



Coimisiún na Scrúduithe Stáit
State Examinations Commission

Junior Certificate Examination, 2015

Technology

Ordinary Level

Wednesday, 17 June
Afternoon, 2:00 - 4:00

Instructions:

1. Answer **Section A** (short answer questions). 80 marks
2. Answer **two** questions from **Section B**. 80 marks
3. Hand up this paper at the end of the examination.
4. Write your examination number in the box below.

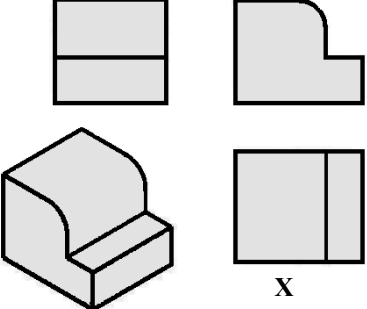
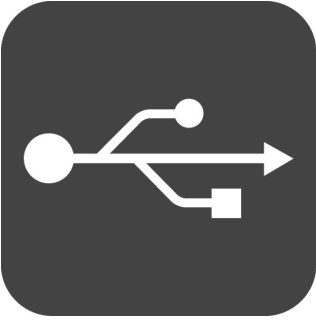
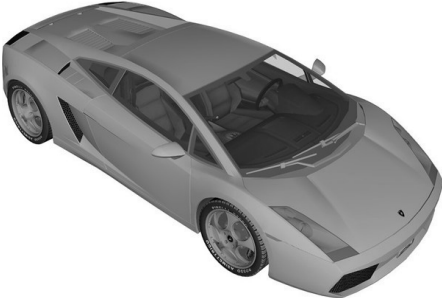


Centre Number



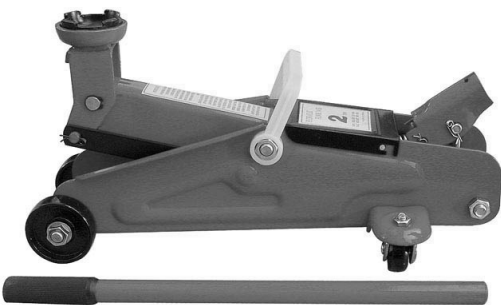


Examination Number



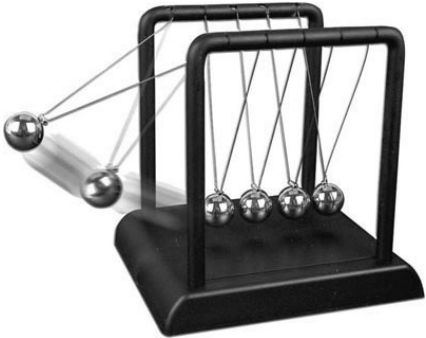


1.	Total of end of page totals	
2.	Aggregate total of all disallowed question(s)	
3.	Total mark awarded (1 minus 2)	
4.	Bonus mark for answering through Irish (if applicable)	
5.	Total mark awarded if Irish Bonus (3+4)	
	Note: The mark in row 3 (or row 5 if an Irish bonus is awarded) must equal the mark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

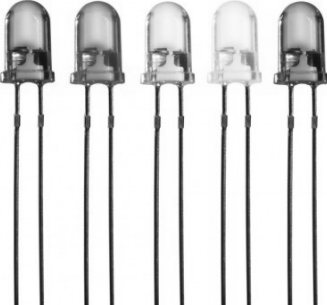
Total Mark	
Question	Mark
Section A	
Section B Q 1	
Q 2	
Q 3	
Q 4	
Total	
Grade	

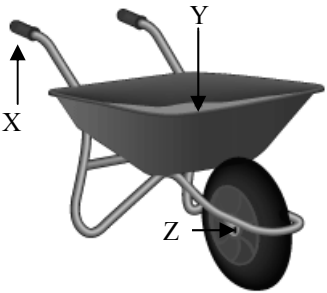
Section A – 80 Marks. Answer **any sixteen** questions in this section.


