An Roinn Oideachais agus Eolaíochta S56

JUNIOR CERTIFICATE EXAMINATION, 2001

MATERIALS AND TECHNOLOGY 5377

METALWORK - ORDINARY LEVEL

100 Marks

Tuesday, 19 June, Afternoon, 2.00 to 3.30

Centre Number

Examination Number

For Examiner	
Total Mark	
Question	Mark
1A	
1B	
2	
3	
4	
5	
6	
Total	
Grade	

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.

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)	

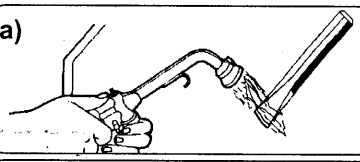
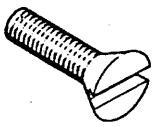
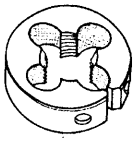
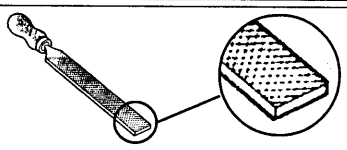
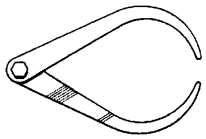
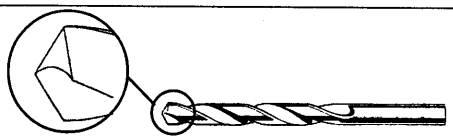
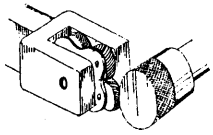
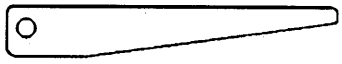
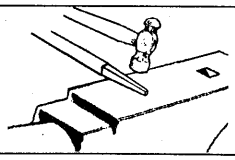
Note: The mark in row 3 (or row 5 if an Irish Bonus is awarded) must equal the mark in the Total Mark box on the script

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

1.

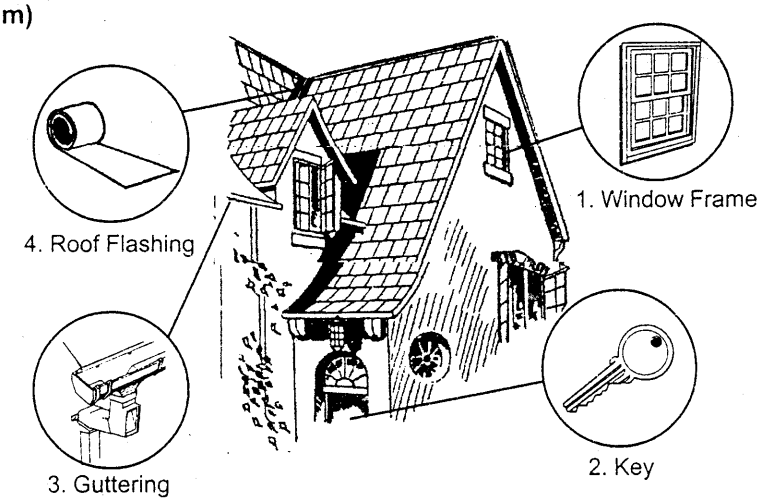
SECTION A - 20 MARKS
ANSWER ANY TEN QUESTIONS FROM THIS SECTION

40 Marks

(a) 	*After hardening, cold chisels should be:*	Annealed Enamelled Tempered Normalised	
(b) 	*This fastener is a:*	Grub Screw Cheese Head Screw Round Head Screw Countersunk Screw	
(c) 	*This cutting tool is a:*	Die Nut Split Die Hand Reamer Centre Drill	
(d) 	*This tool is a:*	Round File Half-Round File Square File Flat File	
(e) 	*This sign warns of a(n):*	Toxic Hazard Fire Hazard Radiation Hazard Electrical Hazard	
(f) 	*This instrument is a(n):*	Vernier Calipers Inside Calipers Outside Calipers Odd-leg Calipers	
(g) 	*The point angle of a standard twist drill is:*	118° 150° 210° 60°	
(h) 	*This lathe technique is called:*	Parting Off Undercutting Knurling Facing	
(i) 	*This tool is a(n):*	Adjustable Spanner Box Spanner Ring Spanner Open Spanner	
(j) 	*This tap is used to cut:*	Acme Threads Square Threads ISO Metric Threads Buttress Threads	
(k) 	*This tool is used with a:*	Brazing Hearth Power Saw Forge Drilling Machine	
(l) 	*This forging technique is called:*	Drawing Down Forming an Eye Upsetting Punching	

