



Coimisiún na Scrúduithe Stáit  
State Examinations Commission

JUNIOR CERTIFICATE EXAMINATION, 2016

**METALWORK  
MATERIALS AND TECHNOLOGY**

ORDINARY LEVEL - 100 Marks

Tuesday 21 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	
<b>Total</b>	
<b>Grade</b>	

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)		A die is used for:	<input type="checkbox"/> Drilling <input type="checkbox"/> Reaming <input type="checkbox"/> Threading <input type="checkbox"/> Riveting
(c)		This lathe part is called a:	<input type="checkbox"/> Topslide <input type="checkbox"/> Chuck <input type="checkbox"/> Headstock <input type="checkbox"/> Tailstock Centre
(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)		Part 'X' is called the:	<input type="checkbox"/> Shank <input type="checkbox"/> Body <input type="checkbox"/> Land <input type="checkbox"/> Flute
(f)		This tool is a:	<input type="checkbox"/> Ring Spanner <input type="checkbox"/> Socket Wrench <input type="checkbox"/> Adjustable Spanner <input type="checkbox"/> Open Spanner
(g)		This fastener is a:	<input type="checkbox"/> Spring Washer <input type="checkbox"/> Grub Screw <input type="checkbox"/> Wing Nut <input type="checkbox"/> Lock Nut
(h)		This cutting tool is a:	<input type="checkbox"/> Flat File <input type="checkbox"/> Square File <input type="checkbox"/> Half Round File <input type="checkbox"/> Needle File
(i)		This mallet head is made from:	<input type="checkbox"/> Cast Steel <input type="checkbox"/> Rawhide <input type="checkbox"/> Mild Steel <input type="checkbox"/> Zinc
(j)		This cutting tool is a:	<input type="checkbox"/> Straight Snips <input type="checkbox"/> Curved Snips <input type="checkbox"/> Combination Pliers <input type="checkbox"/> Bench Shears
(k)		Part 'X' is called the:	<input type="checkbox"/> Ratchet <input type="checkbox"/> Anvil <input type="checkbox"/> Thimble <input type="checkbox"/> Frame
(l)		This tool is used for:	<input type="checkbox"/> Counterboring <input type="checkbox"/> Reaming <input type="checkbox"/> Drilling <input type="checkbox"/> Countersinking


**SECTION B - 20 MARKS**  
ANSWER ALL QUESTIONS FROM THIS SECTION

(m)  Name the **four** labelled parts of this desktop computer.

1.	
2.	
3.	
4.	

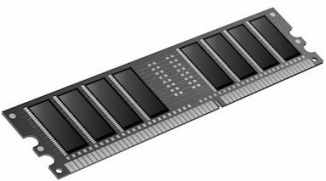
(n)  List **three** advantages of using a tablet computer.

1.	
2.	
3.	


(o)  List **three** differences between this phone and a modern smartphone.

1.	
2.	
3.	

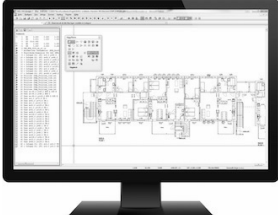
(p) (i) Computer memory is measured in:

	Bytes	
	Volts	
	Grams	
	Amps	


(ii) This device is called a:

	USB Flash Drive	
	Memory Card	
	Hard Disk	
	Floppy Disk	

(q) (i) Technical drawings are produced using a:

	CAD package	
	Spreadsheet	
	Database	
	Wordprocessor	

(ii) A scanner is a:

	Storage Device	
	Output Device	
	Input Device	
	Printing Device	

**Question 2.**

**20 Marks**

**(a)**

(i) Which one of these metals is an alloy?

Aluminium	
Bronze	
Copper	

(v) Cuttlery is normally made from:

Silver Steel	
Stainless Steel	
Mild Steel	

(ii) Which one of these metals is hardest?

Lead	
Zinc	
Steel	

(vi) Drill bits used to drill steel are made from:

Mild Steel	
Cast Iron	
High Speed Steel	

(iii) Which one of these metals is the best conductor of electricity?

