2014. S56

Coimisiún na Scrúduithe Stáit
State Examinations Commission

JUNIOR CERTIFICATE EXAMINATION, 2014

METALWORK
MATERIALS AND TECHNOLOGY

ORDINARY LEVEL - 100 Marks

Tuesday 17 June, Afternoon 2:00 - 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.

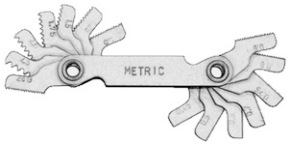
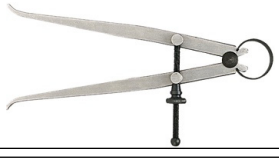
1. Total of end of page totals	
2. Aggregate total marks for all disallowed question(s)	
3. Total mark awarded (1 minus 2)	
4. Bonus mark for answering through Irish (if applicable)	
5. Total mark awarded if Irish Bonus is applied (3+4)	
Note: The mark in row 3 (or row 5 if an Irish Bonus is awarded)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

Question 1.

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

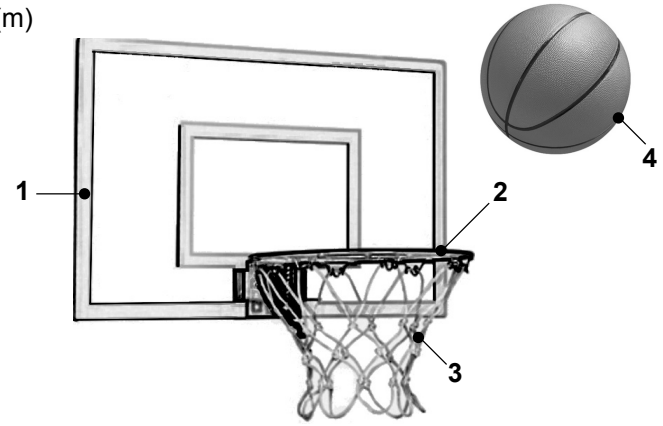
40 Marks

(a) 	Part 'X' is called the:	Anvil	
		Thimble	
		Ratchet	
		Spindle	
(b) 	This tool is a(n):	Adjustable Spanner	
		Open Spanner	
		Combination Spanner	
		Ring Spanner	
(c) 	The tip of a dot punch is normally ground to an angle of:	30 degrees	
		60 degrees	
		120 degrees	
		180 degrees	
(d) 	A tape rule can measure to an accuracy of:	1 mm	
		0.1 mm	
		0.01 mm	
		10 mm	
(e) 	This cutting tool is a:	Split Die	
		Stock	
		Taper Tap	
		Plug Tap	
(f) 	The picture shows a:	Vice Clamp	
		Pin Vice	
		Sliding Jaw	
		Hand Vice	
(g)  	This tool is a(n):	Square Bit	
		Phillips Bit	
		Slotted Bit	
		Allen Bit	
(h) 	This is a:	Panning Hammer	
		Cross Pein Hammer	
		Ball Pein Hammer	
		Soft Hammer	
(i) 	This fastener is a:	Bolt	
		Wing Nut	
		Round Head Screw	
		Countersunk Screw	
(j) 	This measuring tool is a:	Radius Gauge	
		Drill Gauge	
		Screw Pitch Gauge	
		Wire Gauge	
(k) 	This calipers shown is a(n):	Vernier Calipers	
		Odd-Leg Calipers	
		Outside Calipers	
		Inside Calipers	
(l) 	This tool is a:	Tap Wrench	
		Stillson Wrench	
		Adjustable Wrench	
		Channel Wrench	

SECTION B - 20 MARKS

ANSWER **ALL** QUESTIONS FROM THIS SECTION

(m)

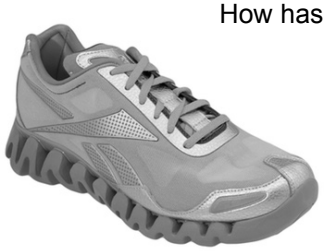


(i) Complete the chart.

Part	Material
1. Backboard	
2. Hoop	
3. Net	
4. Basketball	

(ii) How would you fix the hoop to the backboard?

(n)



How has the use of new materials improved the design of modern running shoes?