<p>1.</p> 	<p>The view marked X is a/an:</p>	<p>Elevation</p>	
<p>2.</p> 	<p>The symbol shown represents a:</p>	<p>USB connection</p>	
<p>3.</p> 	<p>A software application used for 3D solid modelling is:</p>	<p>Microsoft Excel</p>	
<p>4.</p> 	<p>Stainless steel is used in guitar strings because:</p>	<p>It is a conductor</p>	
<p>5.</p> 	<p>Lenses for sunglasses that darken in bright sunlight are made from:</p>	<p>‘Smart’ Materials</p>	
		<p>‘Clever’ Materials</p>	
		<p>‘Intelligent’ Materials</p>	

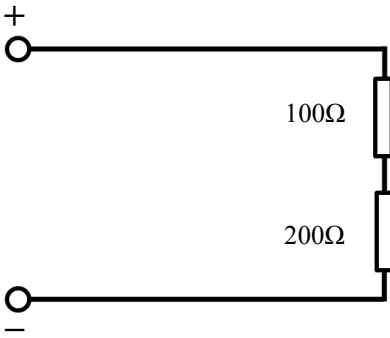
<p>6.</p> 	<p>Drinks bottles are made from:</p>	<p>Rubber</p>	
<p>7.</p> 	<p>The tool shown here is:</p>	<p>An adjustable spanner</p>	
<p>8.</p> 	<p>A hydraulic Jack uses:</p>	<p>Oil pressure</p>	
<p>9.</p> 	<p>Sail cloth must be strong in:</p>	<p>Compression</p>	
<p>10.</p> 	<p>Water meters are used to measure:</p>	<p>Water usage</p>	
		<p>Water quality</p>	
		<p>Water pressure</p>	


<p>11.</p> 	<p>Waste batteries should be disposed of in:</p>	<p>A landfill site</p>	
<p>12.</p> 	<p>The device shown is used on a:</p>	<p>Drill</p>	
<p>13.</p> 	<p>The outer spheres on Newton's Cradle:</p>	<p>Oscillate</p>	
<p>14.</p> 	<p>Car designs that showcase new technology and futuristic styling are known as:</p>	<p>Modern designs</p>	
<p>15.</p> 	<p>Dynamo torches do not use:</p>	<p>Disposable Batteries</p>	
		<p>Electricity</p>	
		<p>Energy</p>	

16. 	LED stands for:	Light Energised Diode	
		Light Emitting Diode	
		Light Energy Diffusion	

17. 	The <i>effort</i> force is positioned at:	Position Z	
		Position Y	
		Position X	

18. 	The resistance of an LDR varies with:	Temperature	
		Humidity	
		Light intensity	

19. 	The total resistance in this circuit is:	200 Ohms	
		20000 Ohms	
		300 Ohms	

20. 	The dual-cyclone bagless vacuum cleaner was invented by:	Sir James Dyson	
		Sir Walter Raleigh	
		Sir Tim Berners-Lee	

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

Question 1

40 Marks

(a) An image of an acrylic toast rack is shown.

12 marks

(i) Give **two** reasons for selecting acrylic as the material for the toast rack.

1. _____

2. _____

(ii) Name a suitable alternative material and give a reason for your choice.

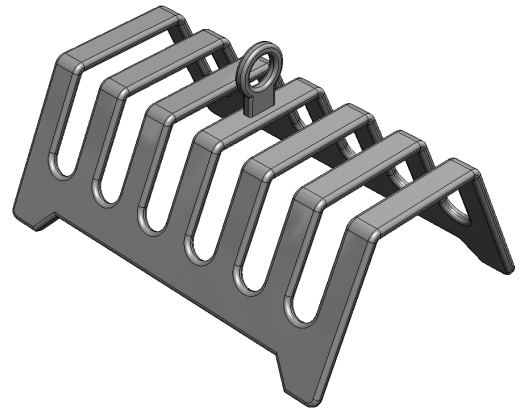
Material: _____

Reason: _____

(iii) Identify a design feature of this toast rack that you like, and give a reason why.

