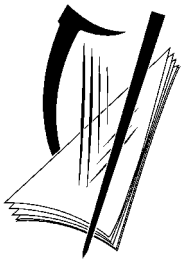


Coimisiún na Scrúduithe Stáit
State Examinations Commission

Junior Certificate 2014

Marking Scheme

Technology

Ordinary Level

Note to teachers and students on the use of published marking schemes

Marking schemes published by the State Examinations Commission are not intended to be standalone documents. They are an essential resource for examiners who receive training in the correct interpretation and application of the scheme. This training involves, among other things, marking samples of student work and discussing the marks awarded, so as to clarify the correct application of the scheme. The work of examiners is subsequently monitored by Advising Examiners to ensure consistent and accurate application of the marking scheme. This process is overseen by the Chief Examiner, usually assisted by a Chief Advising Examiner. The Chief Examiner is the final authority regarding whether or not the marking scheme has been correctly applied to any piece of candidate work.

Marking schemes are working documents. While a draft marking scheme is prepared in advance of the examination, the scheme is not finalised until examiners have applied it to candidates' work and the feedback from all examiners has been collated and considered in light of the full range of responses of candidates, the overall level of difficulty of the examination and the need to maintain consistency in standards from year to year. This published document contains the finalised scheme, as it was applied to all candidates' work.

In the case of marking schemes that include model solutions or answers, it should be noted that these are not intended to be exhaustive. Variations and alternatives may also be acceptable. Examiners must consider all answers on their merits, and will have consulted with their Advising Examiners when in doubt.

Future Marking Schemes

Assumptions about future marking schemes on the basis of past schemes should be avoided. While the underlying assessment principles remain the same, the details of the marking of a particular type of question may change in the context of the contribution of that question to the overall examination in a given year. The Chief Examiner in any given year has the responsibility to determine how best to ensure the fair and accurate assessment of candidates' work and to ensure consistency in the standard of the assessment from year to year. Accordingly, aspects of the structure, detail and application of the marking scheme for a particular examination are subject to change from one year to the next without notice.

Coimisiún na Scrúduithe Stáit
State Examinations Commission

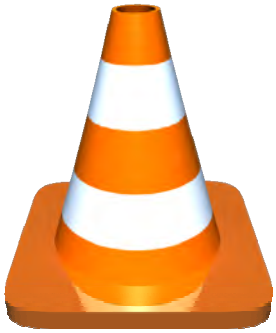
Junior Certificate Examination, 2014

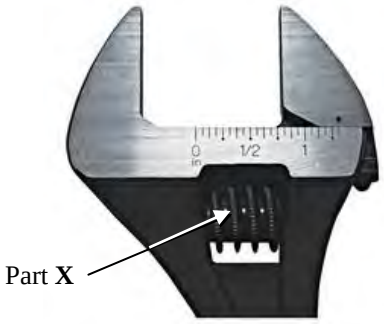
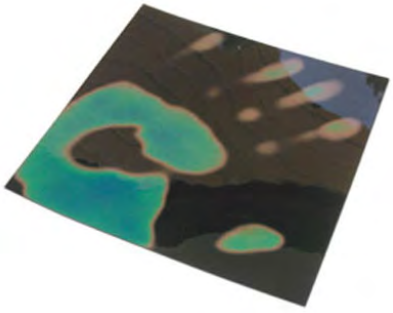
Technology

Ordinary Level

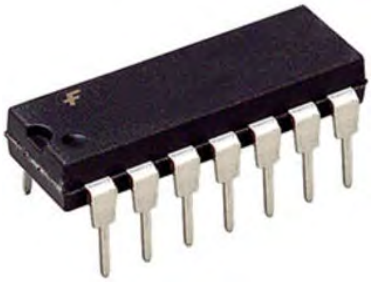
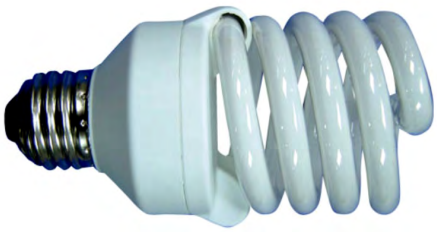
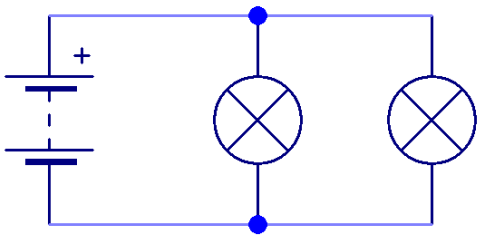
Marking Scheme

Section A – 80 Marks. Answer **any sixteen** questions in this section.