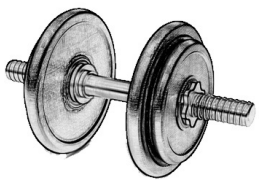
(o) (i) The ball pump gauge measures:

Heat	
Pressure	
Weight	
Density	

(ii) This stopwatch has a(n):

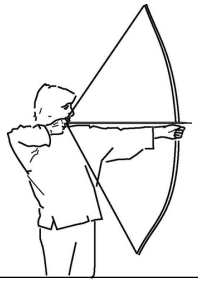
Analog Display	
Antique Display	
Transistor Display	
Digital Display	

(p) (i) Weight plates are normally made from:



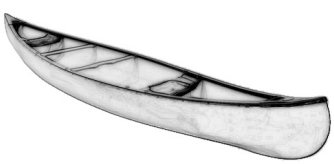
Cast Iron	
Aluminium	
Copper	
Brass	

(ii) The bow string is in:



Compression	
Tension	
Shear	
Torsion	

(q) (i) Canoes are made from:



Acrylic	
Fibreglass	
Polyethylene	
Polyurethane	

(ii) Olympic medals are made from:

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

Question 2. 20 Marks

(a)

(i) Plastic window frames are made from:

Acrylic	
PVC	
Polyester	

(ii) Galvanised iron is steel coated with:

Lead	
Zinc	
Aluminium	

(iii) Brass is an alloy of:

Copper & Tin	
Copper & Zinc	
Copper & Steel	

(iv) Cast Iron is a(n):

Brittle Material	
Plastic Material	
Elastic Material	

(v) A hand file is made from:

Mild Steel	
Medium Carbon Steel	
High Carbon Steel	

(vi) Plastics that can be softened when reheated are called:

Thermoplastics	
Thermosetting Plastics	
Soft Plastics	

(vii) Stainless steel is used to make:

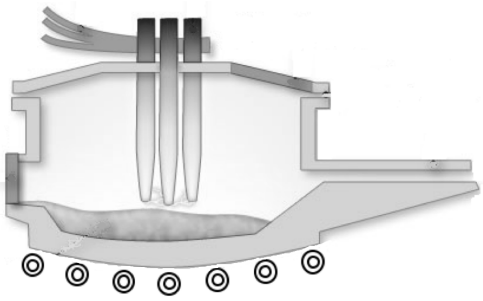
Soldering Iron Bits	
Kitchen Foil	
Cutlery	

(viii) Lead is a(n):

Ferrous Metal	
Non-Ferrous Metal	
Alloy	

(b) Complete the table:

(i) This furnace is used to produce pig iron.	Yes	
	No	
(ii) This furnace can be tilted.	Yes	
	No	
(iii) Heat is generated using electrodes.	Yes	
	No	



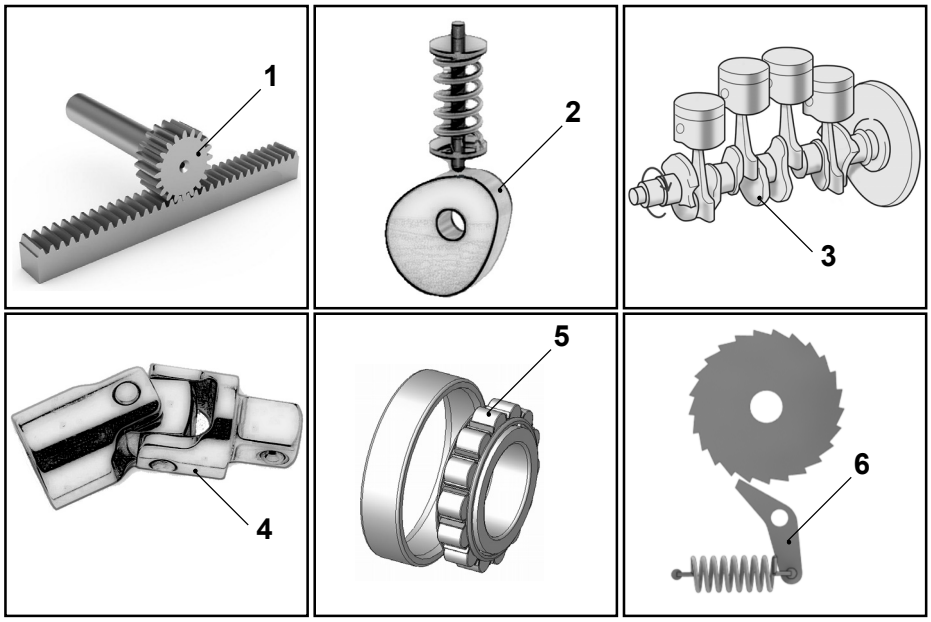
(iv) A water cooled lance is used to blow oxygen into this furnace.	Yes	
	No	
(v) Impurities in this furnace form to produce slag.	Yes	
	No	
(vi) Slag can be used as a fertilizer.	Yes	
	No	

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

Task	Tool
Measure the depth of a hole.	*Depth Gauge*
Draw an arc on a piece of metal.	
Measure the diameter of a hole.	
Clean a pinned file.	
Hold a hot metal bar when forging.	
Remove a pin from a hole.	
Cut sheet metal by hand.	

