



**Coimisiún na Scrúduithe Stáit
State Examinations Commission**

S56

JUNIOR CERTIFICATE EXAMINATION, 2003

MATERIALS AND TECHNOLOGY

METALWORK - ORDINARY LEVEL

100 Marks

Tuesday, 17 June, Afternoon, 2.00 to 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	

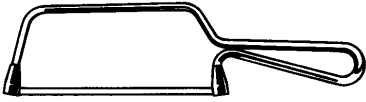
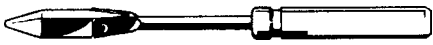
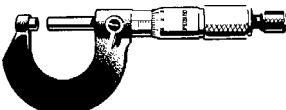
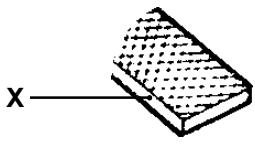
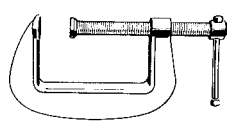
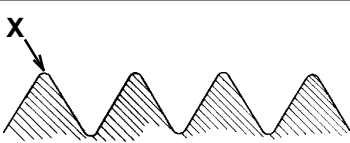
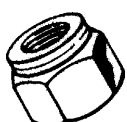
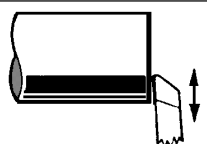
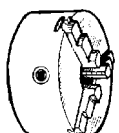

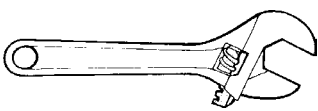
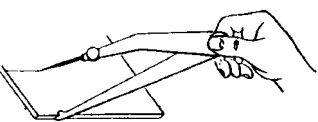
1. Total of end of page totals	
2. Aggregate total of all disallowed question(s)	
3. Total mark awarded (1 minus 2)	
4. Bonus mark for answering through Irish (if applicable)	
5. Total mark awarded if Irish Bonus (3+4)	
Note: The mark in row 3 (or row 5 if an Irish Bonus is awarded) must equal the mark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

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

1.

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

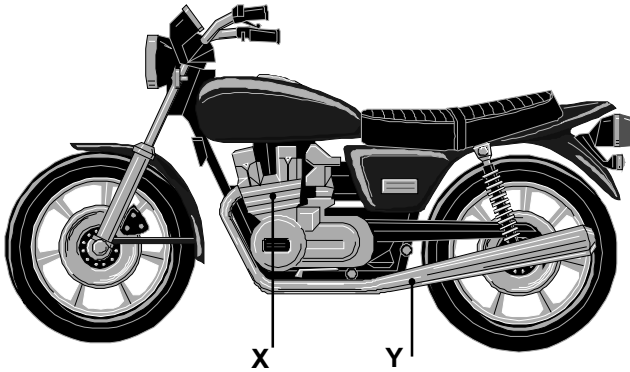
40 Marks

(a)		<p><i>This cutting tool is a:</i></p>	<input type="checkbox"/> Fret Saw <input type="checkbox"/> Junior Hacksaw <input type="checkbox"/> Coping Saw <input type="checkbox"/> Pad Saw
(b)		<p><i>This tool is used when:</i></p>	<input type="checkbox"/> Riveting <input type="checkbox"/> Drilling <input type="checkbox"/> Threading <input type="checkbox"/> Soldering
(c)		<p><i>This measuring instrument is a(n):</i></p>	<input type="checkbox"/> Vernier Calipers <input type="checkbox"/> Outside Calipers <input type="checkbox"/> Micrometer <input type="checkbox"/> Depth Gauge
(d)		<p><i>Part 'X' is called the:</i></p>	<input type="checkbox"/> Flat Edge <input type="checkbox"/> Safe Edge <input type="checkbox"/> Double Cut <input type="checkbox"/> Single Cut
(e)		<p><i>This tool is a:</i></p>	<input type="checkbox"/> Machine Vice <input type="checkbox"/> Hand Vice <input type="checkbox"/> Vice Grips <input type="checkbox"/> G-Cramp
(f)		<p><i>Part 'X' of the thread is called the:</i></p>	<input type="checkbox"/> Flank <input type="checkbox"/> Lead <input type="checkbox"/> Pitch <input type="checkbox"/> Crest
(g)		<p><i>This fastener is a:</i></p>	<input type="checkbox"/> Rivet <input type="checkbox"/> Lock Nut <input type="checkbox"/> Bolt <input type="checkbox"/> Grub Screw
(h)		<p><i>This lathe operation is called:</i></p>	<input type="checkbox"/> Parting <input type="checkbox"/> Threading <input type="checkbox"/> Knurling <input type="checkbox"/> Facing
(i)		<p><i>This lathe part is called a:</i></p>	<input type="checkbox"/> Tailstock <input type="checkbox"/> Three Jaw Chuck <input type="checkbox"/> Headstock <input type="checkbox"/> Topslide
(j)		<p><i>This cutting tool is a:</i></p>	<input type="checkbox"/> Twist Drill <input type="checkbox"/> Reamer <input type="checkbox"/> Centre Drill <input type="checkbox"/> Countersinking Drill
(k)		<p><i>This tool is called a(n):</i></p>	<input type="checkbox"/> Socket <input type="checkbox"/> Ring Spanner <input type="checkbox"/> Adjustable Spanner <input type="checkbox"/> Ratchet
(l)		<p><i>This marking out tool is called a(n):</i></p>	<input type="checkbox"/> Inside Calipers <input type="checkbox"/> Odd Leg Calipers <input type="checkbox"/> Spring Dividers <input type="checkbox"/> Scriber

