An Roinn Oideachais agus Eolaíochta S56

2657

JUNIOR CERTIFICATE EXAMINATION, 2002

MATERIALS AND TECHNOLOGY

METALWORK - ORDINARY LEVEL

100 Marks

Tuesday, 18 June, Afternoon, 2.00 to 3.30

MARKING SCHEME

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.

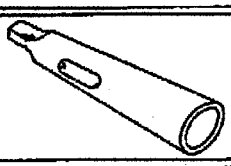
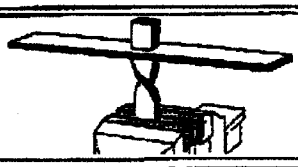
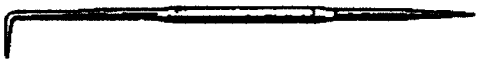
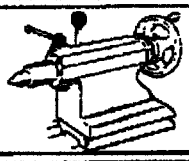
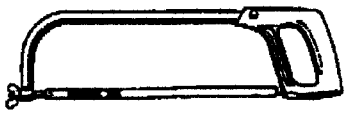
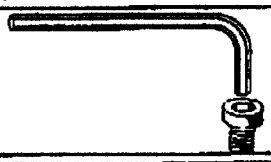
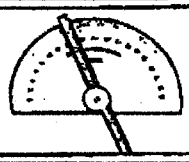
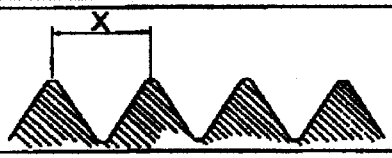
1. Total of end of page totals	
2. Aggregate total of all disallowed question(s)	
3. Total mark awarded (1 minus 2)	
4. Bonus mark for answering through Irish (if applicable)	
5. Total mark awarded if Irish Bonus (3+4)	
Note: The mark in row 3 (or row 5 if an Irish Bonus is awarded) must equal the mark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

(a) 	*This cutting tool is a:*	Curved Snips	√
		Straight Snips	
		Universal Snips	
		Bench Shears	
(b) 	*This tool is used when :*	Riveting	
		Drilling	√
		Threading	
		Soldering	
(c) 	*This soldering iron bit is made from:*	Brass	
		Copper	√
		Lead	
		Steel	
(d) 	*This technique is called:*	Scrolling	
		Forming	
		Twisting	√
		Bending	
(e) 	*This scriber is made from:*	Mild Steel	
		Cast Iron	
		High Carbon Steel	√
		Tin	
(f) 	*This tool is a:*	Die Stocks	√
		Tap Wrench	
		Split Die	
		Taper Tap	
(g) 	*This lathe part is a:*	Headstock	
		Tailstock	√
		Centre	
		Carriage	
(h) 	*Hacksaw blades are made from:*	Mild Steel	
		Stainless Steel	
		High Speed Steel	√
		Cast Iron	
(i) 	*This tool is a(n):*	Box Spanner	
		Ring Spanner	
		Allen Key	√
		Open Spanner	
(j) 	*This instrument is a(n):*	Thread Gauge	
		Feeler Gauge	
		Engineers Protractor	√
		Wire Gauge	
(k) 	*Part 'X' is called the:*	Sleeve	
		Thimble	√
		Frame	
		Ratchet	
(l) 	*The distance 'X' is called the :*	Flank	
		Lead	
		Pitch	√
		Crest	

SECTION B - 20 MARKS
ANSWER ALL QUESTIONS FROM THIS SECTION

(m)

(i) Complete the chart by listing a different material for each part:

Part	Material
1. Body	Steel\Plastic
2. Headlight Lens	Glass
3. Soft Roof	Plastic\Canvas
4. Wheels	Steel\Aluminium

3

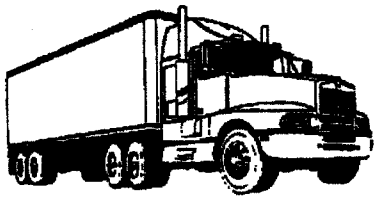
(ii) How can steel be protected against rust?