SECTION B - 20 MARKS
ANSWER ALL QUESTIONS FROM THIS SECTION

(m)



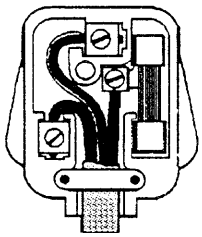
(i) Complete this chart by naming a non-ferrous metal suitable for each part:

Part	Non-Ferrous Metal
1. Window Frames	
2. Key	
3. Guttering	
4. Roof Flashing	

(ii) Name a plastic material suitable to make both the window frame and the guttering.

4 Marks

(n)



(i) The earth wire is colour coded:

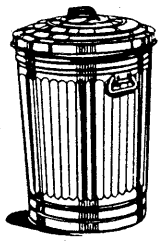
Red	
Brown	
Green/Yellow	
Blue	

(ii) Household electricity uses:

100V AC	
160V AC	
220V AC	
540V AC	

4 Marks

(o)



(i) Galvanised iron is mild steel coated with:

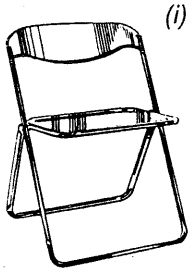
Zinc	
Tin	
Copper	
Silver	

(ii) Which one of the following is an alloy?

Iron	
Copper	
Zinc	
Solder	

4 Marks

(p)



(i) Metal camping chairs are lightweight because they are made from:

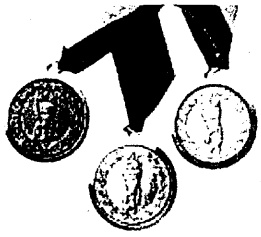
Solid Section	
Tubular Section	
Triangular Section	
Square Section	

(ii) A lever pivots about a fixed point called a:

Structure	
Fulcrum	
Linkage	
Caliper	

4 Marks

(q)



(i) Olympic medals are made from:

Silver, Gold, Pewter	
Zinc, Gold, Silver	
Silver, Bronze, Gold	
Tin, Gold, Silver	

(ii) Which of the following metals is the best conductor of heat?

Mild Steel	
Cast Iron	
Copper	
High Carbon Steel	

4 Marks

2. **20 Marks**

(a)

(i) **Complete the chart:**

Plastic Material	Thermosetting or Thermoplastic	List a use for each plastic
Polyurethanes	*Thermosetting*	*Flexible foam for upholstery*
Polythene		
Acrylic		
Nylon		

(ii) **The ability of a metal to withstand wear is called:**

Elasticity	
Hardness	
Brittleness	
Malleability	

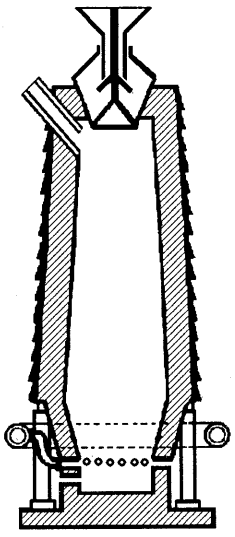
8 Marks

(b) Complete the chart:

(i) **Is the melting of a glass powder onto copper called enamelling?**	**Yes**	
	No	
(ii) **Is hollowing a method used to form copper bowls?**	**Yes**	
	No	
(iii) **Does copper work harden?**	**Yes**	
	No	
(iv) **Is repoussé the method used to produce raised designs in copper?**	**Yes**	
	No	
(v) **Does copper rust?**	**Yes**	
	No	
(vi) **Does engraving involve the use of acid?**	**Yes**	
	No	

6 Marks

(c) Complete the chart:



(i) **Does this furnace produce Pig Iron?**	**Yes**	
	No	
(ii) **Does molten metal form part of the charge for this furnace?**	**Yes**	
	No	
(iii) **Is this a Basic Oxygen Furnace?**	**Yes**	
	No	
(iv) **Is hot air blown through the tuyeres of this furnace?**	**Yes**	
	No	
(v) **Can this furnace be tilted to pour the molten metal?**	**Yes**	
	No	
(vi) **Does molten metal fall to the bottom of this furnace?**	**Yes**	
	No	

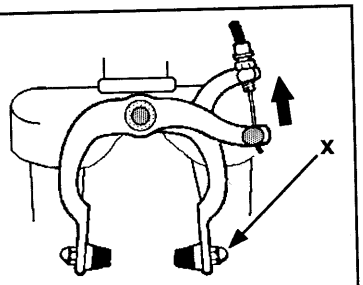
6 Marks

20 Marks

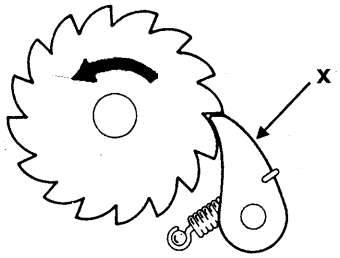
3.

(a) (i) Indicate with an arrow the direction of movement of part 'X' in each of the following:

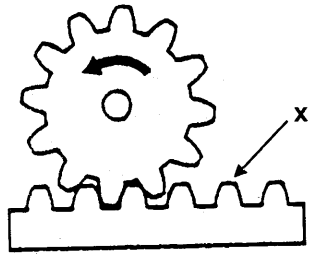
1.



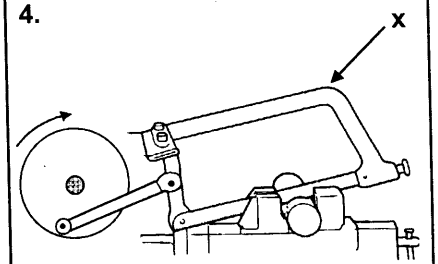
2.



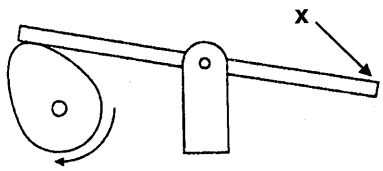
3.



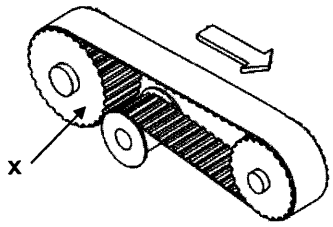
4.



5.



6.

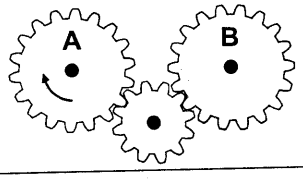


(ii) Name a machine that uses a rack and pinion mechanism.

8 Marks

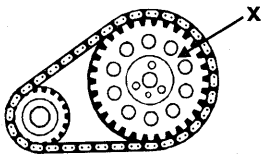
(b) Answer the following:

(i) Is gear 'B' turning anti-clockwise?



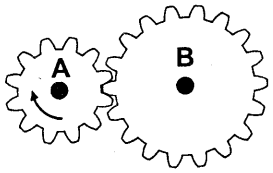
Yes	
No	

(ii) Is part 'X' called a rachet?



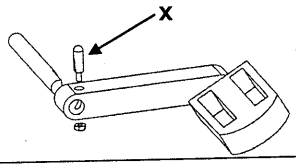
Yes	
No	

(iii) Does gear 'B' turn faster than gear 'A'?



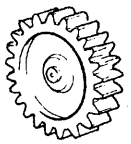
Yes	
No	

(iv) Is part 'X' called a cotter pin?



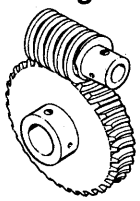
Yes	
No	

(v) Can gears be made from nylon?



Yes	
No	

(vi) Are these gears known as bevel gears?