Question 3. 20 Marks

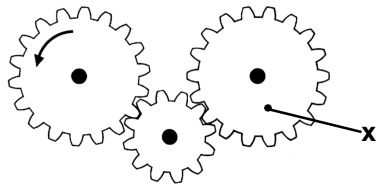
(a) (i) Match the number to the correct mechanism part.



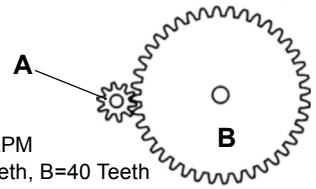
Mechanism	No.
Cam	
Pawl	
Universal Joint	
Roller Bearing	
Pinion	
Crankshaft	

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

(b) (i) Indicate the direction of gear 'X'.



(ii) Gear 'B' rotates at:



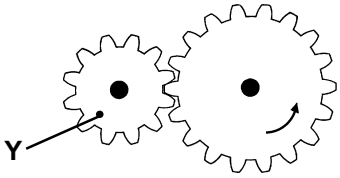
A=400 RPM
A=10 Teeth, B=40 Teeth

400 RPM	
100 RPM	
40 RPM	

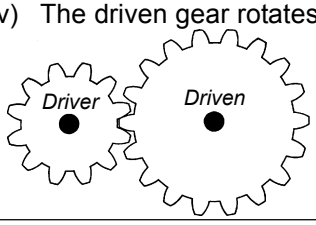
(iii) The motion of the Jigsaw blade is:

Reciprocating	
Linear	
Oscillating	

(iv) Indicate the direction of gear 'Y'.



(v) The driven gear rotates:



Faster	
Slower	
Same speed	

(vi) The motion produced when a swing moves is:

Reciprocating	
Linear	
Oscillating	

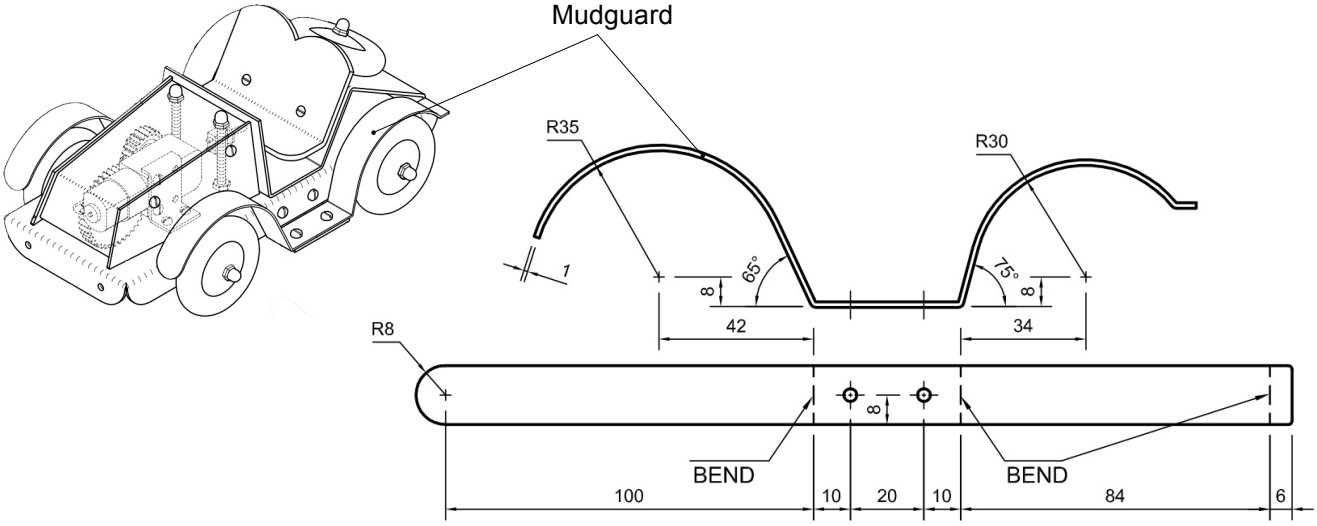
(c) Complete the table by naming devices that use the following mechanisms.

Mechanism	**Device**
Pulley	*Washing machine*
Bevel Gears	
Lever	
Screw Thread	
Sprocket	
Clutch	
Bell Crank	

Question 4.

20 Marks

Details of a mudguard used in the manufacture of a model grand tourer sports car are shown.



(i) Describe the stages involved in bending the mudguard to shape.

(ii) What is the overall length and width of the piece of metal used to make the mudguard?