Galvanize\Paint

1

4 Marks

(n)



(i) Truck engines are powered by:

Unleaded Petrol	
Leaded Petrol	
Diesel	√
Gas	

2

(ii) Truck engines are lubricated using:

Oil	√
Air	
Water	
Cooling Fluid	

2

4 Marks

(o)

(i) This is a:

Drum Brake	
Disc Brake	√
Stirrup Brake	
Shoe Brake	

2

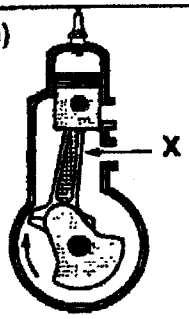
(ii) The steam engine was invented by:

Henry Ford	
James Watt	√
John P. Holland	
Rudolf Diesel	

2

4 Marks

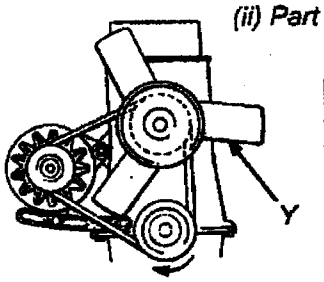
(p)



(i) Part 'X' is called the:

Camshaft	
Connecting Rod	√
Piston	
Crankshaft	

2



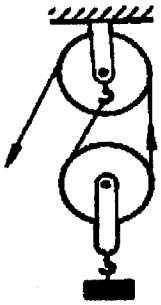
(ii) Part 'Y' is called the:

Fan Belt	
Alternator	
Cooling Fan	√
Crankshaft Pulley	

2

4 Marks

(q)



(i) The load is lifted using:

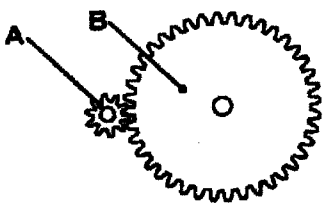
Levers	
Pulleys	√
Gears	
Chain and Sprocket	

2

(ii) If gear 'A' rotates at 40 RPM, how fast will gear 'B' rotate?
(A = 10 Teeth, B = 40 Teeth.)

10 RPM

2



4 Marks

2. **20 Marks**

(a) (i) Complete the chart:

Plastic Material	Thermosetting or Thermoplastic	List two uses for each plastic Any four correct answers (4 x 1)	
PVC	*Thermoplastic*	*(i) Pipes*	*(ii) Windows*
Acrylic	Thermoplasti	(i) Windows	(ii) Baths
Nylon	Thermoplastic	(i) Bearings	(ii) Clothes

(ii) Complete the chart:

Metals	Ferrous or Non - Ferrous	List two uses for each metal Any four correct answers (4 x 1)	
Brass	*Non-Ferrous*	*(i) Screws*	*(ii) Door Handles*
Mild Steel	Ferrous	(i) Gates	(ii) Furniture
Copper	Non-Ferrous	(i) Pipes	(ii) Soldering Iron

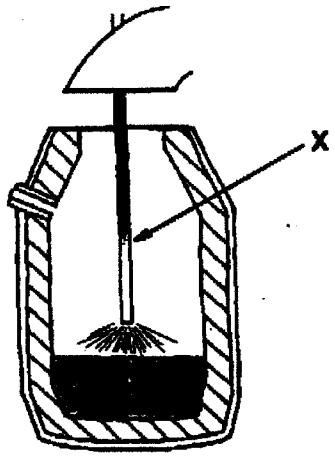
8 Marks

(b) Complete the chart: 6 x 1 mark

(i)	Is Lead a hard material?	Yes	
		No	√
(ii)	Is Iron Ore mined from the ground?	Yes	√
		No	
(iii)	Is brittleness the ability of a material to resist wear?	Yes	
		No	√
(iv)	Is Copper a malleable material?	Yes	√
		No	
(v)	Is Cast Iron produced in the Electric Arc Furnace?	Yes	
		No	√
(vi)	Are Ferrous metals magnetic?	Yes	√
		No	

