



**Coimisiún na Scrúduithe Stáit
State Examinations Commission**

JUNIOR CERTIFICATE EXAMINATION, 2008

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 style="width: 80%; height: 40%;" type="text"/>
Question	Mark
1A	
1B	
2	
3	
4	
5	
6	
Total	
Grade	

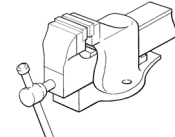
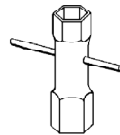
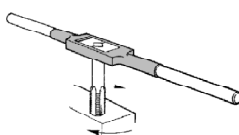
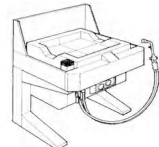
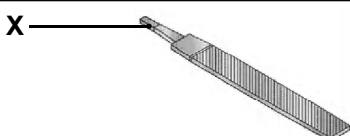
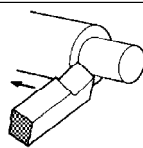
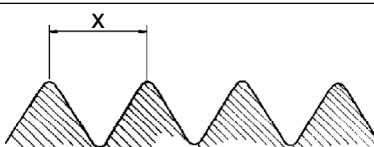
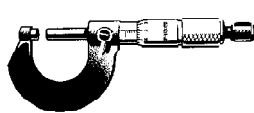
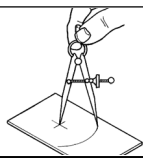
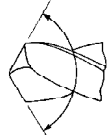
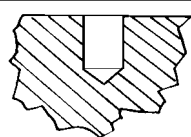
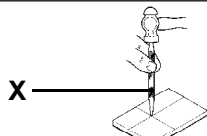
1. Total of end of page totals	
2. Aggregate total of all disallowed question(s)	
3. Total mark awarded (1 minus 2)	
4. Bonus mark for answering through Irish (if applicable)	
5. Total mark awarded if Irish Bonus (3+4)	
<p>Note: The mark in row 3 (or row 5 if an Irish Bonus is awarded) must equal the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

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

Question 1.

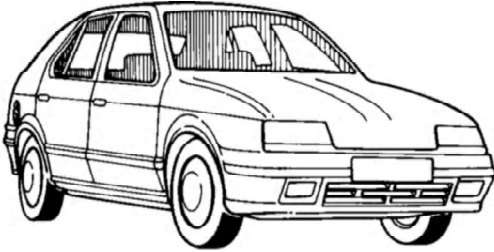
SECTION A - 20 MARKS
ANSWER ANY TEN QUESTIONS FROM THIS SECTION

40 Marks

(a)		This holding device is a:	<input type="checkbox"/> Hand Vice <input type="checkbox"/> Bench Vice <input type="checkbox"/> Leg Vice <input type="checkbox"/> Machine Vice
(b)		This tool is a(n):	<input type="checkbox"/> Ring Spanner <input type="checkbox"/> Adjustable Wrench <input type="checkbox"/> Box Spanner <input type="checkbox"/> Vice Grips
(c)		Taps are used to form:	<input type="checkbox"/> Internal Threads <input type="checkbox"/> Buttress Threads <input type="checkbox"/> External Threads <input type="checkbox"/> Acme Threads
(d)		The brass used for brazing is called:	<input type="checkbox"/> Spelter <input type="checkbox"/> Solder <input type="checkbox"/> Enamel <input type="checkbox"/> Flux
(e)		Part 'X' is called the:	<input type="checkbox"/> Point <input type="checkbox"/> Face <input type="checkbox"/> Edge <input type="checkbox"/> Tang
(f)		This technique is called:	<input type="checkbox"/> Parallel Turning <input type="checkbox"/> Taper Turning <input type="checkbox"/> Knurling <input type="checkbox"/> Facing
(g)		The distance 'X' is called the:	<input type="checkbox"/> Crest <input type="checkbox"/> Flank <input type="checkbox"/> Root <input type="checkbox"/> Pitch
(h)		A micrometer can measure to an accuracy of:	<input type="checkbox"/> 1 mm <input type="checkbox"/> 0.5 mm <input type="checkbox"/> 0.1 mm <input type="checkbox"/> 0.01 mm
(i)		This tool is called a(n):	<input type="checkbox"/> Outside Calipers <input type="checkbox"/> Spring Dividers <input type="checkbox"/> Odd Leg Calipers <input type="checkbox"/> Inside Calipers
(j)		The drill point angle is:	<input type="checkbox"/> 118° <input type="checkbox"/> 90° <input type="checkbox"/> 180° <input type="checkbox"/> 60°
(k)		This drawing shows a:	<input type="checkbox"/> Counterbored Hole <input type="checkbox"/> Contersunk Hole <input type="checkbox"/> Pilot Hole <input type="checkbox"/> Blind Hole
(l)		Tool 'X' is a:	<input type="checkbox"/> Scriber <input type="checkbox"/> Parallel Punch <input type="checkbox"/> Centre Punch <input type="checkbox"/> Centre Square