1. 	The traffic device shown is:	Cylindrical	
		Conical	5
		Pyramidal	
2. 	The capacity of an external hard drive is measured in:	Gigabytes	5
		Kilobytes	
		Bytes	
3. 	A software application that requires the use of a web-cam is:	Microsoft Word	
		Skype	5
		SolidWorks	
4. 	Plastic is used for electrical products because it is a/n:	Conductor	
		Capacitor	
		Insulator	5
5. 	The process of coating steel to prevent rusting is called:	Soldering	
		Galvanising	5
		Welding	

6. 	Rubber is used to make wristbands because it is:	Elastic	5
		Rigid	
		Ductile	
7.  Part **X**	Part **X** in the head of the adjustable wrench is:	A worm gear	5
		A spur gear	
		A bevel gear	
8. 	The item shown is a:	Drill bit	
		Countersink bit	
		Drill chuck	5
9. 	Thermo-chromic materials change colour in response to changes in:	Light	
		Temperature	5
		Sound	
10. 	LEDs are now used in torches because they:	Use very little energy	5
		They look good	
		They heat up	

11. 	The downward force produced by a house acting on the ground is:	Shear	
		Torsion	
		Compression	5
12. 	The items shown are:	Bevel gears	5
		Spur gears	
		Worm gears	
13. 	The **pistons** in an engine:	Reciprocate	5
		Oscillate	
		Rotate	
14. 	The force that converts the kinetic energy of a car to heat energy in the brakes is called:	Bending	
		Friction	5
		Tension	
15. 	The energy produced by devices such as solar cells is often referred to as:	Blue energy	
		Green energy	5
		Red Energy	

16. 	Micro-chips are often called ICs. IC stands for:	International Circuit	
		Integrated Circuit	5
		Internal Circuit	
17. 	This energy saving light bulb:	Has lower wattage than a standard light bulb.	5
		Has higher wattage than a standard light bulb.	
		Has the same wattage as a standard light bulb.	
18. 	The long leg of the capacitor is:	Negative	
		Positive	5
		Neutral	
19. 	The bulbs in this circuit are in:	Parallel	5
		Series	
		Neither of the above	
20. 	The pneumatic bicycle tyre was invented by:	Harry Ferguson	
		John Boyd Dunlop	5
		John Philip Holland	

Question 1

Section B – 80 Marks.
Answer **any two** questions from this section.

40 Marks

12 marks

(a) An image of a ring-throwing game is shown.

(i) Brass was selected as the material for the rod. Give a reason for this choice.

2 Reason: *Polished finish can applied, strong, does not rust.*

(ii) Name a suitable wood for the base and give a reason for your choice.

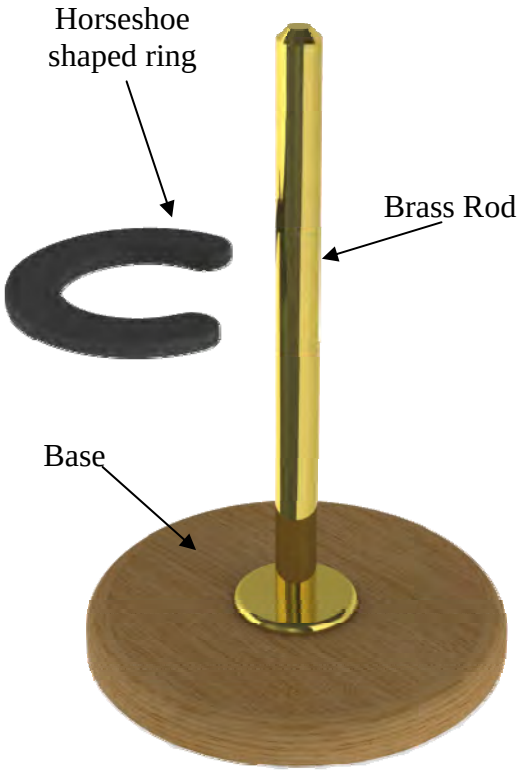
2 Wood: *Any hardwood*

2 Reason: *Durable, looks well, easily drilled.*

(iii) A ring is required that will not damage the wood or brass. Name a suitable material for the ring and state a property of this material.