6 Marks

(c) (i) Name this steel making furnace: Basic Oxygen Furnace 2



(ii) Part 'X' is called the:

Arc	
Oxygen Lance	√
Charge	
Electrode	

2

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

Aluminium	
Zinc	
Bronze	√
Copper	

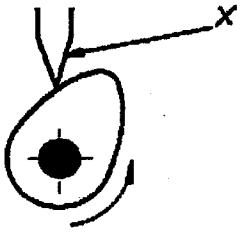
2

6 Marks

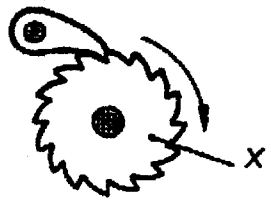
3. **20 Marks**

(a) (i) Name the part of the mechanism marked 'X' in each box. 6 x 1 mark

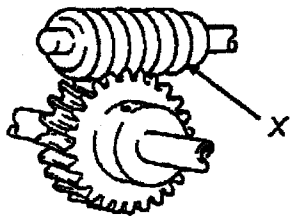
Name: Follower



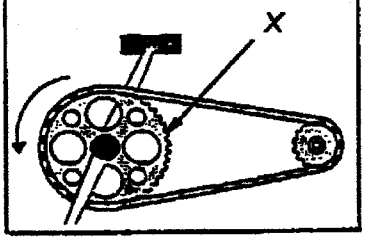
Name: Ratchet



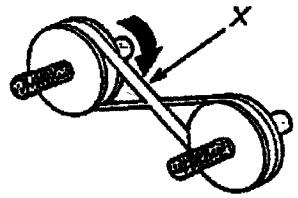
Name: Worm



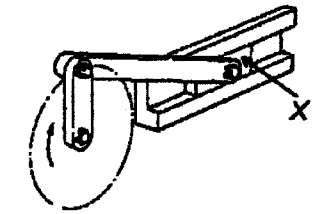
Name: Sprocket



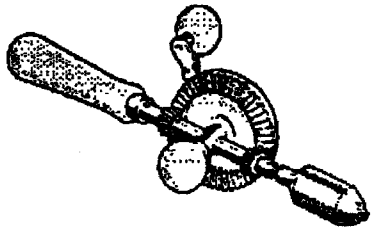
Name: Belt



Name: Slider



(ii) This hand drill uses:

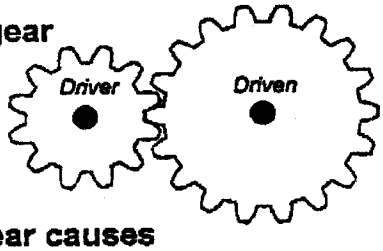


Spur Gears	
Bevel Gears	√
Ratchets	
Pulleys	

2

8 Marks

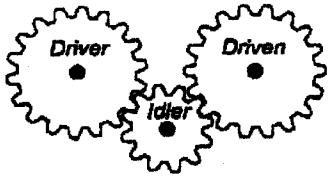
(b) (i) The driven gear rotates:



at the same speed as the driver.	
slower than the driver.	√
faster than the driver.	

2

(ii) The idler gear causes the driven gear to:



rotate in the same direction as the driver.	√
go slower.	
go faster.	

2

(iii) Name a machine in the school workshop that uses gears:

Lathe or Drill

2

6 Marks

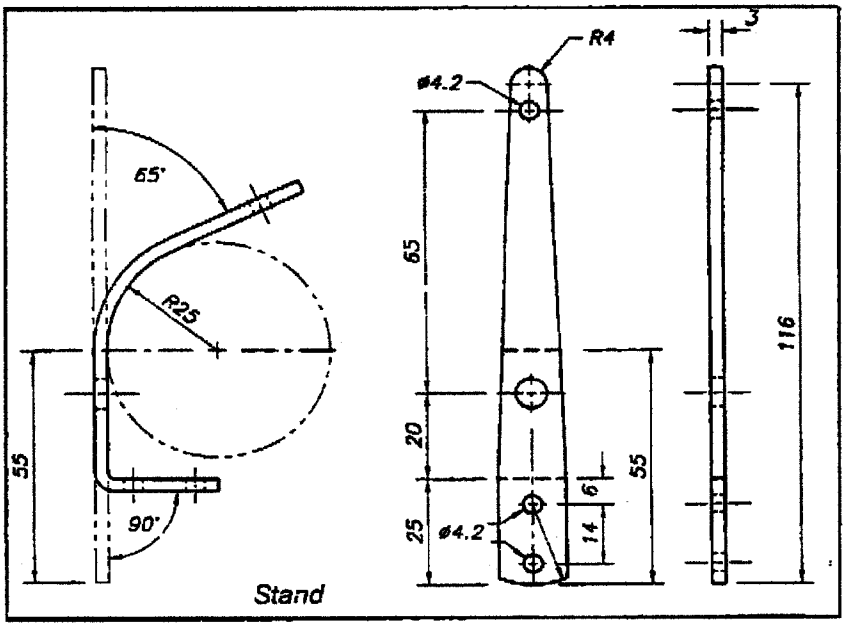
(c) (i) Complete the chart by naming the inventors: 2 marks each - any three correct

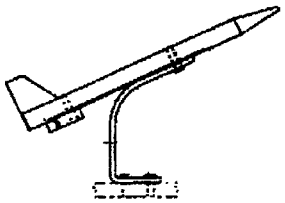
INVENTION	INVENTOR
1. Pneumatic Tyre	John Dunlop
2. Telephone	Alexander Graham Bell
3. Mass Production	Henry Ford
4. Submarine	John P. Holland

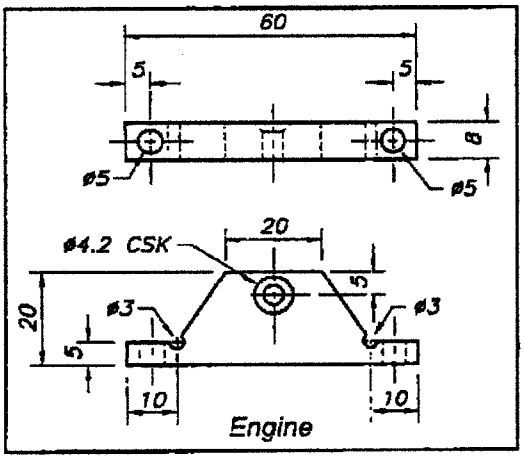
6 Marks

4. **20 Marks**

Details of a model jet are shown.







(i) **State the steps involved in making the stand from a blank piece of metal.**

Marking out, Drilling, Cutting, Filing, Bending. 4

(ii) **Briefly explain how the engine is made.**

Mark out
Drill holes and countersink
Cut and file to shape 4

(iii) **What does 'CSK' refer to in the drawing of the engine shown above?**

Drill a countersunk hole 2

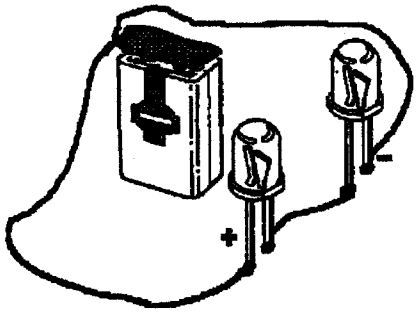
(iv) **What is the overall width and height of the engine?**

60mm x 20mm or 60mm x 8mm 2

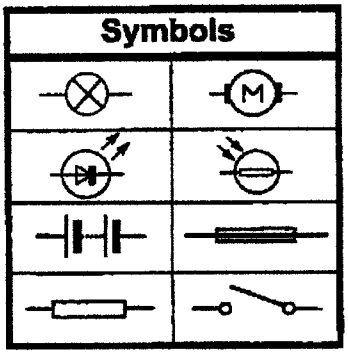
(v) **What is the difference between a pilot hole and a tapping hole?**