SECTION B - 20 MARKS
ANSWER ALL QUESTIONS FROM THIS SECTION

(m)

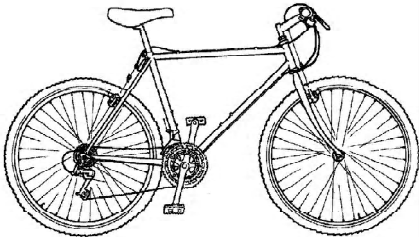


(i) Name **any three** parts in a car engine.

1.
2.
3.

(ii) Describe the purpose of **any one** of these engine parts.

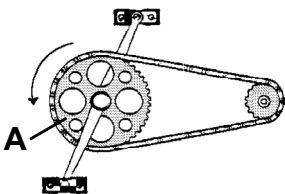
(n)



List **four** design features of a modern bicycle.

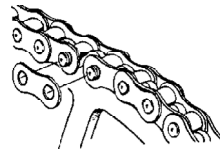
1.
2.
3.
4.

(o) (i) Part 'A' is called a:



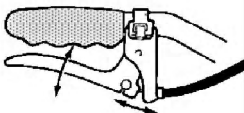
Sprocket	
Linkage	
Pawl	
Ratchet	

(ii) The links of this chain are joined by:



Brazing	
Screwing	
Riveting	
Welding	

(p) (i) This mechanism uses a:

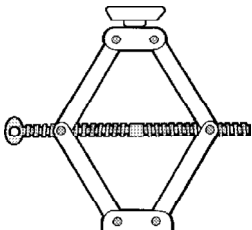


Gear	
Lever	
Caliper	
Bearing	

(ii) Why is a bicycle chain lubricated?



(q) (i) This scissors jack uses a:



Screw mechanism
Ratchet mechanism
Cam mechanism
Gear mechanism

(ii) Car bodies are made from:



Copper
Zinc
Steel
Iron

Question 2.

20 Marks

(a)

(i) Complete the chart:

Plastic Material	Thermosetting or Thermoplastic	List a use for each plastic
Polyurethane	<i>Thermosetting</i>	<i>Flexible foam for upholstery</i>
Polythene		
PVC		
Nylon		

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

Lead	<input type="checkbox"/>
Brass	<input type="checkbox"/>
Silver	<input type="checkbox"/>
Aluminium	<input type="checkbox"/>

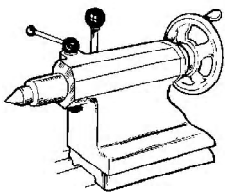
(iii) Why is copper used to make electrical wire?

(b) Complete the chart:



(i) The tool shown is a straight-bit soldering iron.	Yes	<input type="checkbox"/>
	No	<input type="checkbox"/>
(ii) Fluxes are used to remove oxides.	Yes	<input type="checkbox"/>
	No	<input type="checkbox"/>
(iii) Soft solders begin to melt at 800°C.	Yes	<input type="checkbox"/>
	No	<input type="checkbox"/>
(iv) Resin fluxes are used for electrical work.	Yes	<input type="checkbox"/>
	No	<input type="checkbox"/>
(v) Soldering iron bits are made from steel.	Yes	<input type="checkbox"/>
	No	<input type="checkbox"/>
(vi) Sweating is a method of soldering.	Yes	<input type="checkbox"/>
	No	<input type="checkbox"/>

(c) Complete the chart:

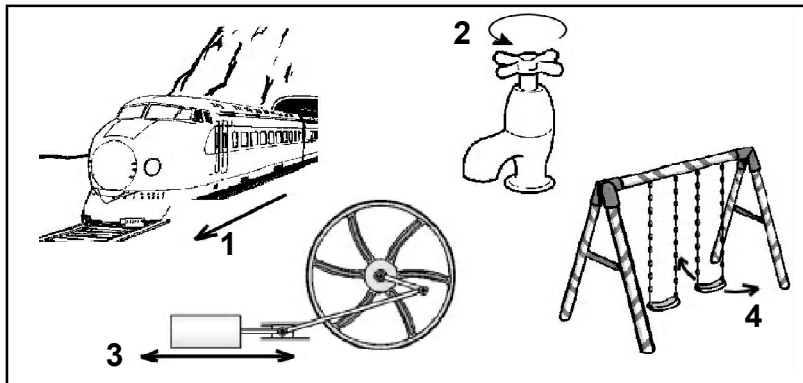


(i) Lathe work is sometimes called 'turning'.	Yes	<input type="checkbox"/>
	No	<input type="checkbox"/>
(ii) A drill chuck can be fitted to a lathe tailstock.	Yes	<input type="checkbox"/>
	No	<input type="checkbox"/>
(iii) Lathe cutting tool bits are made from cast iron.	Yes	<input type="checkbox"/>
	No	<input type="checkbox"/>
(iv) A self-centring chuck has four jaws.	Yes	<input type="checkbox"/>
	No	<input type="checkbox"/>
(v) A tool holder is used when knurling.	Yes	<input type="checkbox"/>
	No	<input type="checkbox"/>
(vi) A lathe can be used for screwcutting.	Yes	<input type="checkbox"/>
	No	<input type="checkbox"/>

Question 3.

20 Marks

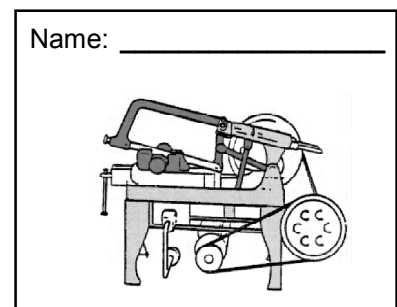
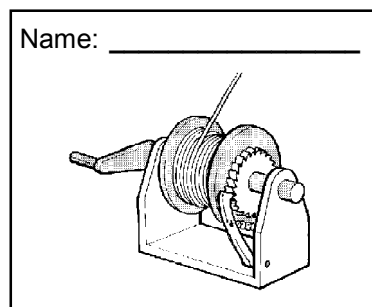
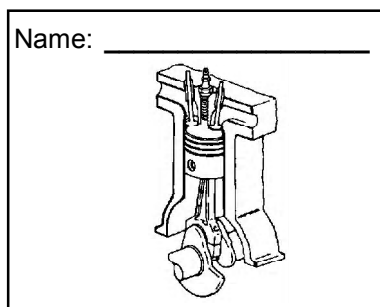
(a) (i) Match the number to the correct motion type.



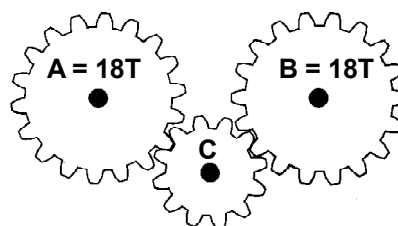
Motion Type	No.
Rotary Motion	
Linear Motion	
Oscillating Motion	
Reciprocating Motion	

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

(b) (i) For **each** of the machines shown name a mechanism used in its operation.



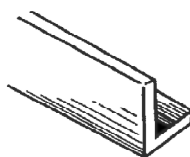
(ii) If gear 'A' rotates at 100 RPM how fast will gear 'B' rotate?



50 RPM	
100 RPM	
150 RPM	
200 RPM	

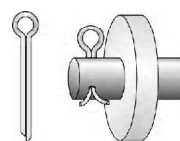
(iii) What is gear 'C' called?

(c) (i) This metal section is known as:



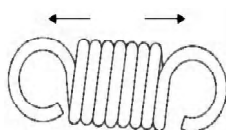
Channel Iron	
Angle Iron	
Box Iron	

(iv) This device uses a:



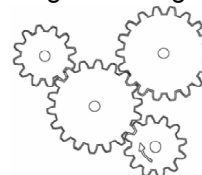
Locknut	
Grub Screw	
Split Pin	

(ii) This spring is in:



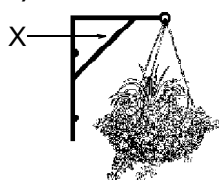
Shear	
Tension	
Compression	

(v) This gear arrangement is known as a:



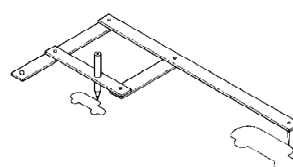
Worm Gear	
Gear Train	
Bevel Gear	

(iii) Part 'X' is a:



Strut	
Tie	
Truss	

(vi) The linkages used are:

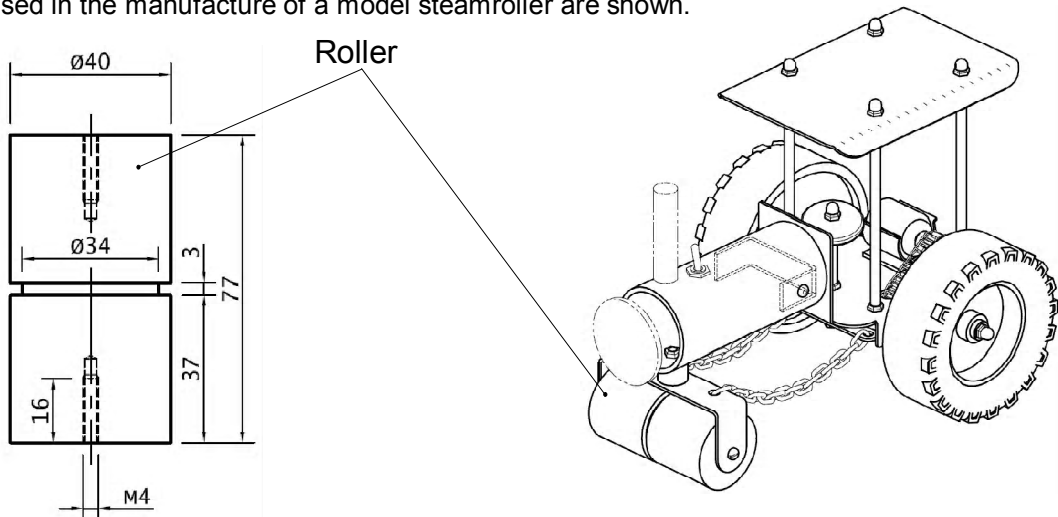


Perpendicular	
Parallel	
Fixed	

Question 4.

20 Marks

Details of a roller used in the manufacture of a model steamroller are shown.



(i) List the tools and processes used to form the M4 threads in the roller.

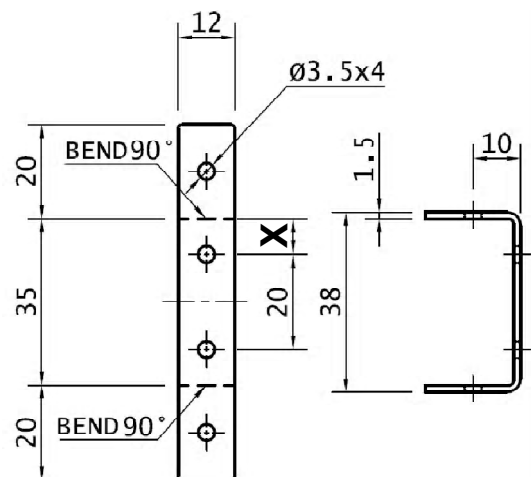
Tools:	Processes:

(ii) What does M4 mean?

(iii) Describe how you would form the 3mm undercut in the roller.

(iv) What precautions should you take when soldering the electric circuit?

(v) Describe how you would accurately mark out the centre of the drill holes in the boiler bracket.



(vi) What is the overall length of the boiler bracket?

(vii) What is distance 'X'?

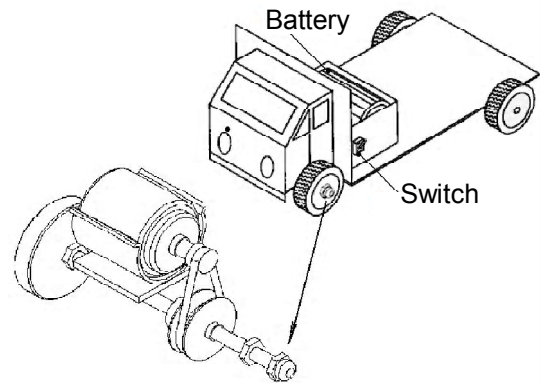
Boiler Bracket

Question 5.