SECTION B - 20 MARKS
ANSWER ALL QUESTIONS FROM THIS SECTION

(m)

(i) Name a metal used to make the engine case 'X':



(ii) Is this metal ferrous or non-ferrous?

(iii) Does this metal rust?

(iv) The exhaust pipe 'Y' is usually coated with a metal. Name this metal.

4 Marks

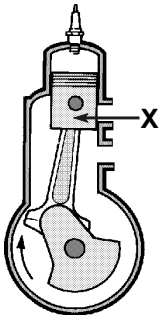
(n)



State the function of a spark plug.

4 Marks

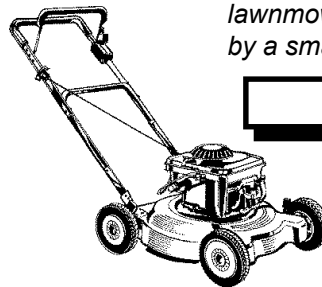
(o)



(i) Part 'X' is called the:

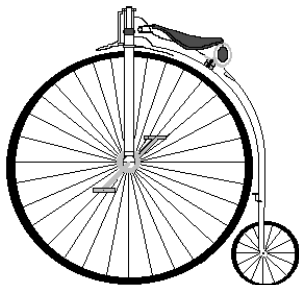
Valve	
Connecting Rod	
Piston	
Crankshaft	

(ii) Name a device other than a lawnmower that can be driven by a small petrol engine.



4 Marks

(p) List four differences between this bicycle and a modern bicycle.

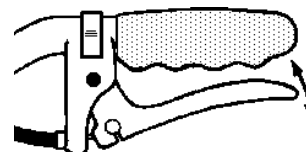
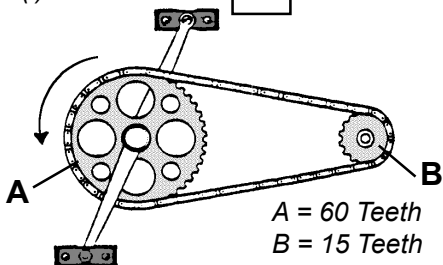


1.	
2.	
3.	
4.	

4 Marks

(q) (i) One turn of A = turns of B.

(ii) Indicate with an arrow the fulcrum point of the brake lever.



4 Marks

(a) Complete the chart:

Material	List a use for each material
Nylon	
Copper	
PVC	
Stainless Steel	
Brass	
Polythene	
Mild Steel	
Zinc	

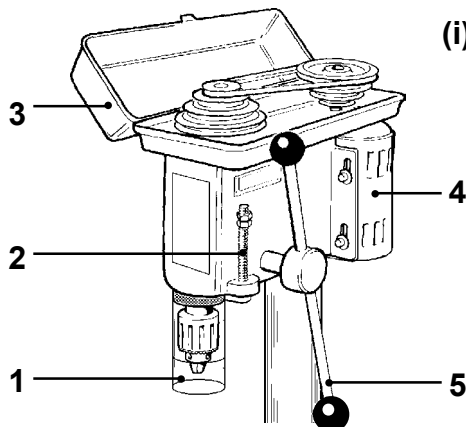
8 Marks

(b) Complete the chart:

(i) Can thermosetting plastics be re-shaped?	Yes	
	No	
(ii) Is aluminium ore called bauxite?	Yes	
	No	
(iii) Is copper a good conductor of heat?	Yes	
	No	
(iv) Is bronze an alloy of copper and tin?	Yes	
	No	
(v) Is cast iron used to make fire grates?	Yes	
	No	
(vi) Is mild steel an alloy?	Yes	
	No	

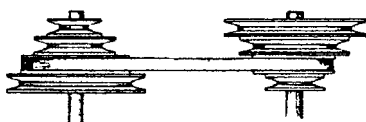
6 Marks

(c)



(i) Complete the chart by naming the parts:

Part No.	Name
1.	
2.	
3.	
4.	
5.	

