



Coimisiún na Scrúduithe Stáit
State Examinations Commission

Junior Certificate 2016

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.

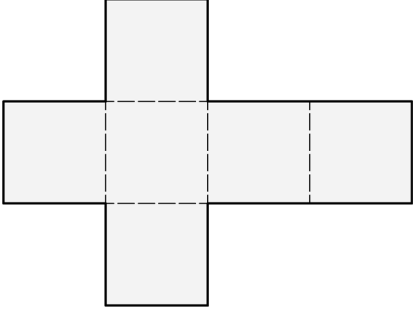




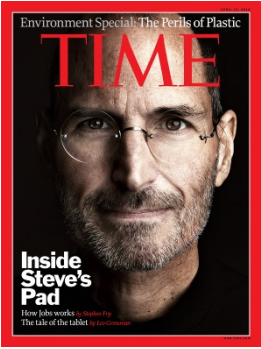


Marking schemes are working documents. While a draft marking scheme is prepared in advance of the examination, the scheme is not finalised until examiners have applied it to candidates' work and the feedback from all examiners has been collated and considered in light of the full range of responses of 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.



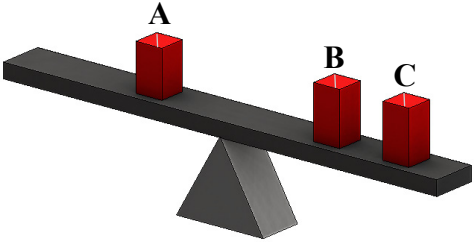


In the case of marking schemes that include model solutions or answers, it should be noted that these are not intended to be exhaustive. Variations and alternatives may also be acceptable. Examiners must consider all answers on their merits, and will have consulted with their Advising Examiners when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



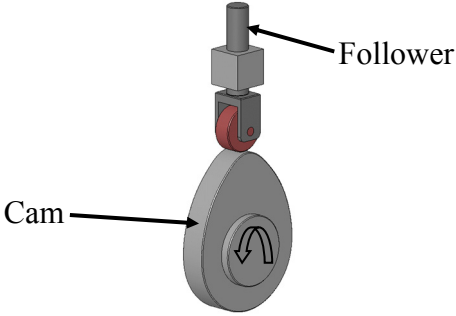


Future Marking Schemes



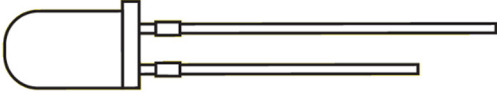
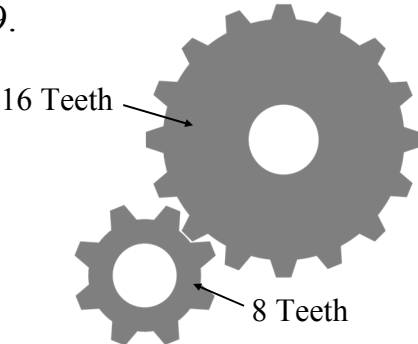

Assumptions about future marking schemes on the basis of past schemes should be avoided. While the underlying assessment principles remain the same, the details of the marking of a particular type of question may change in the context of the contribution of that question to the overall examination in 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.

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

<p>1.</p> 	<p>Shown is a development of a:</p>	Cone	
		Cube	5
		Pyramid	
<p>2.</p> 	<p>The power on/off symbol on electronic devices is usually:</p>		5
			
			
<p>3.</p> 	<p>Magazines are produced using:</p>	Word Processing Software	
		CAD Software	
		Desktop Publishing Software	5
<p>4.</p> 	<p>The property of copper which makes it possible to beat it into curved shapes is:</p>	Brittleness	
		Malleability	5
		Hardness	
<p>5.</p> 	<p>Which of the materials listed is the most environmentally friendly?</p>	Wood	5
		Plastic	
		Metal	