20 Marks

(a) (i) This toy truck uses a motor to turn the front axle. A switch and a battery are also used in the truck. Draw the electrical circuit diagram for the truck.

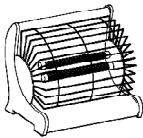
Draw the circuit in this box



(ii) Complete the chart:

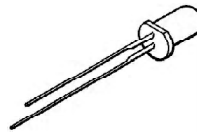
A battery is made up of a number of cells joined together.	Yes	<input type="checkbox"/>
	No	<input type="checkbox"/>
The current supplied by a battery is called Alternating Current (AC).	Yes	<input type="checkbox"/>
	No	<input type="checkbox"/>
In an electronic system, a buzzer is an output device.	Yes	<input type="checkbox"/>
	No	<input type="checkbox"/>
An ordinary bulb has a tungsten filament.	Yes	<input type="checkbox"/>
	No	<input type="checkbox"/>

(b) (i) A heater converts electrical energy into:



Chemical Energy	<input type="checkbox"/>
Mechanical Energy	<input type="checkbox"/>
Heat Energy	<input type="checkbox"/>

(iv) This component is a(n):



LED	<input type="checkbox"/>
LDR	<input type="checkbox"/>
Bulb	<input type="checkbox"/>

(ii) This device is a:



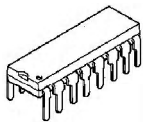
Floppy Disk	<input type="checkbox"/>
CD	<input type="checkbox"/>
Hard Disk	<input type="checkbox"/>

(v) A mouse is a(n):



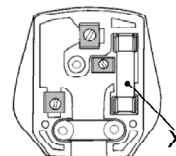
Output Device	<input type="checkbox"/>
Input Device	<input type="checkbox"/>
Process Device	<input type="checkbox"/>

(iii) This component is a(n):



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

(vi) Part 'X' is a:



Diode	<input type="checkbox"/>
Fuse	<input type="checkbox"/>
Resistor	<input type="checkbox"/>

(c) Complete the chart by matching the inventor(s) to the achievement.

Inventors: Henry Ford, John Dunlop, John P. Holland, Wright Brothers.

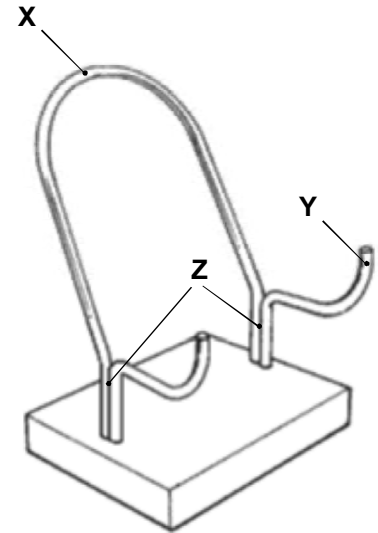
Achievement	Inventor(s)
1. Aeroplane	
2. Submarine	
3. Pneumatic Tyre	
4. Mass Production	

Question 6.

20 Marks

- (i) This drawing shows a kitchen book holder. Name a metal suitable for making the rods 'X' and 'Y'. Give a reason for your choice.

Metal:
Reason:



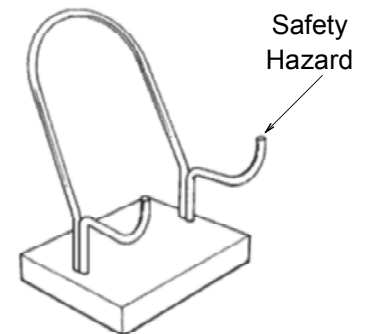
- (ii) Describe how you would join the metal rods at 'Z'.

- (iii) Using the chart below describe **one** shaping process, **one** finishing process and name the tools used to make the kitchen book holder.

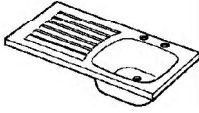

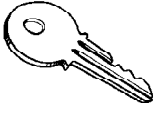

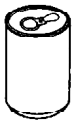

Shaping Process:	Tools used:
Finishing Process:	Tools used:

- (iv) Draw a sketch to show how you would modify the book holder to make it safer.

--



- (v) Match the household item to the correct material.

1.  Sink	2.  Bucket	3.  Key
4.  Toothbrush	5.  Drinks Can	6.  Stove

Item	No.
Cast Iron	
Aluminium	
Stainless Steel	
Polyethylene	
Nylon	
Brass	