



**Coimisiún na Scrúduithe Stáit**  
**State Examinations Commission**

*Junior Certificate Examination, 2017*

# **Technology**

## **Ordinary Level**

**Wednesday, 21 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.

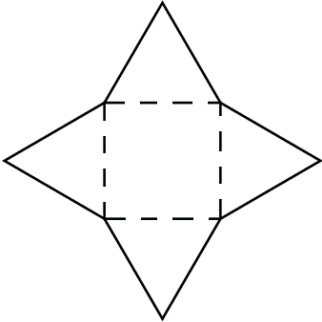
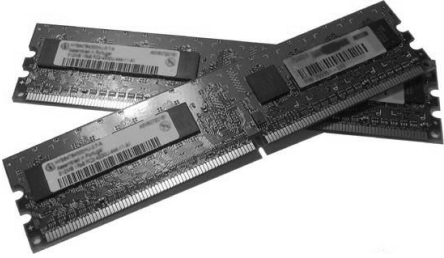



**Centre Number**


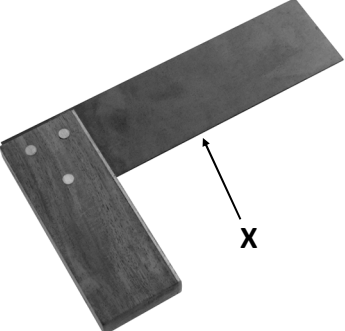
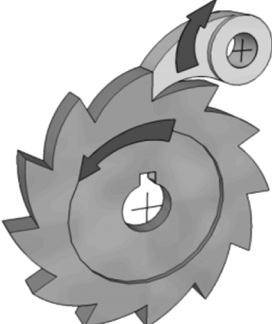

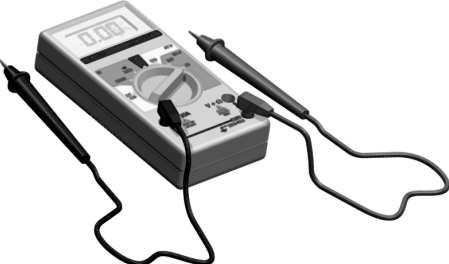
**Examination Number**






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 answers 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 Mór-iomlán 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>This shape can be folded to make a:</p>	<p>Cube</p>	
<p>2.</p> 	<p>In computer technology RAM stands for:</p>	<p>Remote Available Memory</p>	
<p>3.</p> 	<p>A computer mouse is an example of:</p>	<p>Software</p>	
<p>4.</p> 	<p>Drink cans are typically made from:</p>	<p>Aluminium</p>	
<p>5.</p> 	<p>The classic Pantone chair shown is made from injection moulded:</p>	<p>Glass reinforced plastic</p>	
		<p>Thermosetting plastic</p>	
		<p>Thermoplastic</p>	

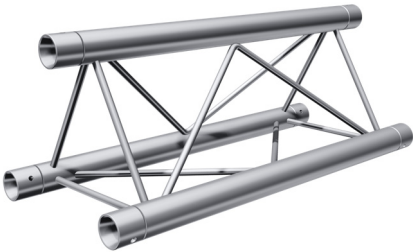
<p>6.</p> 	<p>The strings of a tennis racket are in:</p>	<p>Compression</p>	
		<p>Tension</p>	
		<p>Torsion</p>	
<p>7.</p> 	<p>Part 'X' of a Try Square is called the:</p>	<p>Blade</p>	
		<p>Knife</p>	
		<p>Plate</p>	
<p>8.</p> 	<p>A Ratchet and Pawl mechanism is used in a:</p>	<p>Car engine</p>	
		<p>Fishing reel</p>	
		<p>Digital camera</p>	
<p>9.</p> 	<p>The car jack shown is an example of a:</p>	<p>Parallel linkage</p>	
		<p>Treadle linkage</p>	
		<p>Reverse motion linkage</p>	
<p>10.</p> 	<p>An electronic multimeter <b>cannot</b> be used to measure:</p>	<p>Voltage levels</p>	
		<p>Resistance</p>	
		<p>Sound levels</p>	