<p>6.</p> 	<p>The cables of a suspension bridge are usually made from:</p>	<p>High tensile steel</p>	<p>5</p>
<p>7.</p> 	<p>The cross section of an Allen key is a:</p>	<p>Square</p>	
<p>8.</p> 	<p>Different amounts of the same material are put into boxes A, B and C. If the beam is balanced, which box contains the most material?</p>	<p>Box A</p>	<p>5</p>
<p>9.</p> 	<p>The peat in these briquettes has been:</p>	<p>Stretched</p>	
<p>10.</p> 	<p>The number of millimetres in one metre is:</p>	<p>10,000</p>	
		<p>1,000</p>	<p>5</p>
		<p>1,000,000</p>	

<p>11.</p> 	<p>Burning fossil fuels contributes to:</p>	<p>Global warming</p>	<p>5</p>
		<p>Global cooling</p>	
		<p>Neither of the above</p>	
<p>12.</p> 	<p>The addition of diamond grit to a cutting blade makes the blade:</p>	<p>Softer</p>	
		<p>Cheaper</p>	
		<p>Last longer</p>	<p>5</p>
<p>13.</p> 	<p>The rotating cam causes the follower to:</p>	<p>Reciprocate</p>	<p>5</p>
		<p>Rotate</p>	
		<p>Oscillate</p>	
<p>14.</p> 	<p>An example of a renewable energy source is:</p>	<p>Coal</p>	
		<p>Gas</p>	
		<p>Wood</p>	<p>5</p>
<p>15.</p> 	<p>Speakers convert:</p>	<p>Chemical energy to electrical energy</p>	
		<p>Electrical energy to sound energy</p>	<p>5</p>
		<p>Sound energy to electrical energy</p>	

<p>16.</p> 	<p>When describing a switch, SPST stands for:</p>	<p>Separate Pole Separate Throw</p>	
		<p>Single Pole Single Throw</p>	5
		<p>Single Pole Single Turn</p>	
<p>17.</p> 	<p>Electronic devices that are temperature sensitive are:</p>	<p>Transistors</p>	
		<p>Thyristors</p>	
		<p>Thermistors</p>	5
<p>18.</p> 	<p>The short leg of an LED is:</p>	<p>Negative</p>	5
		<p>Positive</p>	
		<p>Neutral</p>	
<p>19.</p> 	<p>When the large gear rotates at 100 RPM, the small gear will rotate at:</p>	<p>100 RPM</p>	
		<p>50 RPM</p>	
		<p>200 RPM</p>	5
<p>20.</p> 	<p>Laszlo Biro invented the:</p>	<p>Vacuum Cleaner</p>	
		<p>Ball Point Pen</p>	5
		<p>Washing Machine</p>	

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

Question 1

40 Marks

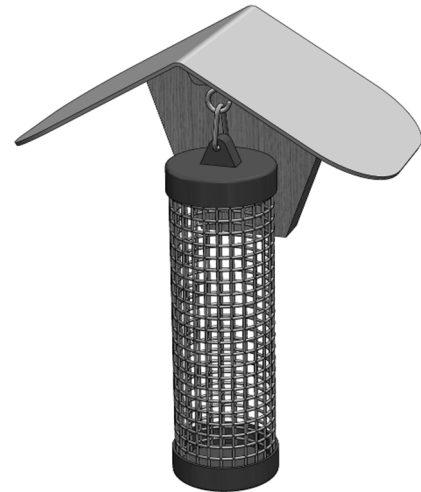
(a) An image of a bird feeder is shown.
The roof of the feeder is made from a single piece of material.

10 marks

(i) Suggest a suitable material for the roof and give a reason for your choice.

Material: Acrylic, Aluminium, PVC, Polystyrene.
2 mks

Reason: Weather proof, Does not rust, water proof, durable. *2 mks*



Bird Feeder

(ii) Name a machine or tool that could be used to cut out the shape of the roof.