3 Material: *Nylon, rubber, etc.*

3 Property: *Hard material*



Ring Throwing Game

8 marks

(b) (i) Name a tool that could be used to cut the thread at the end of the rod. Give a reason why a thread is a suitable method of joining the rod to the base.

2 Tool: *Stocks & Die*

Reason for using a thread:

3 *Easily assembled by user*

Brass Rod Thread

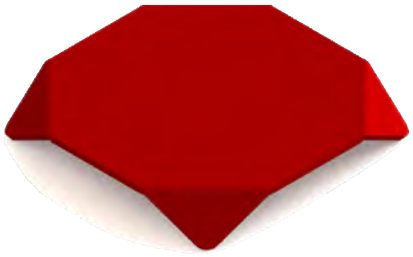
(ii) A large diameter base has been used. Suggest a reason for this.

3 Reason for large base: *To make the object stable*

Question 1

12 marks

(c) (i) An alternative base for the game is shown in which the four corners are folded downwards.
Name a suitable material for this base and explain the procedure for bending the corners.



Alternative Base

2 Material: *Acrylic*

Bending procedure:

4 *Description of bending with a strip heater.*

(ii) Make labelled sketches of an alternative method of joining the brass rod to the base shown above.

6

Joining Method

Quality of the sketches = 2max

No Attempt 0
Fair 2
Good 4
1
3

(d) The material for making the alternative base is shown.

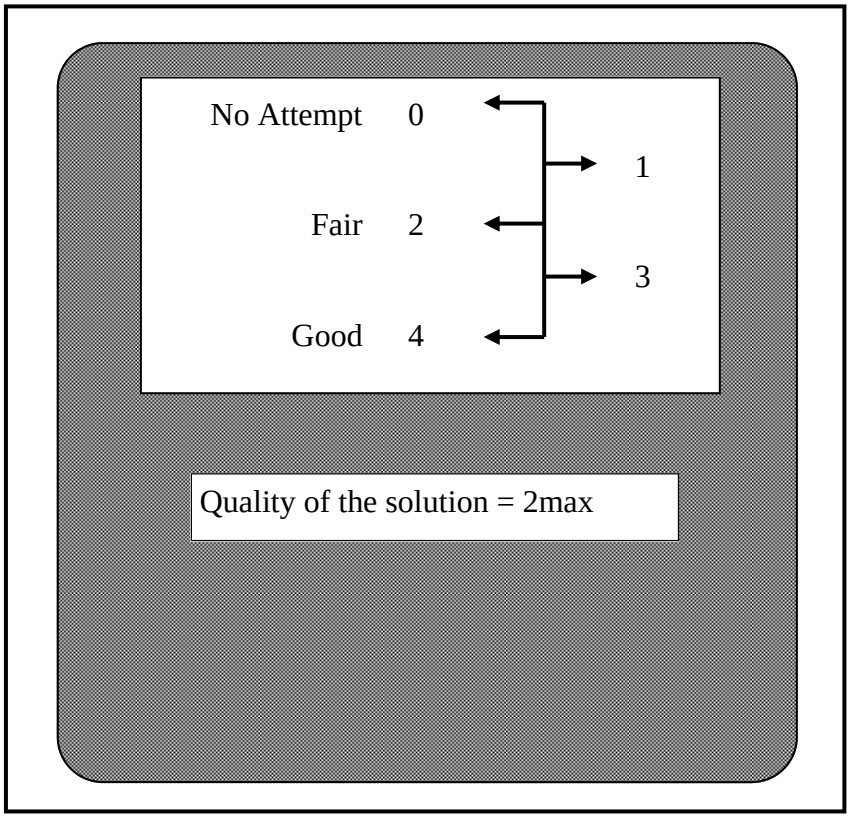
8 marks

6 (i) Draw in all the lines required for marking out the bends at the four corners.

(ii) The marking out of the bend lines at all four corners must be exactly the same. Give a reason for this.

Reason:

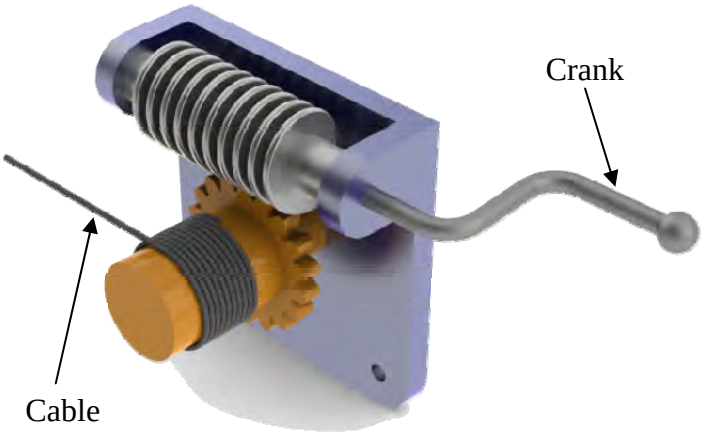
2 *Stability and related reasons*



Question 2 — 40 Marks

12 marks

(a) An image of a mechanism used for tensioning the net on a tennis court is shown.