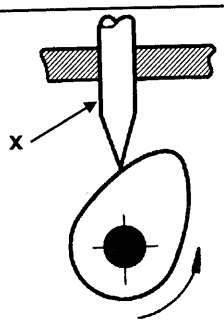


Yes	
No	

6 Marks

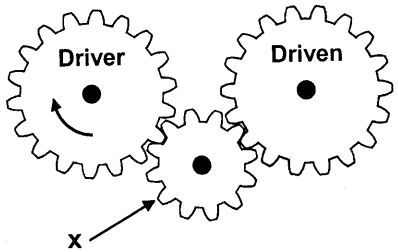
(c) Name the mechanism part indicated by 'X' in each of the following:

1.



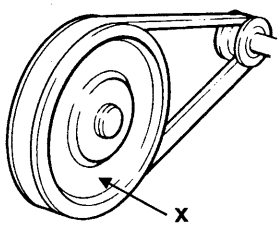
Name: _____

2.



Name: _____

3.

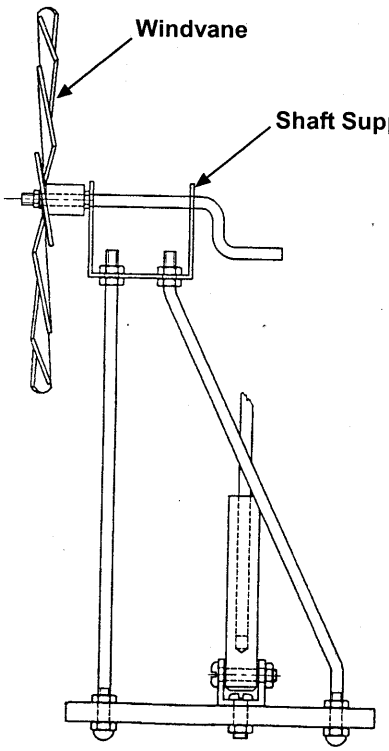


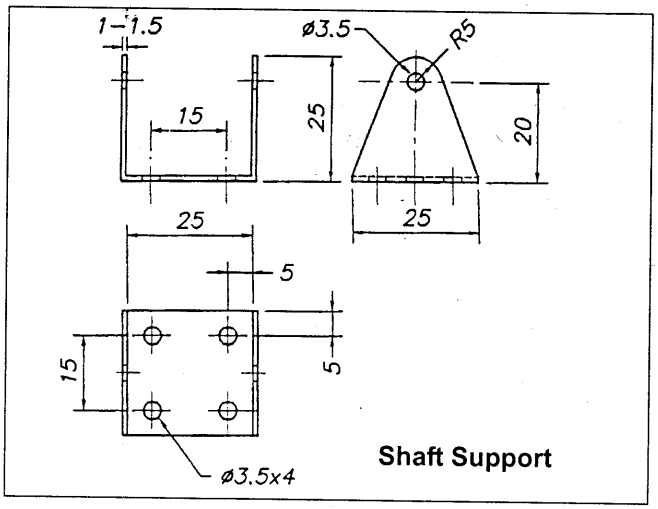
Name: _____

6 Marks

4. **20 Marks**

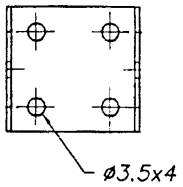
Details of a Wind-Powered Pump are shown.



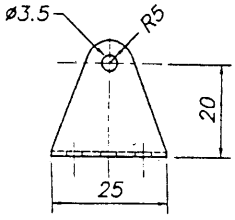


(i) List the steps involved in making the Shaft Support from a blank piece of metal.

(ii) What does 'ø3.5x4' refer to in this drawing?



(iii) What is the overall height of the Shaft Support?



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

(v) The Windvane is to be made from brass, copper or aluminium. What have these metals got in common?

12 Marks

(vi) Draw a development of the Shaft Support in the grid below.