Name: Band Saw, Scroll Saw, Jig Saw, Laser Cutter, CNC router. *2 mks*

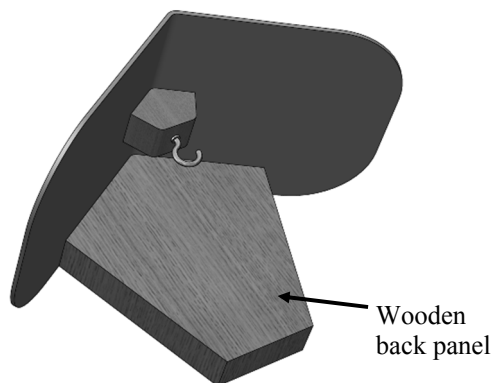
(iii) A metal mesh is used for the food container. Suggest a suitable metal for the mesh and explain why the size of the square holes in the mesh must be carefully considered.

Suitable metal: Galvanised wire, brass, copper, aluminium. *2 mks*

Size of holes: The Hole size must be such that the food does not fall out but large enough to allow the birds to pick it. *2 mks*

(b)

8 marks



(i) Name a suitable hardwood for the back panel of the bird feeder.

Hardwood: Ash, Oak, Beech, Iroko etc.
2 mks

(ii) Describe a method of attaching the roof to the back panel. Use sketches to illustrate your answer.

Method: Screw it on, Glue it on,
2 mks

Sketches

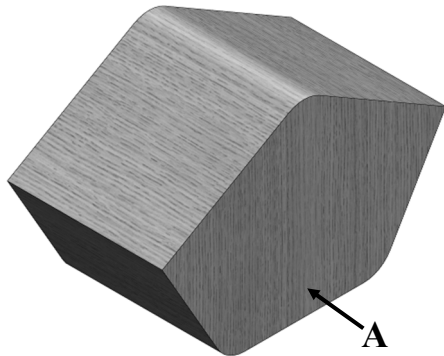
No Attempt	0		1
Fair	2		3
Good	4		

Question 1

10 marks

- (c) An Isometric View and an End View of part of the feeder are shown below.

In the space opposite sketch an Elevation in the direction of arrow A and project a Plan of the part.



Isometric View



End View

Sketches

No Attempt	0	
Fair	3	
Good	5	

Elevation = 5 mks

Plan = 5mks

- (d) Compare the bird feeders A and B under the following headings:

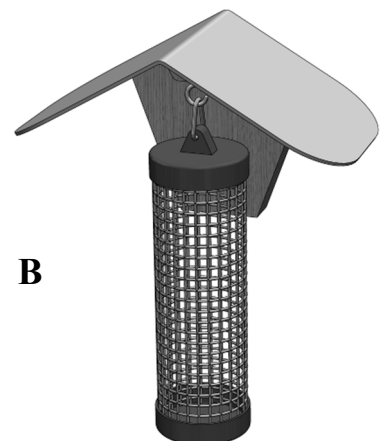
12 marks

Use of materials: Any valid response 3mks

Appearance: Any valid response 3mks

Durability: Any valid response 3mks

Cost: Any valid response 3mks



Question 2

40 Marks

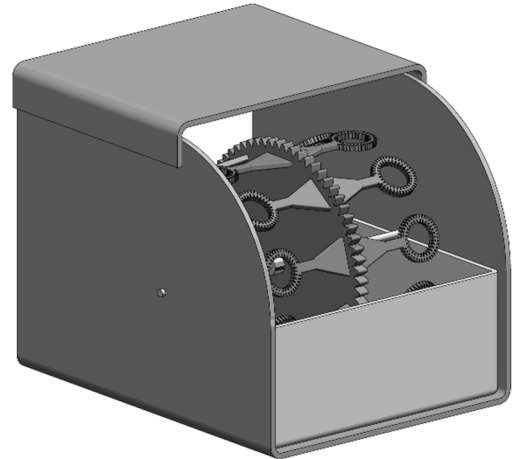
(a) The body of a motorised bubble blower is shown.

10 marks

- (i) Name a suitable material for the top and sides of the bubble blower and give a reason for your choice.

