input type="checkbox"/> Tap

SECTION B - 20 MARKS
ANSWER ALL QUESTIONS FROM THIS SECTION

(m)



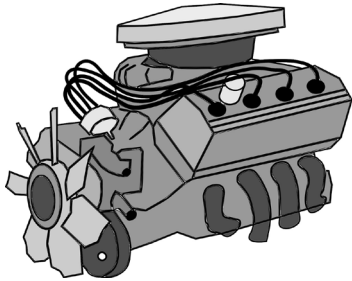
(i) List **three** technological improvements found in modern cars.

1.
2.
3.

(ii) Name **three** materials used in the manufacture of modern cars.

1.
2.
3.

(n)



(i) Name any **three** parts of a car engine.

1.
2.
3.

(ii) Why is oil used in a car engine?

(o) (i) The diesel engine was invented by:



Henry Ford	
James Watt	
John P. Holland	
Rudolf Diesel	

(ii) The safety sign warns of a(n):



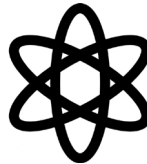
Fire Hazard	
Chemical Hazard	
Electrical Hazard	
Nuclear Hazard	

(p) (i) A car battery supplies:



12v DC	
100v DC	
200v AC	
150v AC	

(ii) A car battery converts chemical energy into:



Mechanical Energy	
Electrical Energy	
Solar Energy	
Chemical Energy	

(q) (i) This mechanism is a:



Scissors Jack	
Screw Jack	
Hoist	
Pump	

(ii) Car bodies are normally made from:



Iron	
Lead	
Copper	
Steel	

Question 2.

20 Marks

(a)

(i) Acrylic sheet is also known as:

Bakelite	
Perspex	
Fibreglass	

(v) Cast Iron is produced in the:

Cupola Furnace	
Blast Furnace	
Electric Arc Furnace	

(ii) Bearings and gears can be made from:

Nylon	
Acrylic	
PVC	

(vi) High Speed Steel is used to make:

Gates	
Pipes	
Cutting Tools	

(iii) Which one of these is a Thermosetting Plastic?

Bakelite	
Nylon	
Acrylic	

(vii) Cooking foil is made from:

Tin	
Aluminium	
Steel	

(iv) The main raw material for plastic is:

Gas	
Oil	
Silk	

(viii) Brass is an alloy of:

Copper & Zinc	
Copper & Lead	
Copper & Tin	

(b) Complete the chart by matching each property to the correct description below.

Property	Definition
Toughness	<i>The ability to ...</i>
Malleability	<i>The ability to ...</i>
Ductility	<i>The ability to ...</i>
Brittleness	<i>The tendency to ...</i>
Hardness	<i>The ability to ...</i>
Conductivity	<i>The ability to ...</i>

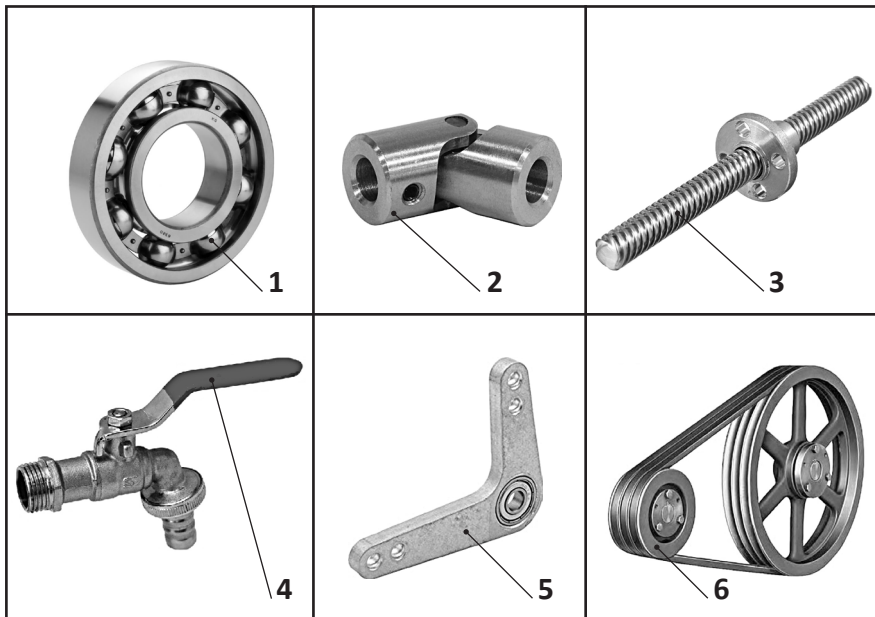
Descriptions:

- *break easily when struck.*
- *resist wear and scratching.*
- *allow electricity to pass through.*
- *withstand blows or an impact.*
- *be hammered into a sheet without breaking.*
- *be stretched into thin wire.*

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

Task	Tool
To flatten copper sheet without causing damage.	Mallet
Hold a hot metal bar when forging.	
To hold a tap while cutting a thread.	
To mark the position of a hole before drilling.	
To draw a circle on a piece of metal.	
To prevent damage caused by the jaw faces of a bench vice.	
To accurately measure the diameter of a round bar.	