Copper	
Steel	
Lead	

(vii) Lead is a:

Brittle Material	
Malleable Material	
Strong Material	

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

Steel	
Lead	
Copper	

(viii) Zinc is a(n):

Ferrous Metal	
Non-Ferrous Metal	
Alloy	

**(b)** Answer the following by ticking the correct box:

(i) Is iron ore smelted in a blast furnace?	Yes	
	No	
(ii) Is hot air blown into a blast furnace when it is operating?	Yes	
	No	
(iii) Can a blast furnace be rotated to remove molten metal?	Yes	
	No	
(iv) Does a blast furnace use an electric arc as a source of heat?	Yes	
	No	
(v) Does a blast furnace produce steel?	Yes	
	No	
(vi) Does the molten metal fall to the bottom of a blast furnace?	Yes	
	No	

**(c)**

(i) Acrylic sheet is also known as:

Fibreglass	
Perspex	
Bakelite	

(iv) Window frames are made from:

Acrylic	
Nylon	
PVC	

(ii) Which one of these is a thermosetting plastic?

Bakelite	
Nylon	
PVC	

(v) The main raw material for plastic is:

Oil	
Wood	
Coal	

(iii) Which one of these is a thermoplastic?

Polyester Resin	
Polyethylene	
Phenolic Resin	

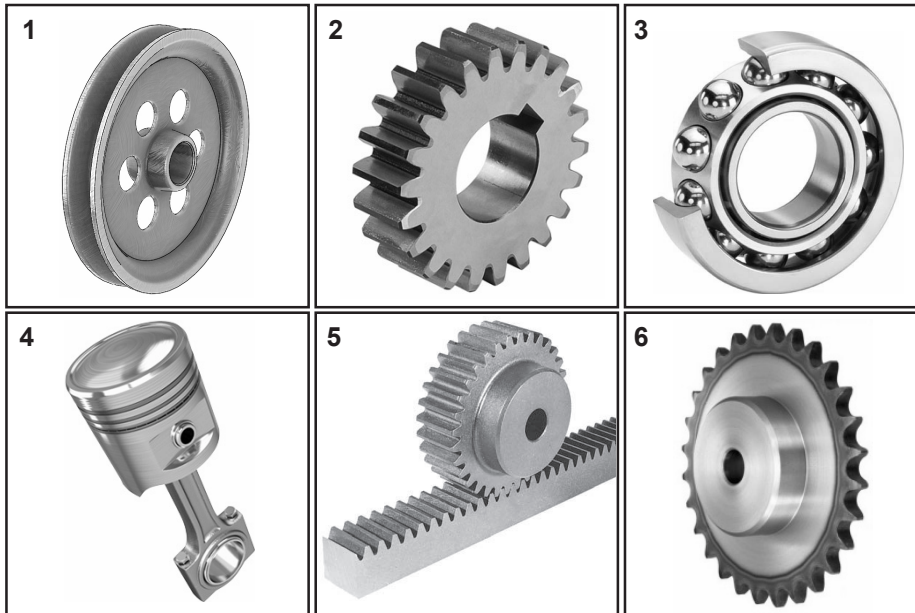
(vi) Polyethylene is used to make:

Bottles	
Foam	
Adhesives	

**Question 3.**

**20 Marks**

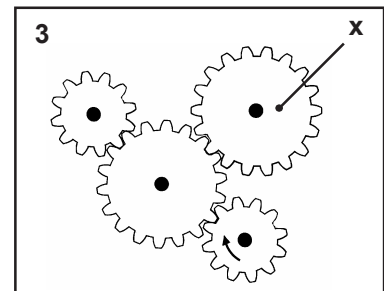
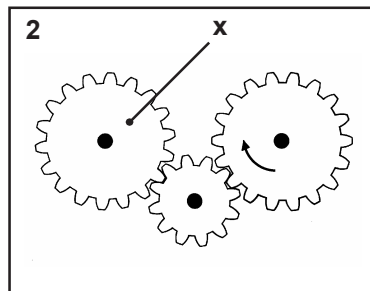
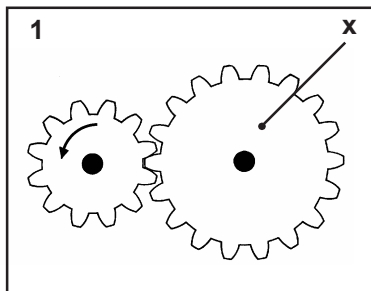
(a) (i) Match the number to the correct mechanism in the given table.