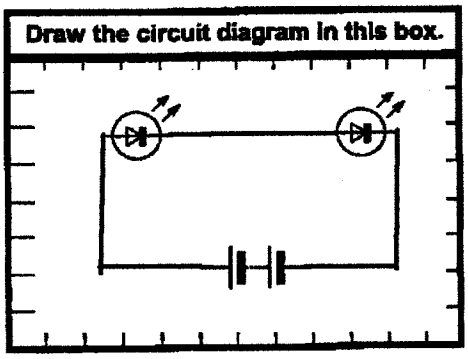
Pilot hole - hole drilled before a larger hole
Tapping hole - hole drilled before tapping a hole. 4

(vi) **Select the correct symbols from the chart and draw the circuit diagram for the model jet.**



Circuit for the model jet.





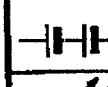
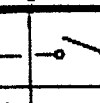
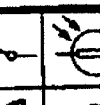
4

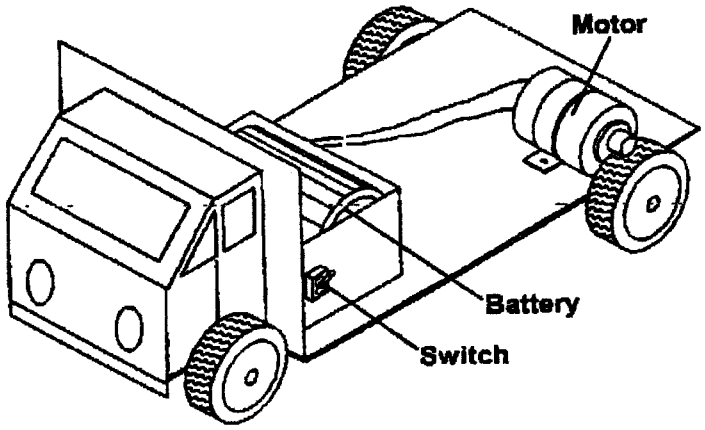
Symbols (3 x 1) Complete circuit 1

5. **20 Marks**

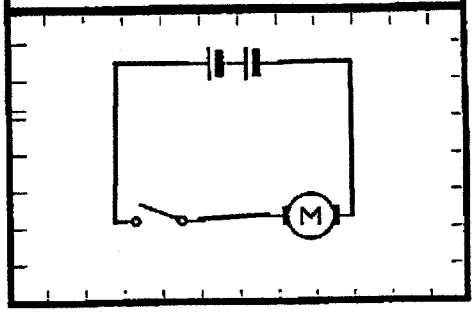
(a) Select the correct symbols from the chart and complete the electrical circuit diagram for this motor driven truck.

Symbols 2 marks x 3
2 marks - circuit

Symbols		
		
		

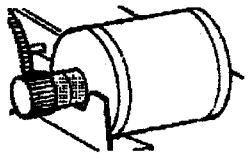


Draw the circuit in this box

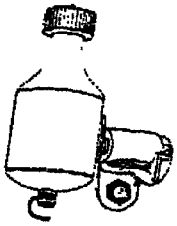


8 Marks

(b) (i) Briefly explain the <u>difference</u> between a motor and a dynamo.



Motor



Dynamo

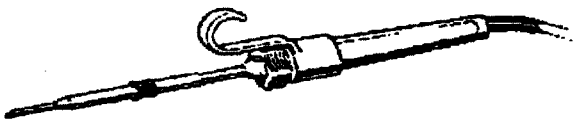
Motor is rotated by electricity

Dynamo makes electricity when rotated

4

2 x 2 marks

(ii) List two safety precautions to be observed when using an electric soldering iron.