Feature: _____

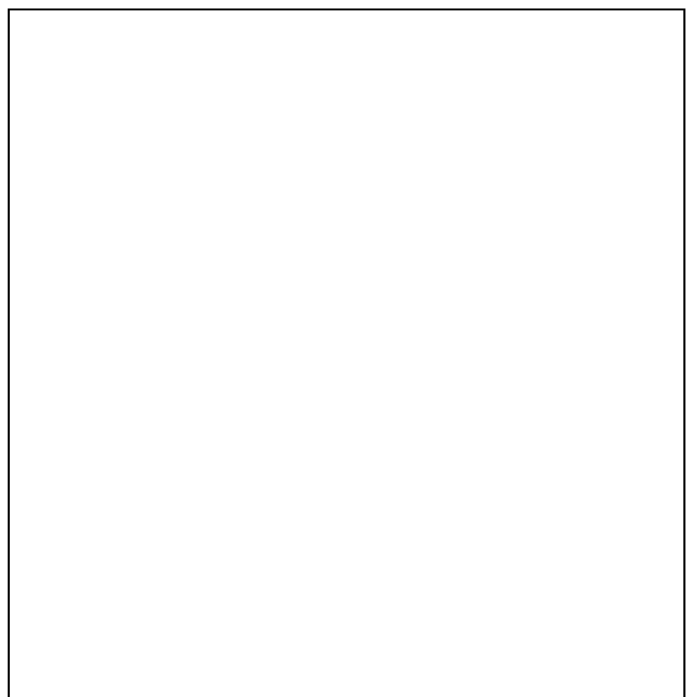
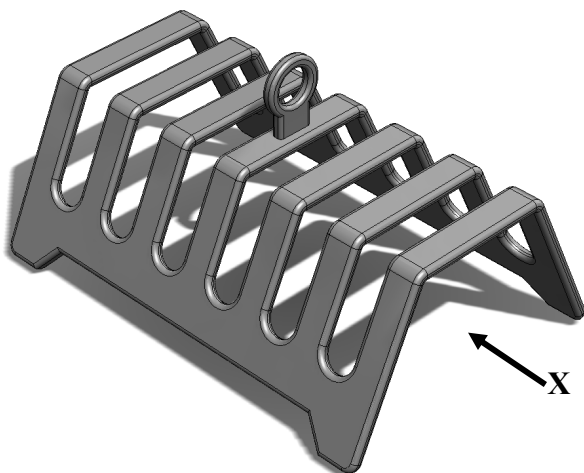
Reason: _____



Toast Rack

(b) In the space provided draw an End View of the toast rack in the direction of arrow X.

8 marks



Question 1

(c) An alternative design for a toast rack is shown.

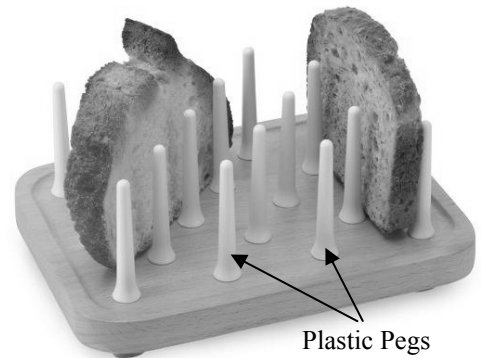
10 marks

- (i) Name a suitable hardwood for the base of this toast rack.

Hardwood: _____

- (ii) Describe a method of attaching the pegs to the base of the toast rack. Use sketches to illustrate your answer.

Method: _____



Sketches

(d) Evaluate the design of the toast rack shown at (c) above under the following headings.

10 marks

Appearance: _____

How well it works (functionality): _____

Safety: _____

Hygiene: _____

Suitability of materials: _____

Question 2

40 Marks

12 marks

(a) An image of an electronic ‘Steady Hand Game’ is shown.

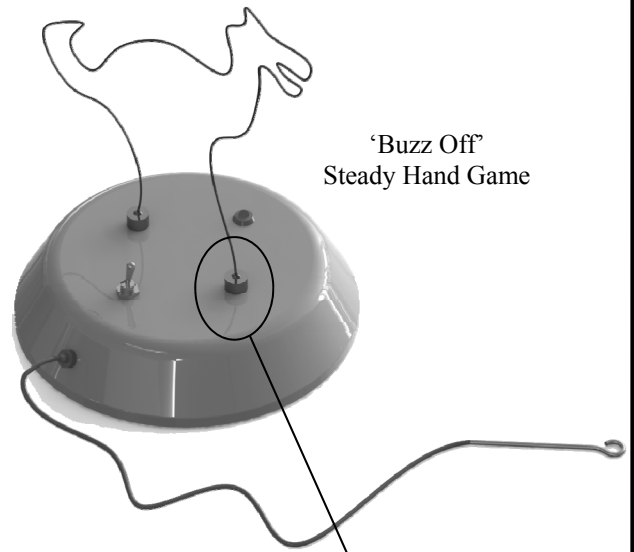
(i) Name a suitable material for the base and for the dinosaur figure. Give a reason for your choice of **each** material.