<p>11.</p> 	<p>Solar cells convert:</p>	<p>Electricity to light</p>	
		<p>Light to electricity</p>	
		<p>Light to heat</p>	
<p>12.</p> 	<p>Bowls are examples of:</p>	<p>Shell structures</p>	
		<p>Frame structures</p>	
		<p>Pneumatic structures</p>	
<p>13.</p> 	<p>The mechanism shown is a:</p>	<p>Compound gear train</p>	
		<p>Complex gear train</p>	
		<p>Simple gear train</p>	
<p>14.</p> 	<p>SUV stands for:</p>	<p>Safer Utility Vehicle</p>	
		<p>Sports Utility Vehicle</p>	
		<p>Super Utility Vehicle</p>	
<p>15.</p> 	<p>To conserve energy manufacturers are now making torches that use:</p>	<p>LEDs</p>	
		<p>Tungsten filament bulbs</p>	
		<p>CFLs</p>	

16.		Wireless speakers typically connect to your music player using:	Bluetooth technology	
			Microwaves	
			Infra-red signals	

17.		A 2200Ω (2k2) resistor has the colour code:  <b>Note:</b> (Red = 2, Black = 0)	Red Red Black Black	
			Red Red Black	
			Red Red Red	

18.		Capacitance is measured in:	Farads	
			Coulombs	
			Volts	

19.		The triangulated truss shown is:	Rigid	
			Flexible	
			Weak	

20.		The inventor of the Model T was:	George Stephenson	
			Karl Benz	
			Henry Ford	

Section B – 80 Marks.

Answer **any two** questions from this section.

40 Marks

Question 1

(a) An image of a stand for a tablet computer such as an iPad is shown opposite. The stand consists of two interlocking parts.

10 marks

(i) Suggest a suitable material from which to make the stand and give a reason for your choice.

Material: \_\_\_\_\_

Reason: \_\_\_\_\_

\_\_\_\_\_

(ii) Name a machine that could be used to make the bends in the stand.

Name: \_\_\_\_\_

(iii) The edges of the parts are rounded. Suggest **two** reasons for this.

Reason 1: \_\_\_\_\_

Reason 2: \_\_\_\_\_

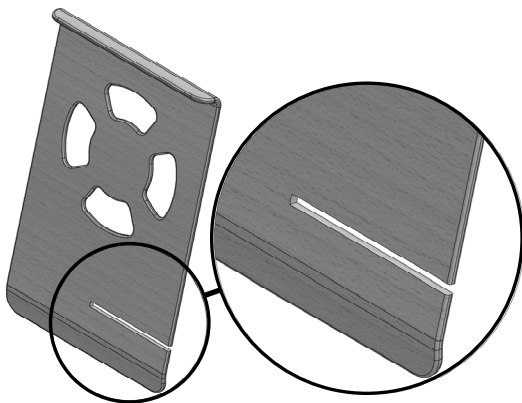
\_\_\_\_\_



Tablet Stand

(b)

10 marks



Enlarged view of the slot

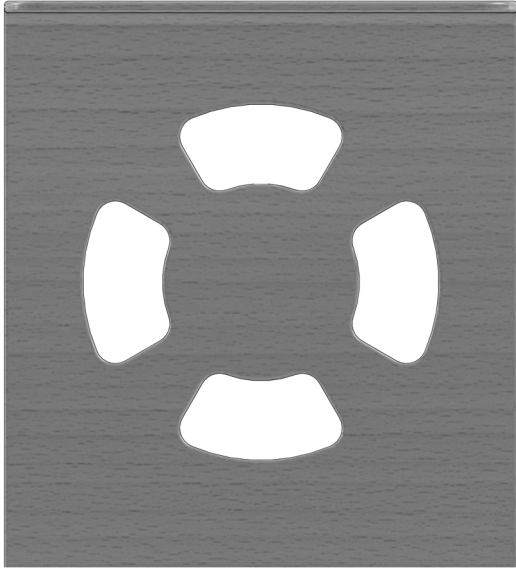
Using notes and sketches describe how you would cut out the slot needed to join both parts of the stand.