Support on stand

Wear Goggles

4

2 x 2 marks

8 Marks

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

Resistor	√
LDR	
LED	
Transistor	

2

(ii) This symbol represents a:

Switch	√
Buzzer	
Loudspeaker	
Battery	

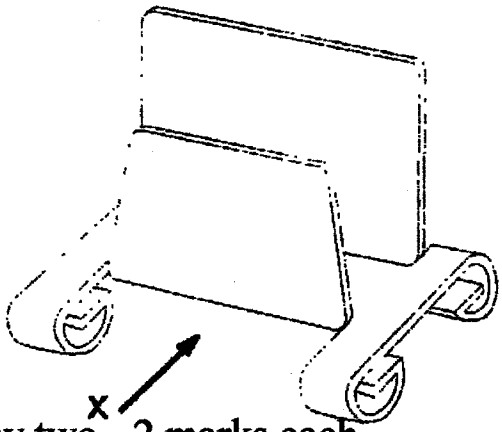
2

4 Marks

(i) **This design shows a Letter Rack made from brass.**
List three processes involved in making the letter rack.

1.	Marking Out
2.	Cutting
3.	Bending

2
2
2



(ii) **List three safety precautions that should be observed when working with brass sheet.**

1.	Wear Gloves
2.	Beware of sharp corners
3.	Support when drilling

Any two - 2 marks each

(iii) **Briefly describe how you would bend the legs to the required shape.**

Place in Jig/Scroll Former and bend to shape.

Bend in vice and bend around a bar/former

4

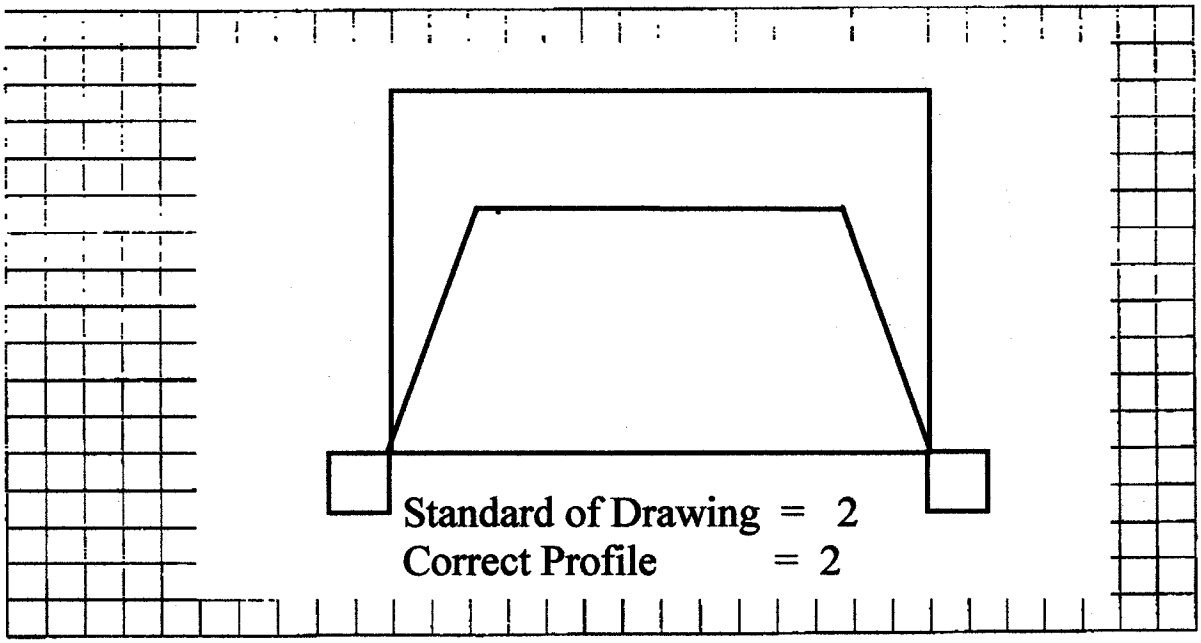
(iv) **Is brass an alloy?**

Yes	√
No	

2

(v) **Draw an elevation of the letter rack looking in the direction of arrow 'X' in the grid below.**

USE A PENCIL ONLY



Standard of Drawing = 2
Correct Profile = 2