Net Tensioner

(i) Give **two** reasons why this mechanism is suitable for this purpose.

3 1. *Crank can be turned easily*

3 2. *Will not slip when tensioned*

(ii) A crank handle is used to turn the mechanism. Name **two** other devices/mechanisms that use a crank handle.

2 Device 1: *Car jack*

2 Device 2: *Lathe*

(iii) To make it easier to turn the crank by hand, suggest one change that could be made to the mechanism.

2 Change: *Make the crank lever longer*

8 marks

(b) (i) A version of the above mechanism uses a motor instead of the crank handle. It also uses a double-pole double-throw slide switch (DPDT slide switch).
Give a reason why this DPDT slide switch is needed to control the motor.

4 Reason: *Forward and reverse motion*

Motor

(ii) Suggest a method of automatically stopping the motor when the net is fully tensioned.

4 Answer: *Limit switch*

DPDT Slide switch

Question 2

(c) The strings of a tennis racket are in tension. This is what makes the head of a tennis racket strong. *8 marks*

Name and sketch another item (from sport or elsewhere) that uses tension to make it strong.

2

Name = 2

6

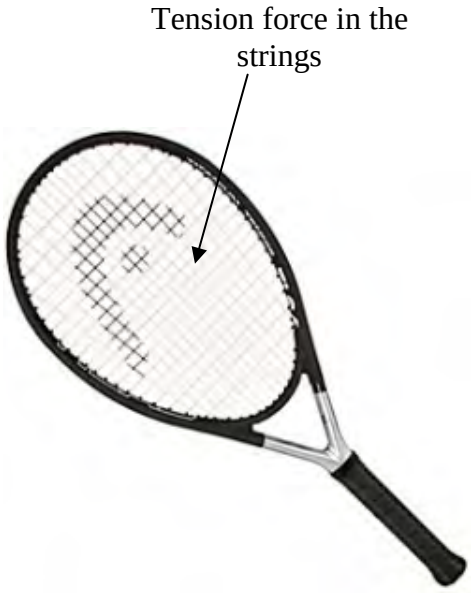
No Attempt 0

Fair 3

Good 6

1

4



Tennis Racket

(d) Old tennis rackets were made from wood. Today rackets are made from special plastics or carbon fibre. *6 marks*

Give **two** reasons why manufacturers stopped using wood to make the rackets.

3 Reason 1: *Difficult to manufacture*

3 Reason 2: *To reduce cost of manufacture*

Wooden Racket

(e) (i) Ash is used in the making of hurleys. Give **one** reason why ash is used. *6 marks*

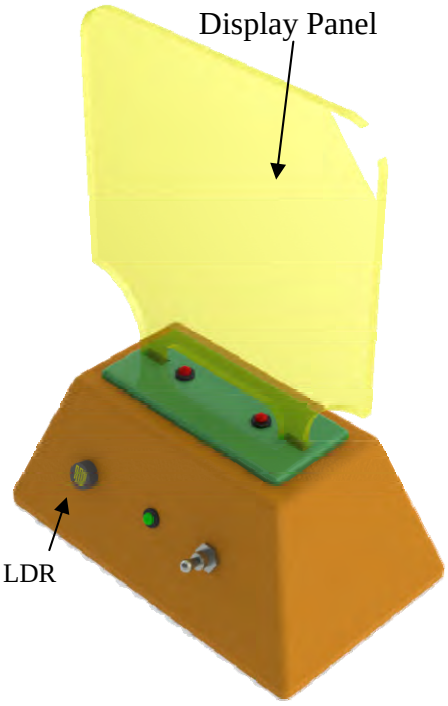
3 Answer: *Ash is a tough flexible wood*

3 (ii) Suggest **one** advantage of using wood for this purpose instead of plastic.

Advantage: *Plastic hurleys are more likely to cause injury*

Question 3 — 40 Marks

(a) A company producing solar panels wishes to give a child's nightlight to each of its customers for advertising purposes. Two LEDs light up a display panel on which is placed a logo representing the company. *12 marks*



Night Light

(i) The display panel is tinted.
Explain the term 'tinted'.