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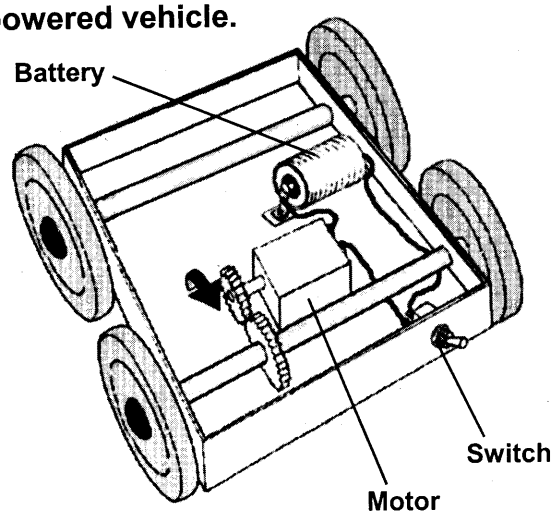
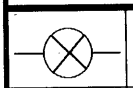
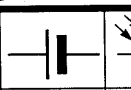
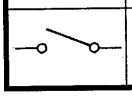
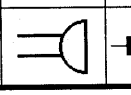
8 Marks

5. **20 Marks**

(a) (i) Select the correct symbols from the chart and complete the electrical circuit diagram for this motor powered vehicle.



Symbols		
		
		

Draw the circuit in this box

(ii) Does a battery supply A.C. current?

Yes		No	

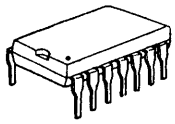
(iii) Does a motor convert electrical energy into mechanical energy?

Yes		No	

8 Marks

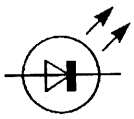
(b)

(i) This electronic component is a(n):



Resistor	
Buzzer	
Integrated Circuit (IC)	
Transistor	

(ii) This symbol represents a(n):



Switch	
LDR	
LED	
Bulb	

(iii) Complete the chart:

Can the speed of an electric motor be changed?	Yes	
	No	
Does solder, used for electronics, contain flux.	Yes	
	No	

6 Marks

(c) Complete the chart by matching the inventor to the invention.

Inventors: Rudolf Diesel, John P. Holland, James Watt, Nicholas Otto, John Dunlop, Alexander Graham Bell

Invention	Inventor
1. Diesel Engine	
2. Submarine	
3. Four Stroke Engine	
4. Pneumatic Tyre	
5. Steam Engine	
6. Telephone	

6 Marks

6. **20 Marks**

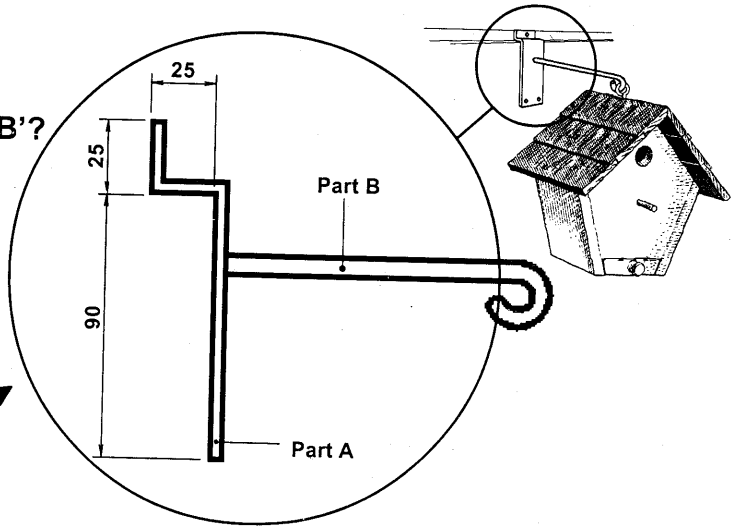
This drawing shows details of a mild steel wall bracket for a bird house.

(i) **What is the total length of part 'A'?**

(ii) **How would you join part 'A' to part 'B'?**

(iii) **How would you prevent the wall bracket from rusting?**

(iv) **Give details on this drawing of how the wall bracket could be strenghtened.**

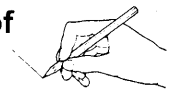


(v) **Does mild steel contain between 0.15% - 0.30% carbon?** Yes ☐ No ☐

(vi) **Briefly describe how the hook at the end of part 'B' could be formed.**

12 Marks

(vii) **Draw full size, in the box below, a complete development of part 'A' showing all bend lines. (Width of part 'A' = 50mm)**



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8 Marks