Base Material: _____

Reason: _____

Dinosaur Material: _____

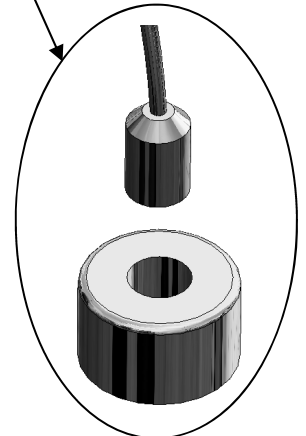
Reason: _____



(ii) A detail view of the method used to connect the dinosaur to the base unit is shown. Suggest **one** advantage of this method of attachment and explain why brass is a good choice of material for the socket.

Advantage: _____

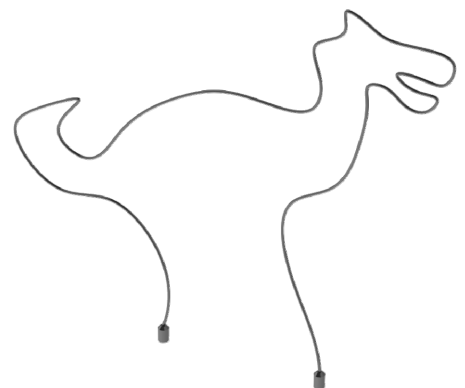
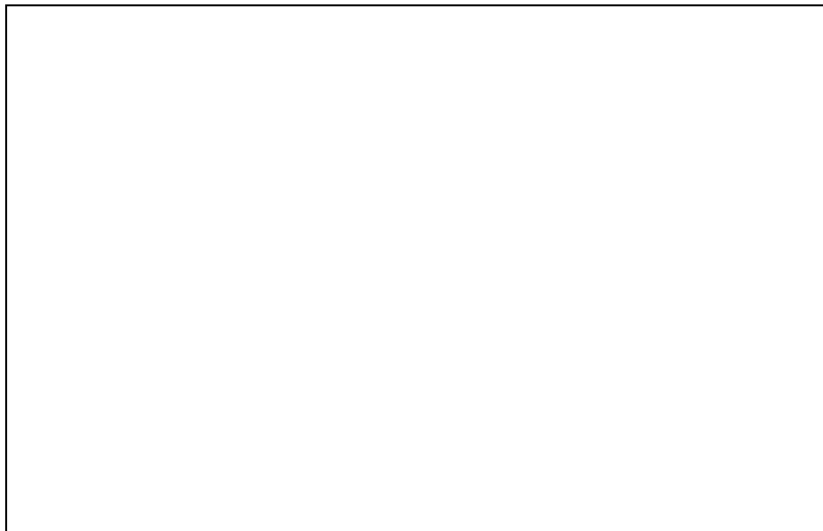
Brass is a good choice of material because: _____



Brass Socket

(b) In the space below sketch an alternative shape to use in the ‘Steady Hand Game’ instead of the dinosaur.

6 marks



Question 2

- (c) The base unit opposite has been vacuum formed using high impact polystyrene (HIPS).

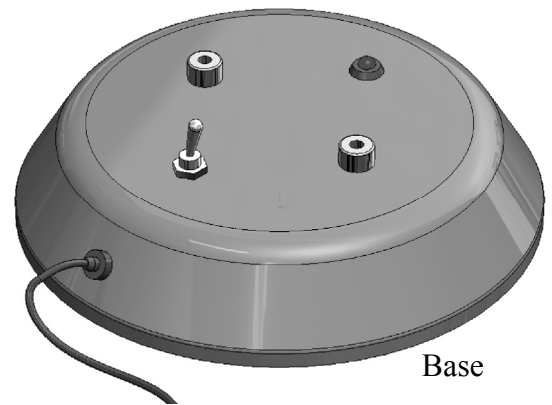
8 marks

Outline **three** steps in the process of vacuum forming and make a sketch of the mould/plug needed to make the base unit.