Material: Acrylic, polystyrene etc. 2mks

Reason: Any valid reason. 2mks



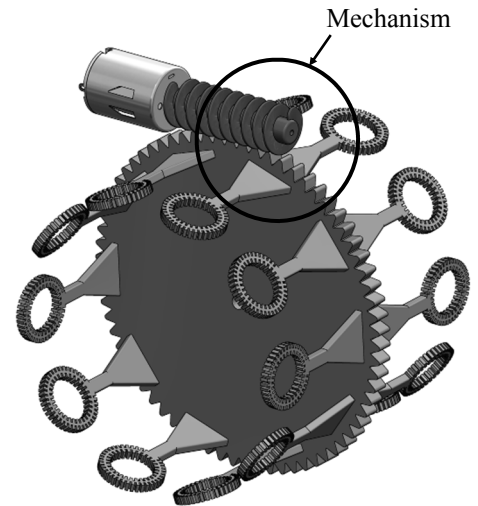
Bubble Blower - main body

- (ii) The graphic shows the wheel that gathers the bubble solution and the mechanism and motor used to turn it.

Name this mechanism and give **one** reason why it is a suitable choice for the bubble blower.

Mechanism Name: Worm & Worm Wheel 3mks

Reason: High velocity ratio (slows the wheel down sufficiently). Very smooth running, compact, very little stress on the motor or any other valid response. 3mks



Bubble Wheel

(b)

8 marks

A handle is required to be attached to the top surface of the bubble blower. Make labelled sketches of your design for a suitable handle which could be made in the Technology classroom.

No Attempt	0	←	→	2
Fair	4	←	→	6
Good	8	←	→	

Question 2

(c) There are two motors in the bubble blower. One drives the bubble wheel mechanism and the other drives a propeller which blows air through the system. The motors are connected in parallel.

10 marks

(i) On the images opposite, draw in the electrical wires so that the motors are connected in **parallel**. **3mks**

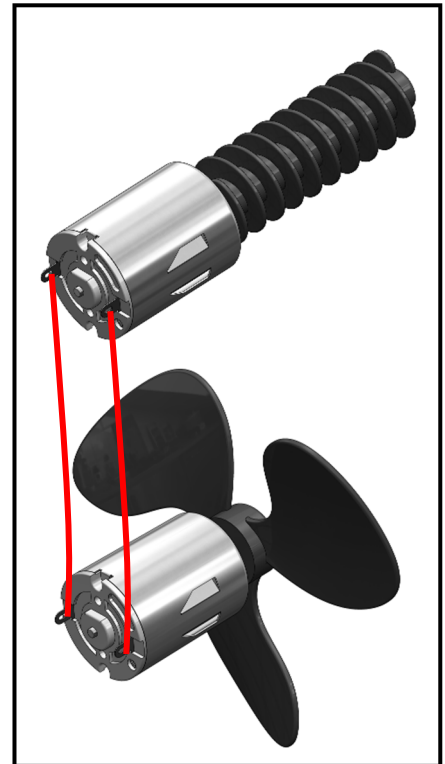
(ii) Name an energy conversion which takes place in a motor when it is in use.

Electrical to Kinetic, Kinetic to Sound, **3mks**

(iii) Name **two** other devices that use miniature motors.

1. Model railway, motorised toy cars, etc. **2mks**

2. Mobile phone, Computer fans, etc. **2mks**



(d) When connected it was found that the propeller motor was rotating in the wrong direction and as a result was not blowing bubbles through the front of the unit.

8 marks

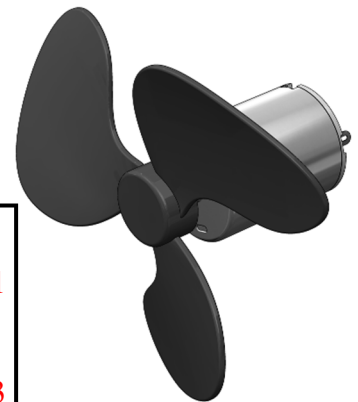
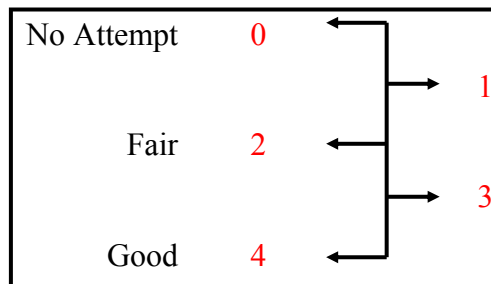
(i) Suggest a solution to this problem.