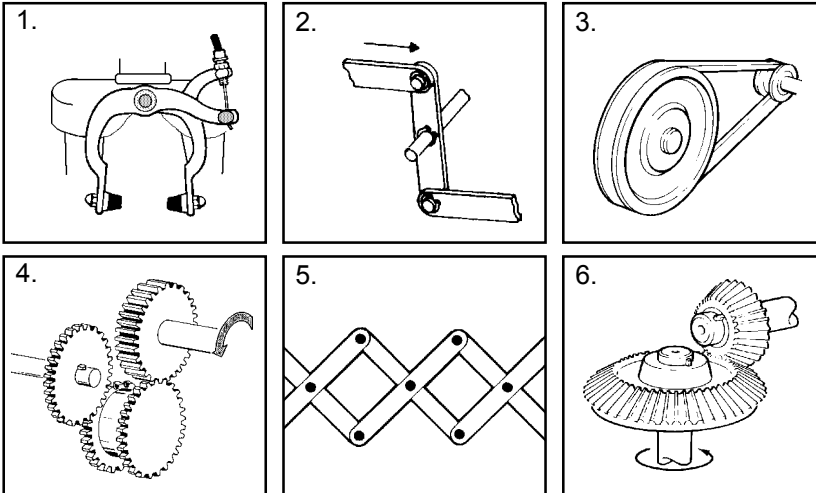


(ii) Stepped pulleys in a pillar drill are used to:

Change the speed	
Change the feed	

6 Marks

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



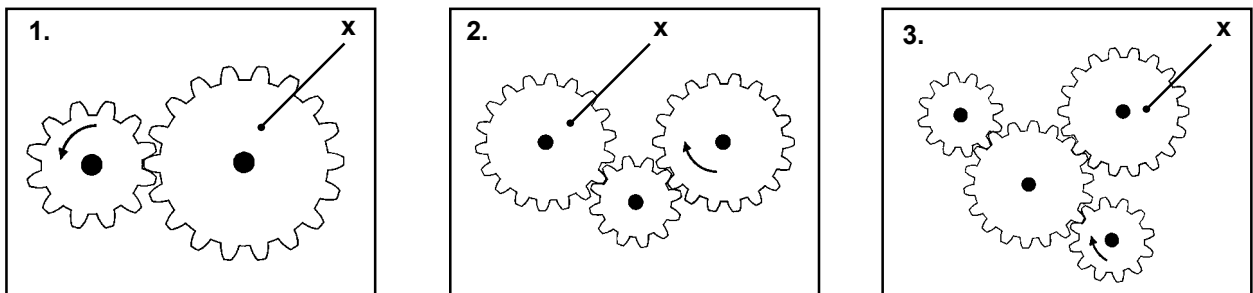
Mechanism	No.
Bell Crank	
Caliper Brake	
Bevel Gears	
Parallel Linkage	
Gear Train	
Pulley System	

(ii) Which one of these mechanisms is used in a hand drill?

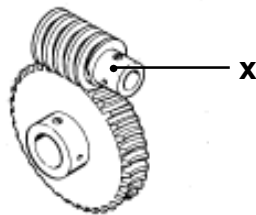
(iii) Name another machine that uses one of these mechanisms. State the number of this mechanism. No.

8 Marks

(b) (i) Indicate the direction of gear 'X' in each of the following:



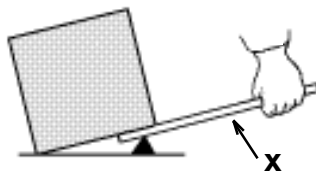
(ii) Gear 'X' is a:



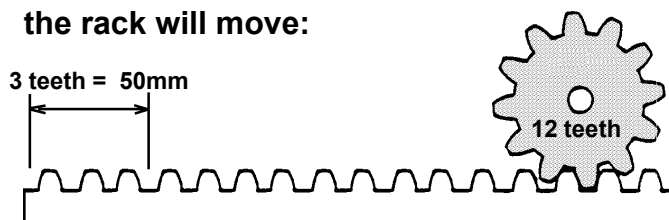
Spur Gear	
Bevel Gear	
Worm Gear	
Helical Gear	

