



**Coimisiún na Scrúduithe Stáit
State Examinations Commission**

JUNIOR CERTIFICATE EXAMINATION, 2007

MATERIALS AND TECHNOLOGY

METALWORK - ORDINARY LEVEL

100 Marks

Tuesday, 19 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	

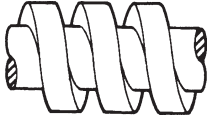




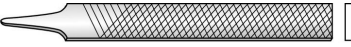
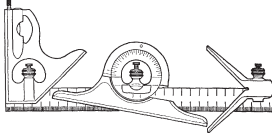
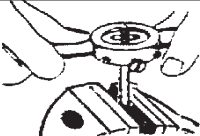
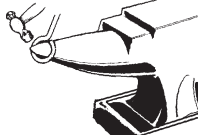
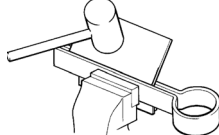
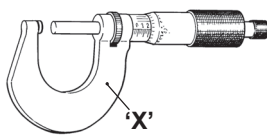
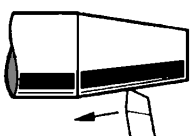
1. Total of end of page totals	
2. Aggregate total of all disallowed question(s)	
3. Total mark awarded (1 minus 2)	
4. Bonus mark for answering through Irish (if applicable)	
5. Total mark awarded if Irish Bonus (3+4)	
Note: The mark in row 3 (or row 5 if an Irish Bonus is awarded) must equal the mark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

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

1.

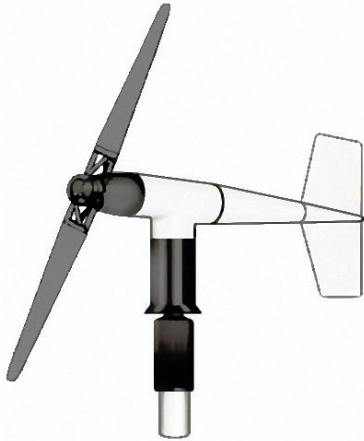
SECTION A - 20 MARKS
ANSWER ANY **TEN** QUESTIONS FROM THIS SECTION

40 Marks

(a)		This thread form is a(n):	Buttress Thread Acme Thread Square Thread ISO Metric Thread	
(b)		This tool is a(n):	Tap Wrench Adjustable Spanner Box Spanner Ring Spanner	
(c)		This fastener is a:	Rivet Nut and Bolt Split Pin Grub Screw	
(d)		This cutting tool is a:	Straight Snips Curved Snips Bench Shears Combination Pliers	
(e)		This technique is called:	Brazing Soldering Hollowing Punching	
(f)		Hand files are made from:	High Carbon Steel Mild Steel Stainless Steel Aluminium	
(g)		This instrument is a(n):	Inside Calipers Combination Set Outside Calipers Vernier Calipers	
(h)		Stocks and Dies are used for:	Tapping Screwing Riveting Drilling	
(i)		This forging technique is called:	Upsetting Hammering Drawing Down Forming an Eye	
(j)		This technique is called:	Scrolling Forming Twisting Bending	
(k)		Part 'X' is called the:	Frame Spindle Anvil Sleeve	
(l)		This technique is called:	Parallel Turning Taper Turning Knurling Facing	

SECTION B - 20 MARKS
ANSWER ALL QUESTIONS FROM THIS SECTION

(m)



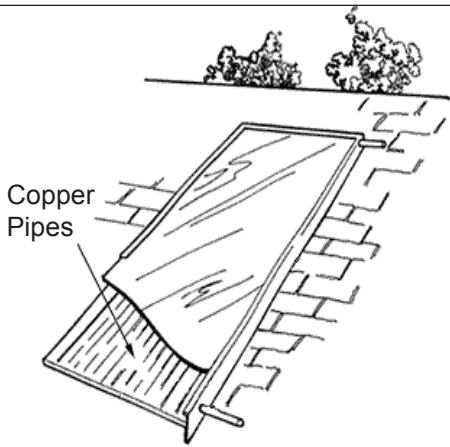
(i) Give **three** reasons why the blades of this wind generator should be made from a plastic material.