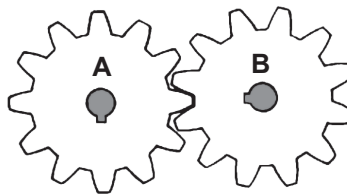
Mechanism	No.
Rack and Pinion	
Bearing	
Sprocket	
Piston	
Pulley	
Gear	

(ii) Name a machine in the school workshop that uses reciprocating motion.

(b) (i) Use an arrow to indicate the direction of gear 'X' in each of the following:



(ii) If gear 'A' rotates at 100 RPM how fast will gear 'B' rotate? (A = 12 Teeth, B = 12 Teeth.)



12 RPM	
50 RPM	
100 RPM	
200 RPM	

(iii) Name a machine that uses gears.

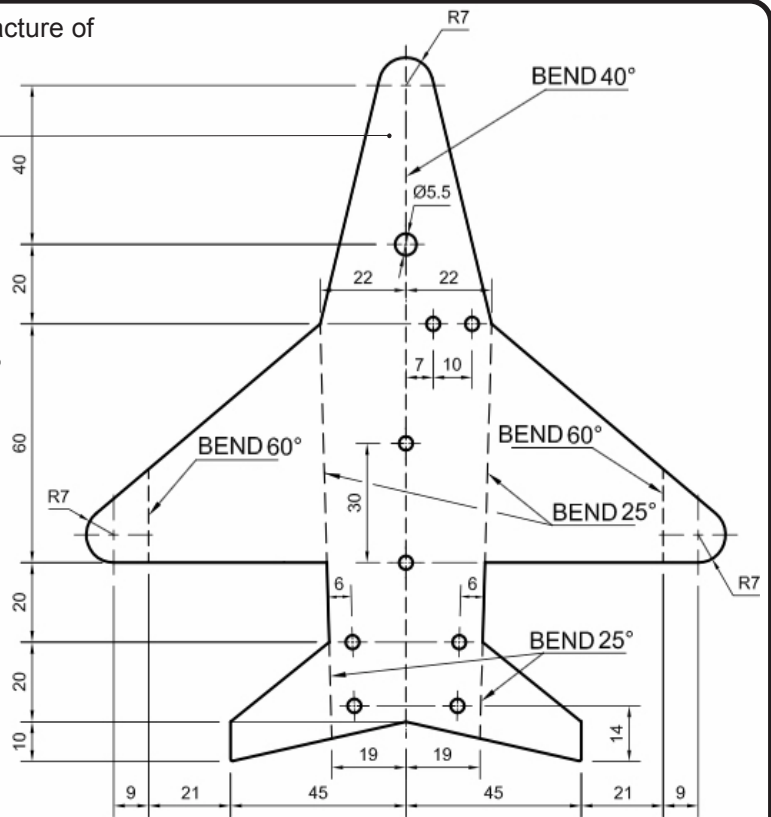
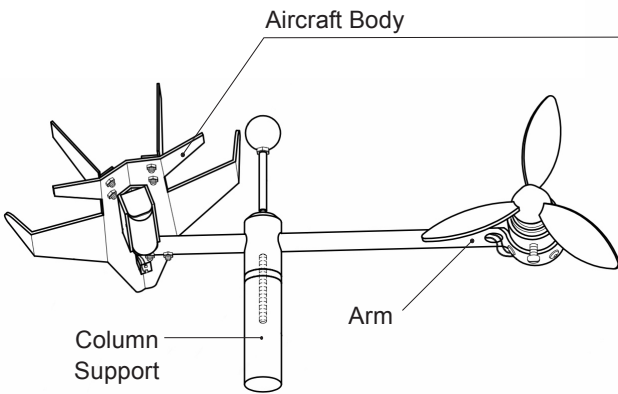
(c) Complete the table by naming devices that use the following mechanisms.