6 Marks

(c) (i) Name 'X':



(ii) When the pinion turns once, the rack will move:

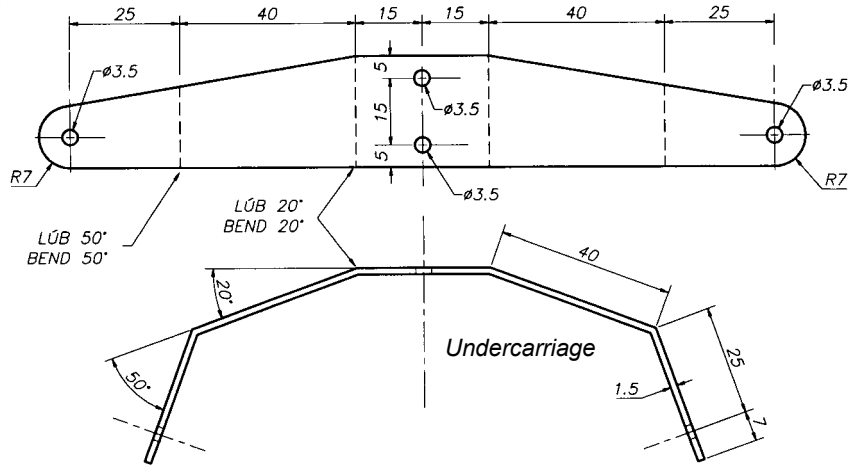
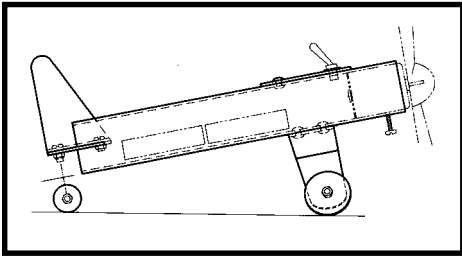


1000mm	
200mm	
600mm	
100mm	

(iii) Name a machine that uses a rack and pinion:

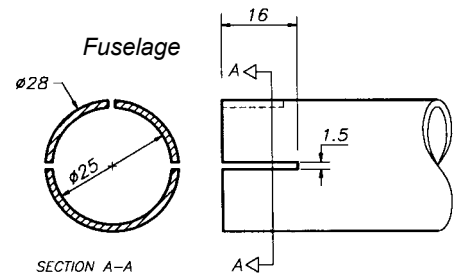
6 Marks

Details of a model aeroplane are shown.



(i) Describe the stages involved in marking out and bending the undercarriage to shape

(ii) What workshop tool is used to check the angles on the undercarriage.

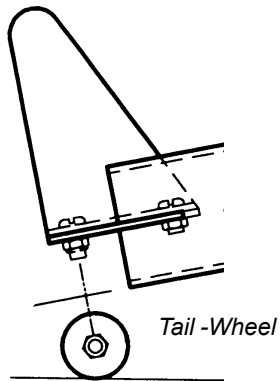
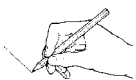


(iii) Describe how the slots in the fuselage are marked out.

(iv) Explain the function of the following components in the aeroplane.

Component	Function
Battery	
Switch	
Motor	

(v) Design a support for the tail-wheel in the grid below.



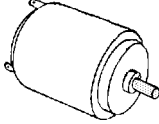






USE A PENCIL ONLY

(a) (i) Select the correct symbols from the chart and complete the circuit diagram for the battery operated drill.



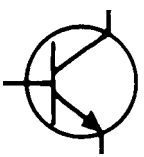

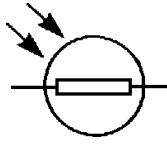
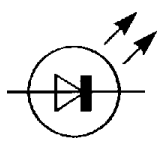
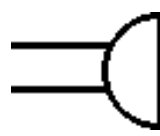
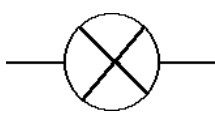
Draw the circuit in this box

Component	Symbol
	
	
	

(ii) State one advantage of battery operated drills.

8 Marks

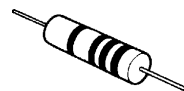
(b) (i) Match the number to the correct symbol.

1. 	2. 	3. 
4. 	5. 	6. 

Component	No.
Bulb	
LDR	
LED	
Switch	
Buzzer	
Transistor	

(ii) What does the electrical term A.C mean?

(iii) Is this component a resistor?



Yes

No

8 Marks

(c) (i) Name one famous Engineering inventor:

(ii) What did this person invent?

(iii) How has this person's invention changed the way we live?