1.
2.
3.

(ii) Name **three** plastic materials.

1.
2.
3.

(n)

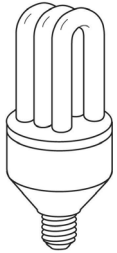


(i) Why is copper used in the manufacture of solar panels?

(ii) List **two** other common uses of copper.

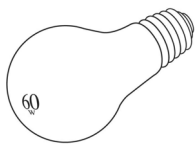
1.
2.

(o) The use of energy saving bulbs saves electricity. List **four** other ways to save energy in the home.



1.
2.
3.
4.

(p) (i) Filament bulbs produce light by heating a(n):



Ceramic Coil	
Tungsten Coil	
Brass Coil	
Aluminium Coil	

(ii) How would you conserve energy in the school workshop?

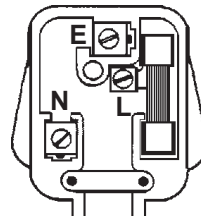


(q) (i) The current supplied by a battery is called:



Direct Current	
Alternating Current	
Electrical Energy	

(ii) Name each terminal:



L	
N	
E	

(a)

(i) Dead mild steel contains the following amount of carbon:

0.05% - 0.15%	
0.25% - 0.35%	
0.45% - 0.55%	

(v) A material is said to be ductile when it can be easily:

Stretched	
Fractured	
Melted	

(ii) High carbon steel is sometimes called:

Silver Steel	
Cast Steel	
Alloy Steel	

(vi) Plastic glazing is made from:

Phenolic Resins	
Nylon	
Acrylic	

(iii) Tin is a(n):

Ferrous Metal	
Non-Ferrous Metal	
Alloy	

(vii) Do thermosetting plastics soften when heated?

Always	
Never	
Sometimes	

(iv) Brass is an alloy of:

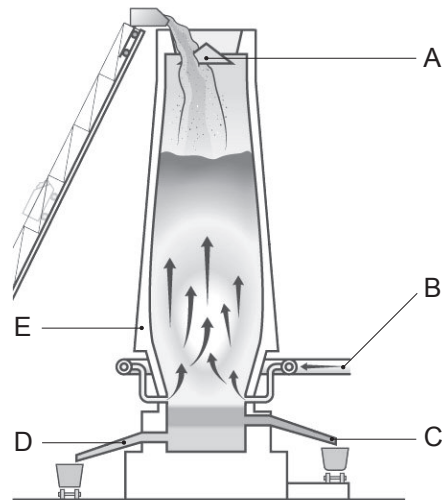
Copper & Tin	
Copper & Zinc	
Copper & Lead	

(viii) Galvanised iron is coated with:

Tin	
Zinc	
Lead	

(b) The diagram shows a Blast Furnace. Name **any three** of the parts labelled.