Step 1: _____

Step 2: _____

Step 3: _____

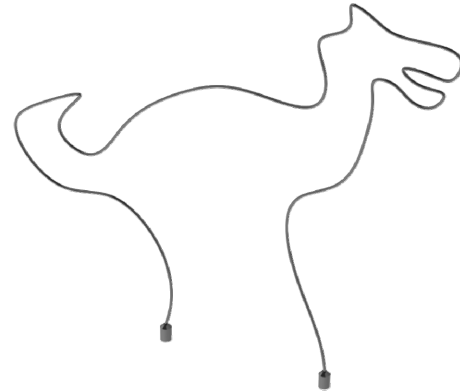


- (d) The components for the operation of the Steady Hand Game are shown.

8 marks

Draw in the connections between the components to complete the circuit for the game.

(The LED has been omitted.)



- (e) Suggest **two** ways in which this game could be improved to make it more exciting to play.

6 marks

Improvement 1: _____

Improvement 2: _____

Question 3

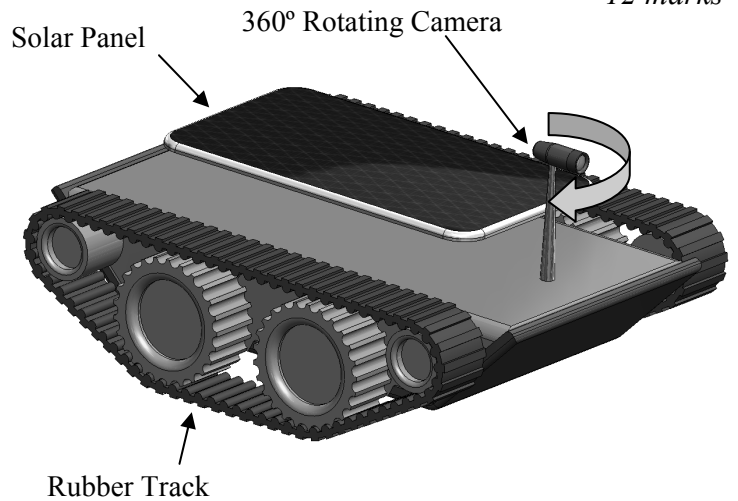
40 Marks

(a) A working model of a ‘Mars Rover’ is shown. This vehicle is designed to run on solar power and is also capable of taking panoramic photographs through 360°.

12 marks

(i) Explain why tracks are used on the Rover instead of wheels and tyres.

Answer: _____



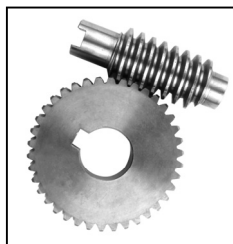
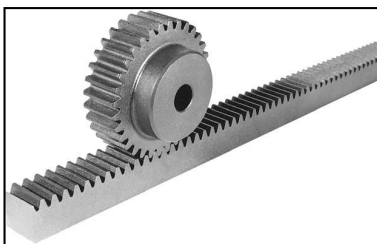
Mars Rover with Rotating Camera

(ii) In the space below describe, using notes and sketches, a bracket that could be used to connect the solar panel to the top surface of the Rover.

(b) The camera on the Rover must be capable of rotating through 360°. From the images below, choose the most suitable mechanism for this purpose. Name the mechanism you have chosen and explain why you consider it to be suitable.