Mechanism	Device
Square Thread	<i>Lathe</i>
Cam	
Ratchet and Pawl	
Bevel Gears	
Rack and Pinion	
Crank and Slider	
Linkage	

**Question 4.**

**20 Marks**

Details of the aircraft body used in the manufacture of a Model Fly-around Aircraft are shown.



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

Length: \_\_\_\_\_ Width: \_\_\_\_\_

(ii) What does 'R7' refer to in the drawing?

\_\_\_\_\_

(iii) List the stages involved in bending the aircraft body to shape.

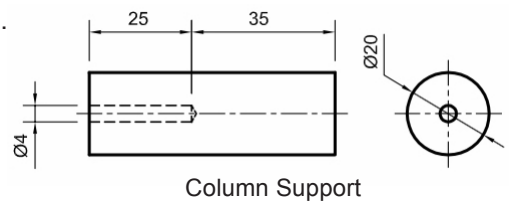
\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

(iv) List **four** tools used in the manufacture of the aircraft body.

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

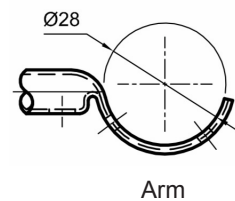
(v) Describe how you would drill the hole in the column support.

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



(vi) Describe how you would form the end of the arm shown opposite.

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



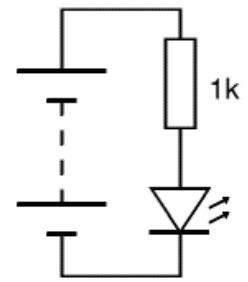
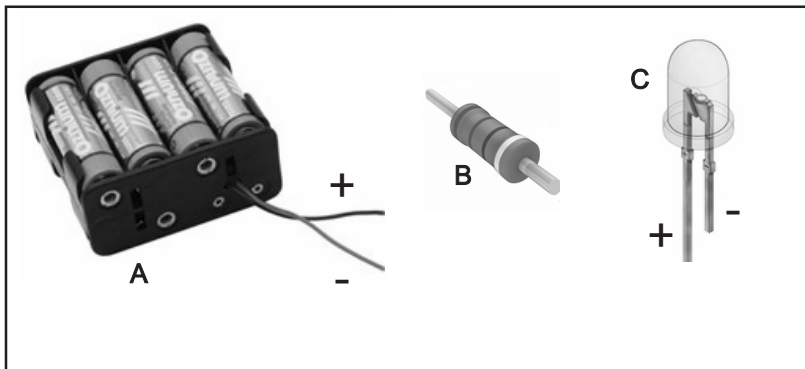
(vii) Why would you design and make a support stand for the model?

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Question 5.**

**20 Marks**

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



Circuit Diagram

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

A	
B	
C	

(iii) State a use for component 'C'.

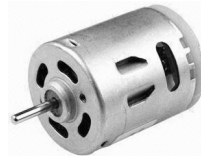
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(b) (i) This device is a:



Toggle Switch	
Push Switch	
Slide Switch	

(iv) A motor converts electrical energy into:



Chemical Energy	
Light Energy	
Mechanical Energy	

(ii) Electrical current is measured in:



Amps	
Ohms	
Volts	

(v) This is a symbol for a:



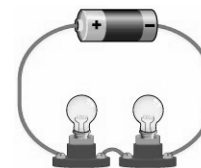
Bulb	
Motor	
Dynamo	

(iii) This device is a(n):



LDR	
Buzzer	
Transistor	

(vi) These bulbs are connected in:



Parallel	
Series	
Parallel & Series	

(c) Name any **two** inventors and briefly describe their achievements.

*Inventor 1:*


*Inventor 2:*