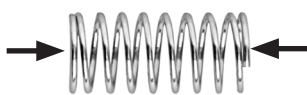
(a) (i) Match the number to the correct mechanism part in the given table.



Mechanism	No.
Universal Joint	
Pulley	
Bell Crank	
Lever	
Leadscrew	
Ball Bearing	

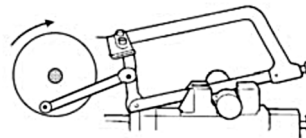
(ii) Which one of the mechanisms above uses a belt?

(b) (i) This spring is in:



Shear	
Compression	
Tension	

(iv) The conversion taking place is rotary to:



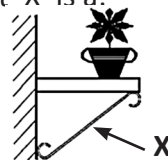
Linear	
Oscillating	
Reciprocating	

(ii) Part 'X' is the:



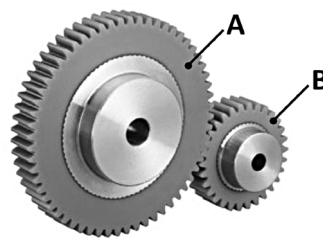
Lever	
Link	
Fulcrum	

(v) Part 'X' is a:



Tie	
Strut	
Stay	

(iii) If gear 'A' rotates at 100 RPM how fast will gear 'B' rotate? (A = 60 Teeth, B = 30 Teeth.)



100 R.P.M.	
200 R.P.M.	
300 R.P.M.	
600 R.P.M.	

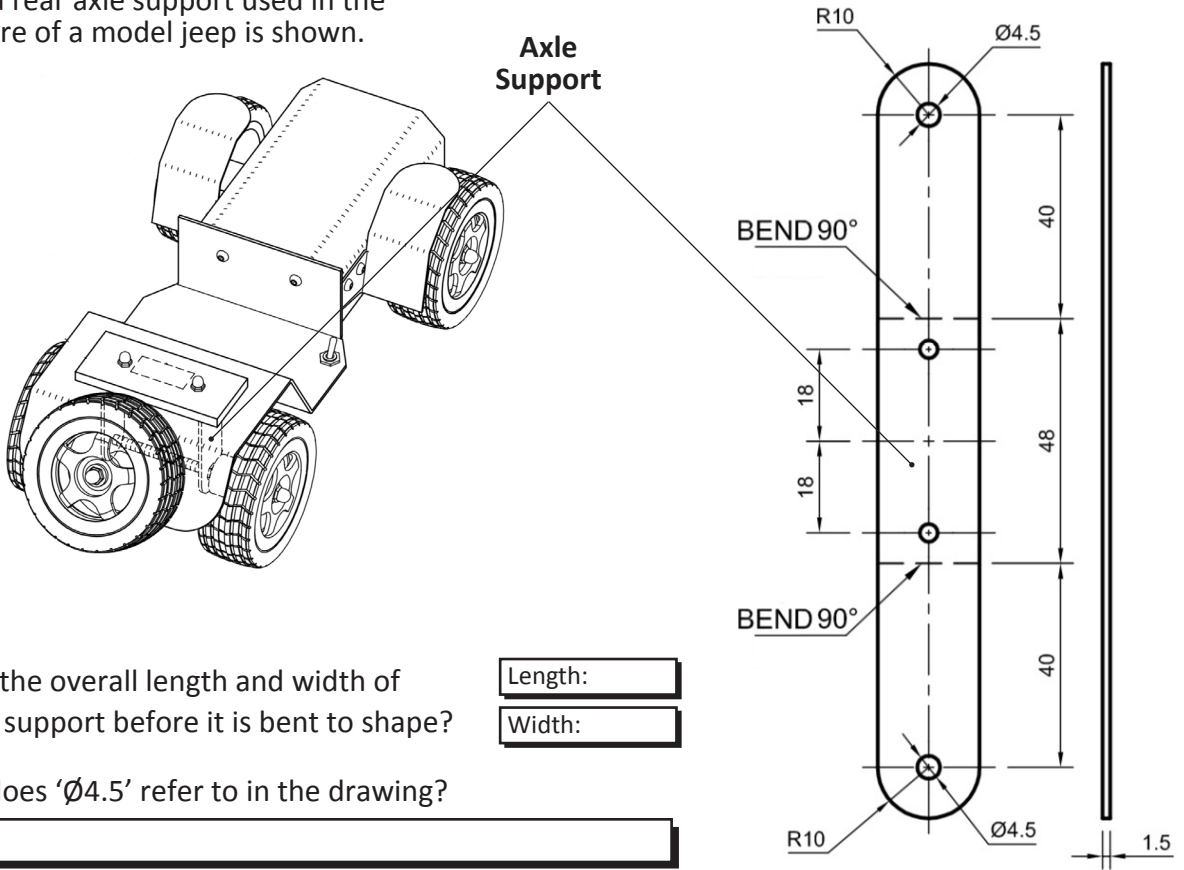
(c) Complete the table by naming devices that use the following mechanisms.