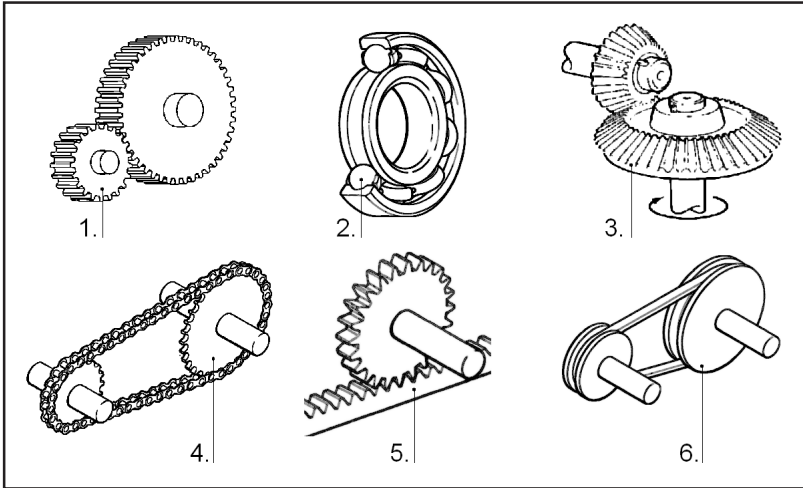
Part	Name
A	
B	
C	
D	
E	



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

Task	Tool
To draw a circle on a piece of metal.	<i>Dividers</i>
To draw a line at right angles to a straight edge.	
To locate the centre of a round bar.	
To hold a tap while cutting a thread.	
To accurately measure the diameter of a round bar.	
To hold small sheet metal parts while drilling.	
To remove large drills from a drilling machine.	

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



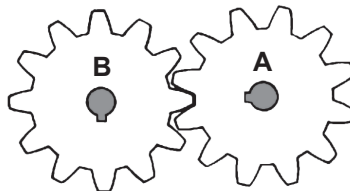
Mechanism Part	No.
Pulley	
Rack	
Sprocket	
Ball Bearing	
Spur Gear	
Bevel Gear	

(ii) What is a set of meshing gears called?

(b) (i) Complete the chart by listing devices that use the following mechanisms:

Mechanism	Device
Ratchet	
Screw Thread	
Crankshaft	
Cam	

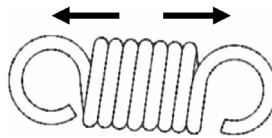
(ii) If gear 'A' rotates at 150 RPM how fast will gear 'B' rotate? (A = 12 Teeth, B = 12 Teeth.)



200 RPM	
100 RPM	
150 RPM	
50 RPM	

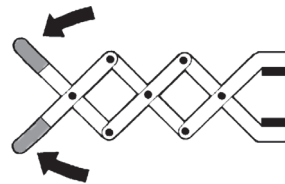
(iii) Can gears be made from nylon?

(c) (i) When pulled in the direction of the arrows the spring will be in:



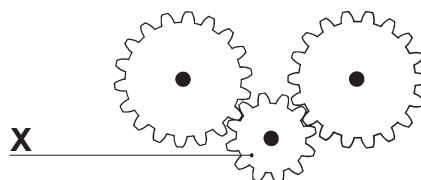
Tension	
Compression	
Torsion	
Shear	

(ii) A linkage is made up of several:

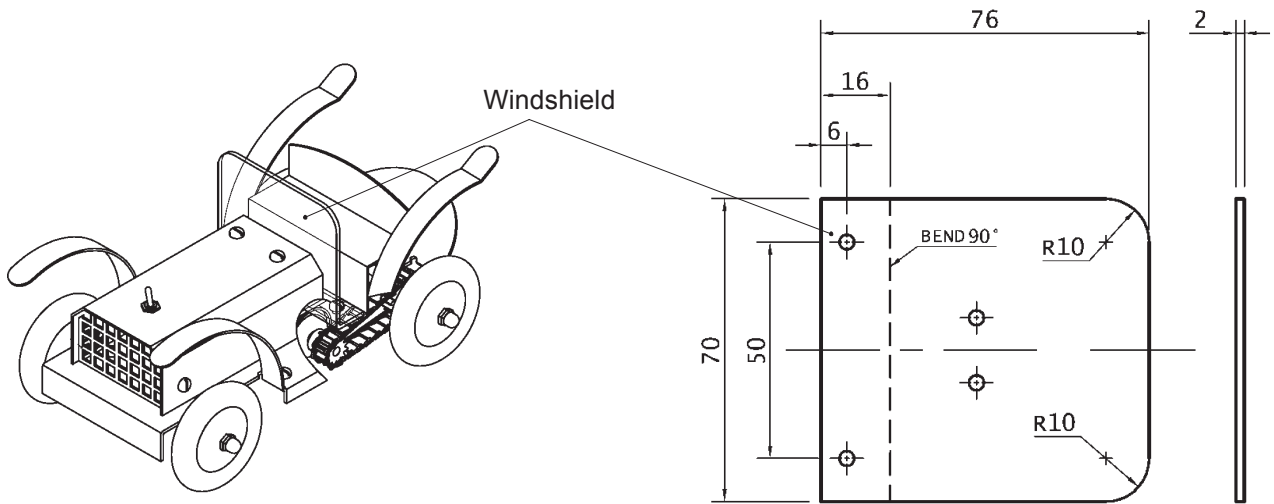


Levers	
Struts	
Ties	
Mechanisms	

(iii) Name gear 'X'.