4 Marks

(i) This design shows a desk ornament. List three tools used to make Part 'A'.

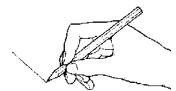
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2.	
3.	

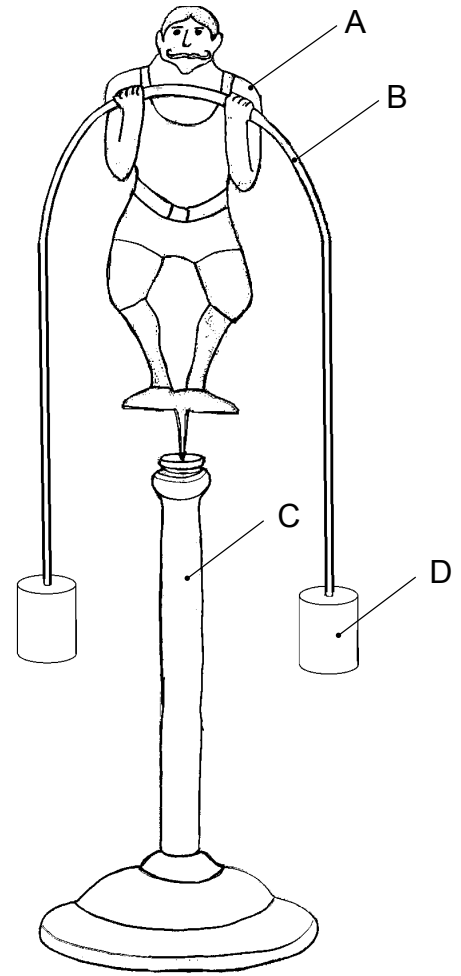
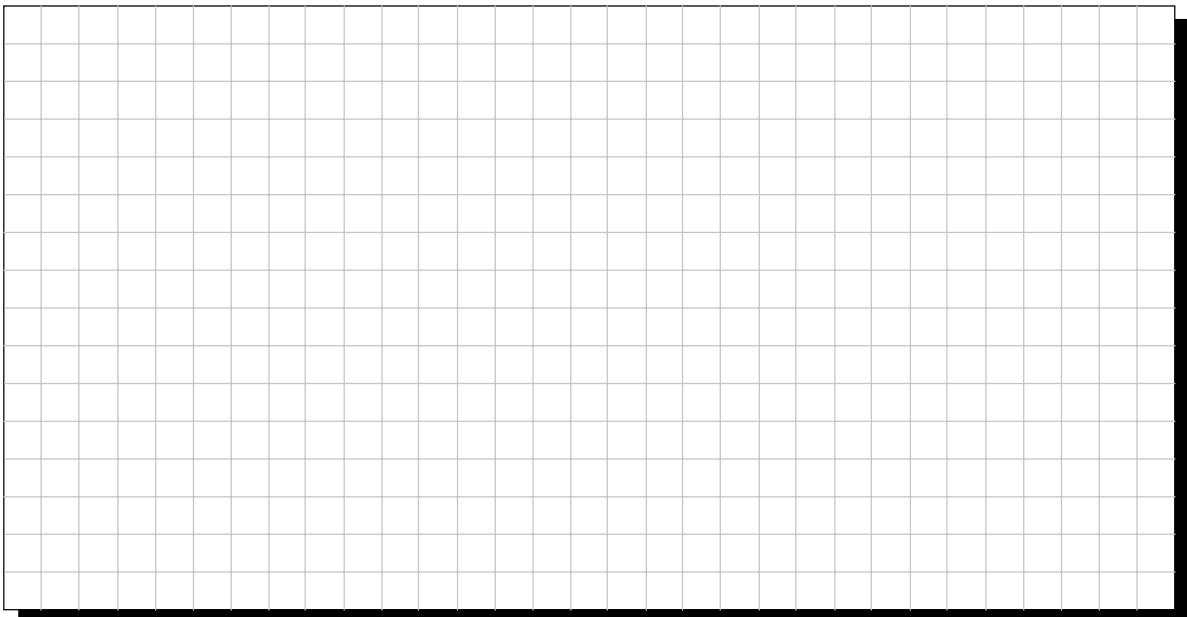
(ii) List suitable materials for the parts labelled 'A', 'B', and 'C'.

A.	
B.	
C.	

(iii) Briefly describe the stages involved in making Part 'D' on the lathe.

(iv) You are required to design a different base for the ornament. Using good proportions make a neat freehand drawing of your design in the grid below.

 USE A PENCIL ONLY



(v) Can the Tailstock on the lathe be used for drilling?

Yes	
No	