Solution: Change the polarity of the wire connections.

4mks

(ii) A *toggle switch* is used to switch the bubble blower on/off.

Make a sketch of a toggle switch in the box opposite.



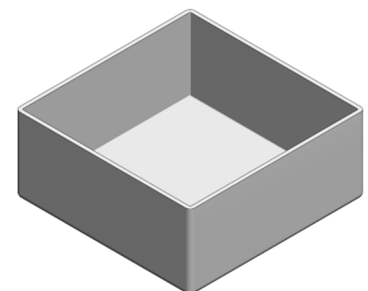
(e) The image shows the container for the bubble solution. It was found that vacuum forming was not a suitable method of producing this container.

4 marks

Suggest a reason for this.

Reason: The sides of the container are vertical and as such will not release from the mould when vacuum formed.

4mks



Container for solution

Question 3

40 Marks

(a) A working model of a wheel-mounted crane is shown. The main parts of the model crane are made from hardwood.

12 marks

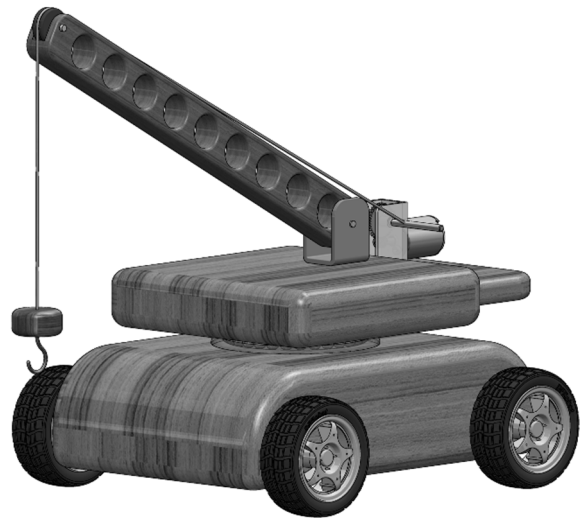
(i) Suggest **two** reasons why hardwood was selected for these parts.

Reason 1: Any valid reason. **2mks**

eg. Hardwood is tough and durable.

Reason 2: Any other valid reason. **2mks**

eg. Hardwood is generally more attractive and takes a very good finish.



Wheel Mounted Crane

(ii) A circuit housing (control box) is required for a switch and battery to control the motor. Make a sketch of a control box that could be fixed in the position shown on the back of the crane. Name a suitable material from which the control box could be made.

Suitable material: Any suitable material. **2mks**. (Generic material = **1mk**)

	<p>Control Box sketch</p> <table> <tr> <td>No Attempt</td> <td>0</td> <td rowspan="3"> </td> </tr> <tr> <td>Fair</td> <td>3</td> </tr> <tr> <td>Good</td> <td>6</td> </tr> </table>	No Attempt	0		Fair	3	Good	6
No Attempt	0							
Fair	3							
Good	6							

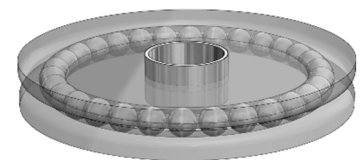
(b) So that the crane can rotate smoothly, a thrust bearing is used.

8 marks

(i) Name **two** other situations where bearings are used.

1. Automobile wheels or any other valid answer. **2mks**

2. Pulley drives on a combine harvester or any other valid answer. **2mks**



Thrust bearing

(ii) Bearings help to reduce a type of resistance. What is the name of this resistance?