Details of a windshield used in the manufacture of a model vintage car are shown.



(i) List the tools and processes used to make the windshield.

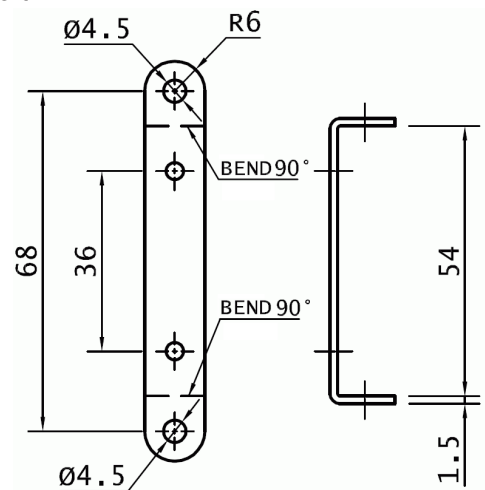
Tools:	Processes:

(ii) What does R10 refer to in the drawing?

(iii) Describe how you would get a smooth finish on the edge of the windshield.

(iv) What safety precautions should be observed when drilling sheet metal?

(v) Describe how you would safely drill the holes in the axle support.



(vi) What is the overall length of the axle support?

(vii) What is the overall width of the axle support?

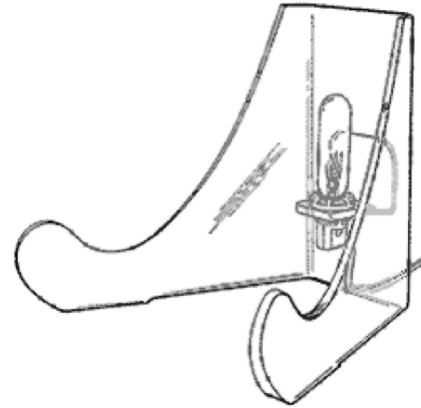
Axle Support

5.

20 Marks

(a) (i) A design for an illuminated display-stand is shown. The design uses a battery, a bulb and a switch. (The battery and switch are not shown.) Draw the electrical circuit diagram for this design.

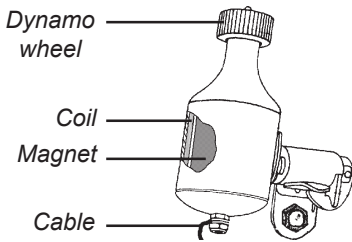
Draw the circuit in this box											



(ii) Complete the chart:

Resistance can be measured using a multimeter.	Yes	
	No	
A fuse is a safety device in an electrical circuit.	Yes	
	No	
Aluminium is an insulator.	Yes	
	No	
A car battery is made up of a number of cells joined together.	Yes	
	No	

(b) (i) Briefly describe how a bicycle dynamo works.



(ii) Name one famous Engineering inventor. Write a brief note about this person's invention.

Inventor's Name:
Invention:

(c) (i) Name any three electronic components.

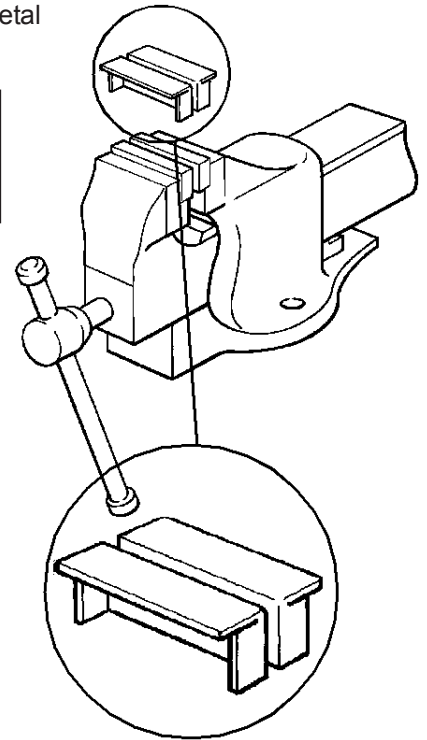
1.
2.
3.