2 Answer: *Cannot see through the display panel*

(ii) An LDR is used in the control circuit of the nightlight.
Explain the term LDR and suggest why it is needed.

2 LDR: *Light Dependent Resistor*

2 Why it is needed: *To turn on lights at night*

(iii) Name a suitable material for the tinted display panel and give a reason for your choice.

3 Material: *Acrylic sheet*

3 Reason for choosing: *Lightweight, easily shaped*

(b) *8 marks*

(i) Half of the outline of the tinted display panel is shown. Complete the drawing of the display panel in the space provided.

4

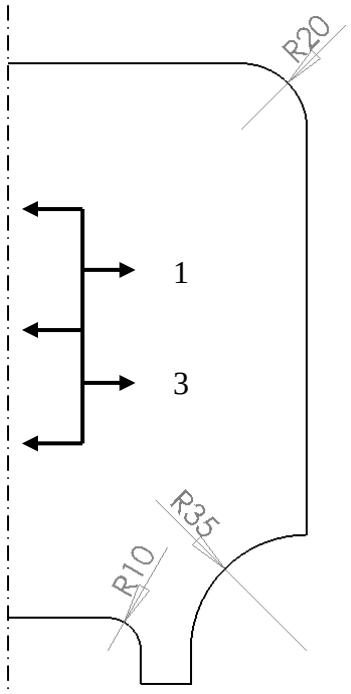
(ii) Two red LEDs light up the display panel. Explain the term LED.

2 LED: *Light Emitting Diode*

(iii) List **two** steps required to produce a smooth finish on the edges of the display panel.

1 Step 1: *File*

1 Step 2: *Polish*



No Attempt 0
1
Fair 2
3
Good 4

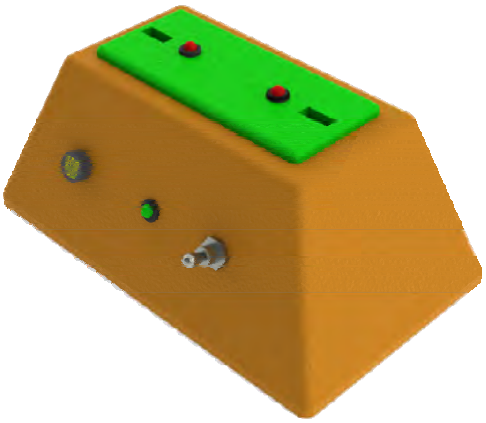
Question 3

12 marks

(c) (i) The circuit box of the night light is vacuum formed. In the space below make a sketch of the mould needed to form this shape.

6

No Attempt 0
Fair 3
Good 6
1
4



Circuit box

(ii) High Impact Polystyrene (HIP) is used to make the circuit box. List **two** important properties of this material that make it suitable for vacuum forming.

2 Property 1: _____

2 Property 2: _____

(iii) An LED is used on the front panel to act as a *pilot* light. What is the purpose of a pilot light?

2 Answer: _____

_____

8 marks

(d) The company producing the solar panels requires a logo to be etched into the tinted display panel. In the space below, make a sketch of your design for this logo.

8

Logo Design

No Attempt 0
Fair 4
Good 8
2
6
LOGO

Question 4 — 40 Marks

(a) *12 marks*

Electronic technology is playing an ever increasing role in sport. Describe **three** modern uses for this technology in sports.

4 1. *Goal line technology*

4 2. *Roving cameras*

4 3. *Electronic scoreboards*

(b) *12 marks*

(i) This rowing machine uses a chain drive.
Give **two** reasons for using a chain drive for this purpose.

3 Reason 1: *Does not slip*

3 Reason 2: *Efficient method of power transmission*

(ii) The seat on the rowing machine can glide back and forward in response to the movement of the person using it. Suggest a way of obtaining this smooth motion.

2 Answer: Mount seat in a slider mechanism

(iii) Name **two** other machines that use a chain drive.

2 Machine 1: *Bicycle* Machine 2: *Timing belt in a car*

(c) *16 marks*

(i) Suggest one possible advantage and one possible disadvantage of wind power generation.

4 Advantage: *Produces green energy*

4 Disadvantage: *Can look unsightly*

(ii) Give **two** reasons why carbon fibre is now being used to make the blades of wind turbines.

4 Reason 1. *Strong*

4 Reason 2. *Lightweight*