Mechanism	Device
Crank and Slider	Power Saw
Bevel Gears	
Sprocket	
Spring	
Rack and Pinion	
Ratchet and Pawl	
Clutch	

Question 4.

20 Marks

Details of a rear axle support used in the manufacture of a model jeep is shown.



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

Length:

Width:

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

(iii) List the steps involved in producing the R10 curve.

(iv) Describe how you would accurately mark out the centre of the drill holes in the axle support.

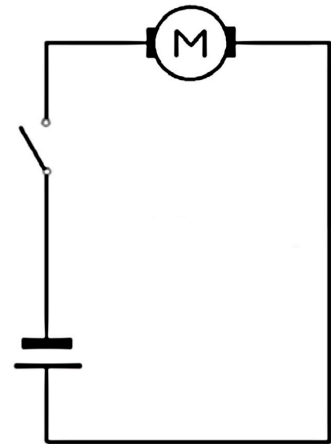
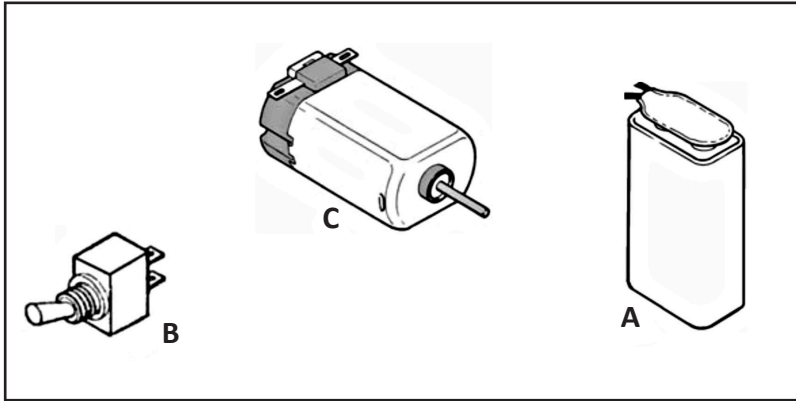
(v) List **three** tools used in the manufacture of the axle support.

1.	<input type="text"/>
2.	<input type="text"/>
3.	<input type="text"/>

(vi) Describe how to apply a highly polished finish to a piece of brass sheet metal.

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

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



Circuit Diagram

(ii) Name the components **A**, **B** and **C** shown above.

A	
B	
C	

(iii) What flows in the wires when the motor is running?

--

(b) (i) A mouse is a(n):



Output Device	
Input Device	
Process Device	

(iv) A solar powered lamp converts electrical energy into:



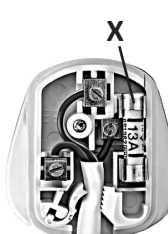
Kinetic Energy	
Chemical Energy	
Light Energy	

(ii) This symbol represents a:



Resistor	
Bulb	
Transistor	

(v) Part 'X' is a:



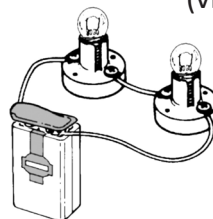
Diode	
Fuse	
Resistor	

(iii) This solder wire has a core of:



Flux	
Lead	
Glue	

(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: Thomas Edison, Henry Ford, John P. Holland, James Watt.

Achievement	Inventors
1. Steam Engine	
2. Pneumatic Tyre	
3. Electric Lamp	
4. Mass Production	