(ii) List three devices that use electronic components.

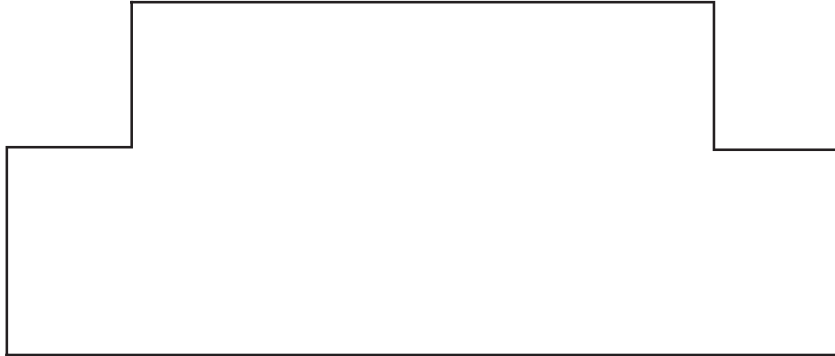
1.
2.
3.

- (i) This drawing shows a bench vice and a pair of vice clamps. Name a metal suitable for making these clamps. Give a reason for your choice.

Metal:
Reason:



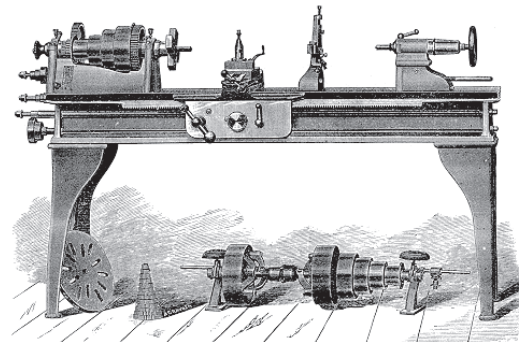
- (ii) The diagram below represents a blank piece of metal to be used to make **one** of the vice clamps. Complete the marking out to show where the bend lines should be located.



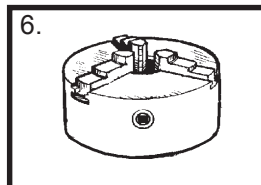
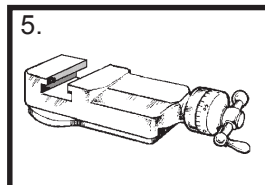
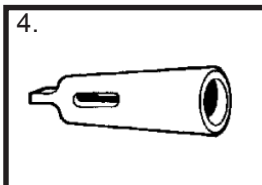
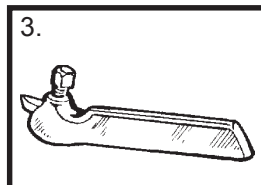
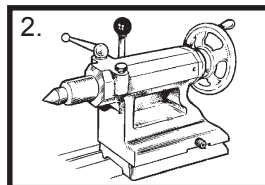
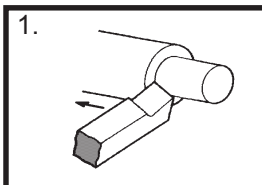
- (iii) Using the chart below describe **one** shaping process, **one** finishing process and name the tools used to make the vice clamps.

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

- (iv) List **two** features of a modern lathe that are not to be found in old lathes.



- (v) Match the number to the correct part.



Part	No.
Tool Bit	
Tool Holder	
Three-Jaw Chuck	
Tailstock	
Morse Taper Sleeve	
Top Slide	