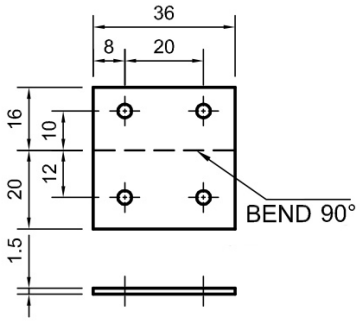
Length:

Width:

(iii) What tool would you use to check the 75° angle?

(iv) Describe how to apply a highly polished finish to the mudguard.

(v) Describe the stages involved in accurately marking out the mudguard support shown below.



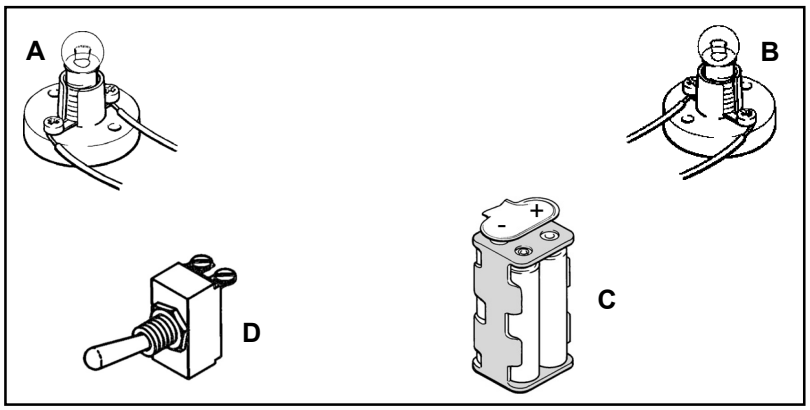
Mudguard Support

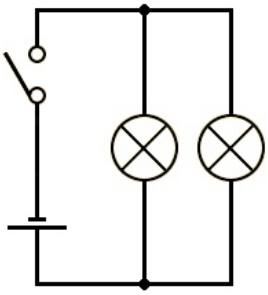
(vi) What precautions should be taken when drilling the mudguard support?

(vii) Describe how the wheels of the model grand tourer sports car are powered.

Question 5. 20 Marks

(a) (i) Using the circuit diagram as a reference, draw the connecting wires between the components **A**, **B**, **C** and **D** in the box below.





Circuit Diagram

(ii) Name the components shown above.

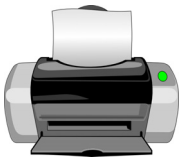
A	
C	
D	

(iii) What is the voltage output of the two batteries in series?

(b) (i) This cable is a(n):

Power Lead	
Audio Lead	
USB Lead	

(ii) A printer acts as a(n):



Output Device	
Input Device	
Process Device	

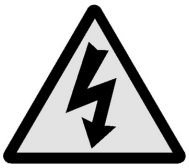
(iii) The device is a:

Hard Disk Card	
Memory Card	
Computer Card	

(iv) A toaster converts electrical energy into:

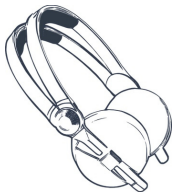
Solar Energy	
Chemical Energy	
Heat Energy	

(v) The safety sign warns of a(n):



Fire Hazard	
Chemical Hazard	
Electrical Hazard	

(vi) Headphones convert electrical energy into:



Light Energy	
Sound Energy	
Electrical Energy	

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

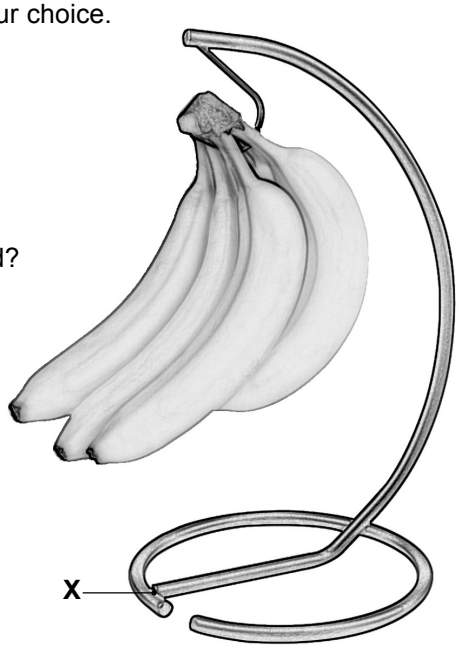
Inventor's Name:
Invention:

Question 6.

20 Marks

(i) This design shows a kitchen stand for holding a bunch of bananas.
Name a suitable metal to make the stand and give a reason for your choice.

Metal:
Reason:



(ii) What information would you need to know before making the stand?

(iii) How you would join the metal parts at point 'X'?

(iv) Describe how you would bend the stand to shape.

(v) Describe how would you would apply a finish to the stand.

(vi) Draw a more stable design for the kitchen stand shown in the grid below.