Name of resistance: Friction or frictional force. **2mks**

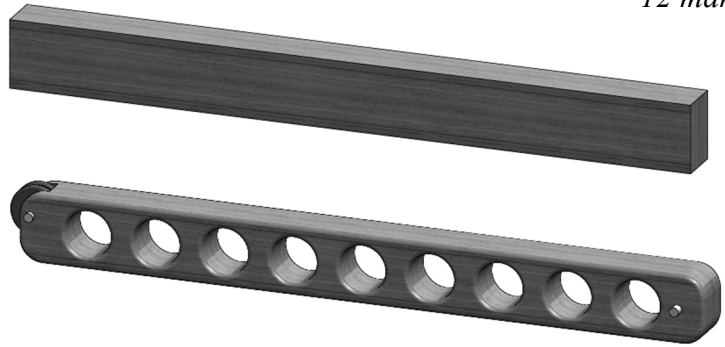
(iii) The ball bearings in a bearing are made from very hard materials. Suggest a suitable material.

Material for ball bearings: Stainless steel, Chrome steel, Ceramics, Plastic, brass. **2mks**

Question 3

- (c) Shown opposite is a piece of hardwood used to make the boom/jib of the model crane.
The completed boom is also shown.
Describe **four** steps in the manufacture of the boom.

12 marks



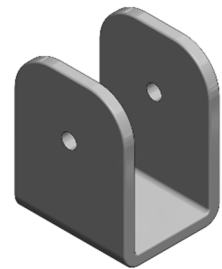
- Step 1: Mark out the hole centres, arcs and pulley slot. **3mks**
- Step 2: Drill the holes and round off the corners. **3mks**
- Step 3: Using the band saw cut out the slot for the pulley and drill the hole. **3mks**
- Step 4: Sand the boom and apply a few coats of lacquer or varnish. **3mks**

Or any four valid sequential steps.

- (d) (i) A bracket is used to connect the boom to the body of the crane.
In the space below draw a flat pattern (development) of the bracket.
You may estimate the dimensions.

8 marks

No Attempt	0	←	→
Fair	2	←	→
Good	4	←	→



Bracket

- (ii) Two of the tools used in the manufacture of the bracket are a *try square* and a *hand file*.
In the boxes below make a 3D sketch of **each** of these tools.

Try Square

2mks

Hand File

2mks

Question 4

40 Marks

- (a) The first electricity pole was erected in rural Ireland in November 1946 in Kilsallaghan, Co. Dublin. Previous to this only homes built in towns and cities had electricity.

12 marks



Describe **three** benefits that electricity brought to rural Ireland.

Benefit 1: People now had electric lighting which was much easier to operate and maintain than oil lamps. **4mks**

Benefit 2: Clothes could now be washed using a washing machine. This took a lot of the drudgery out of tasks such as this. **4mks**

Benefit 3: It made it possible to have gadgets such as televisions and electrically powered radios making people more informed and entertained. **4mks**

Or any other three valid benefits.

- (b) Christopher Latham Sholes invented the first mass produced typewriter. Due to modern technology, typewriters are no longer widely used.

12 marks



- (i) Name **two** other devices that are no longer widely used due to developments in modern technology.

1: Horse drawn cart. **3mks** 2: Gramophone **3mks**

- (ii) Modern day robots are widely used in manufacturing industries.

Suggest **one** advantage and **one** disadvantage of the use of robots in manufacturing.

Advantage: More accurate, work 24/7, no holidays, can be reprogrammed, etc. **3mks**

Disadvantage: Initially very expensive, less employment, etc. **3mks**

- (c) Using the headings given below suggest ways in which a modern bicycle differs from an old 'High Nelly' bicycle.

16 marks

Materials: Many modern bikes are made with aluminium alloys and/or carbon fibre. High Nelly has a steel frame.

Weight: Modern bikes are much lighter due to the use of lightweight materials.

Gears: The High Nelly had only one gear whereas modern bikes usually have many gears from which to select.

Wheels: The wheel rims of the High Nelly were steel where as modern bikes have alloy or carbon fibre wheel rims that do not rust.

4 x 4mks