8 marks

Mechanism name: _____
 This mechanism is suitable because: _____



Question 3

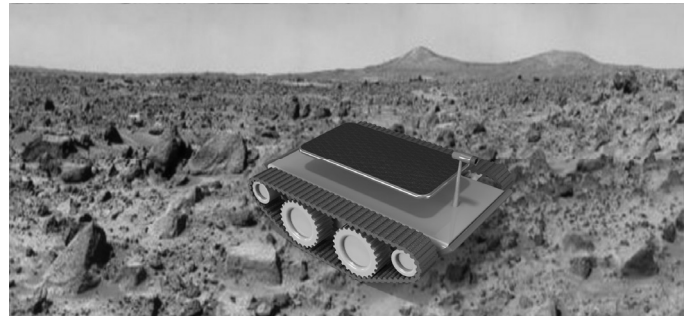
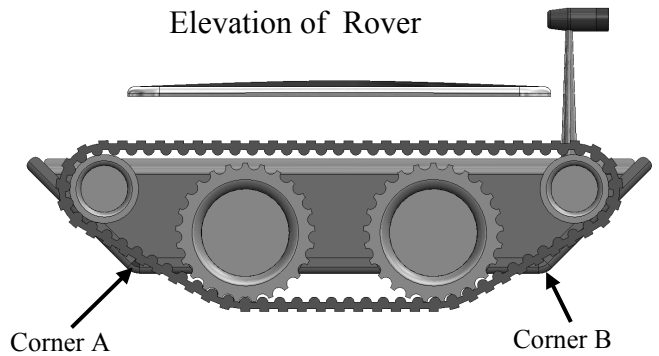
- (c) (i) When testing the vehicle it was found that corners A and B tended to cause the Rover to get stuck when going over rough terrain. Suggest **two** changes that could be made to the design to prevent this problem.

Change 1: _____

Change 2: _____

- (ii) Draw a new Elevation of the Rover below showing the changes you have made to the design.

12 marks



Elevation showing your changes.

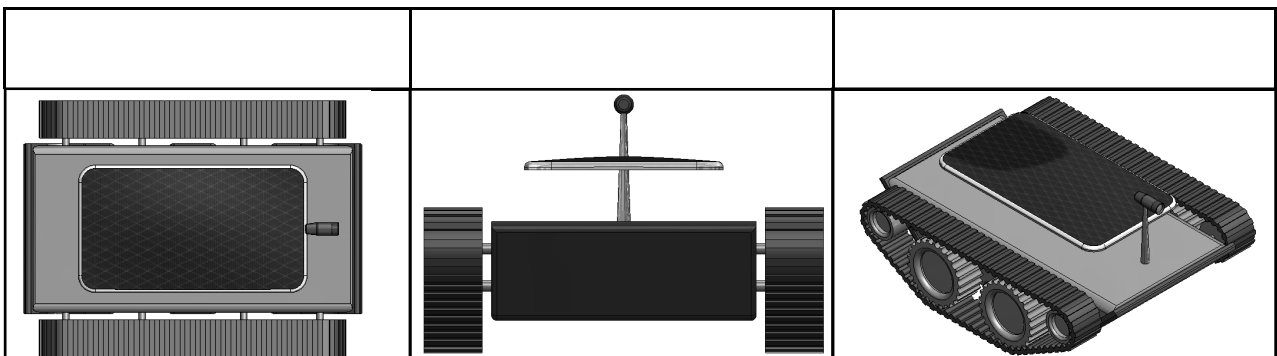
- (d) (i) The Rover sends back images from Mars. List **two** other types of data that Rover vehicles such as this typically send back to Earth.

8 marks

1. _____

2. _____

- (ii) In part (c) above an *Elevation* of the Rover is shown. In the spaces provided, name each projection of the Rover shown below.



Question 4

40 Marks

(a) One of the more recent developments in car technology is the production of cars that run on compressed air.

12 marks

(i) Suggest **two** advantages of this type of technology.

Advantage 1: _____



Advantage 2: _____

(ii) Name **two** other ways to power cars without using fossil fuels (diesel, petrol or gas).

1: _____ 2: _____

(b) Many car companies produce concept designs before introducing a new model.

12 marks

(i) Suggest **two** reasons for this.

Reason 1: _____



Reason 2: _____

(ii) Many car designers are experimenting with materials other than metals for the body of the car. Suggest **two** reasons for this.

Reason 1: _____

Reason 2: _____

(c) Many cities, including Dublin, provide specially designed bicycles for hire and use.

16 marks

(i) Suggest **two** advantages of this system of transport in cities.

Advantage 1: _____

Advantage 2: _____



(ii) Underground rail systems are used in many large cities. Suggest **two** reasons for this.

Reason 1: _____

Reason 2: _____