Notes and Sketches

# Question 1

8 marks

(c) The graphic below shows the cut-out pattern designed to improve the appearance of the stand.



In the space opposite draw **your** design for an alternative cut-out pattern.

Cut-out Pattern

(d) (i) Outline **two** advantages of a tablet computer over a standard laptop computer.

12 marks

Advantage 1: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Advantage 2: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



Tablet computer

(ii) Outline **two** advantages of a laptop computer over a tablet computer.

Advantage 1: \_\_\_\_\_  
\_\_\_\_\_

Advantage 2: \_\_\_\_\_  
\_\_\_\_\_

## Question 2

40 Marks

(a) A model of a helicopter is shown.

10 marks

- (i) Name a suitable hardwood for the body and give a reason for your choice.

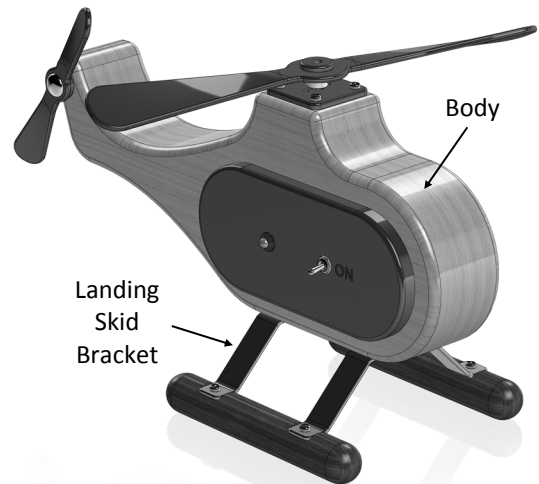
Hardwood: \_\_\_\_\_

Reason: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

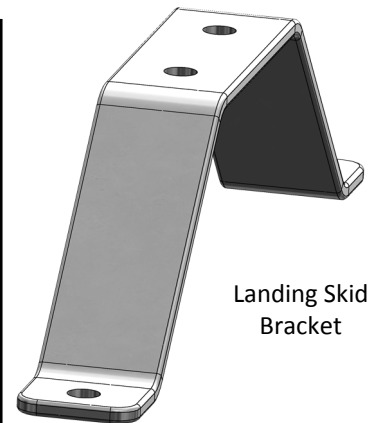
\_\_\_\_\_



Model Helicopter

- (ii) The landing skid brackets are made from metal. Name a suitable metal for the bracket and describe, with labelled sketches, how you would bend it to the shape shown.

Metal: \_\_\_\_\_



Landing Skid Bracket

- (b) (i) Name a suitable machine that could be used to cut the outline shape of the helicopter body. State **one** specific safety precaution to be observed when using this machine.

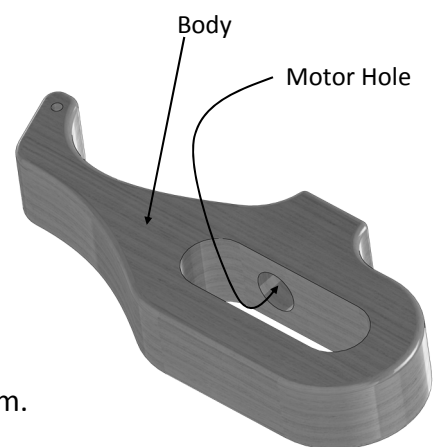
Machine: \_\_\_\_\_

Precaution: \_\_\_\_\_

\_\_\_\_\_

- (ii) The diameter of the hole to be drilled for the motor is 24 mm. Name a suitable type of drill bit that could be used for this purpose.

Name of drill bit: \_\_\_\_\_



Helicopter Body

8 marks



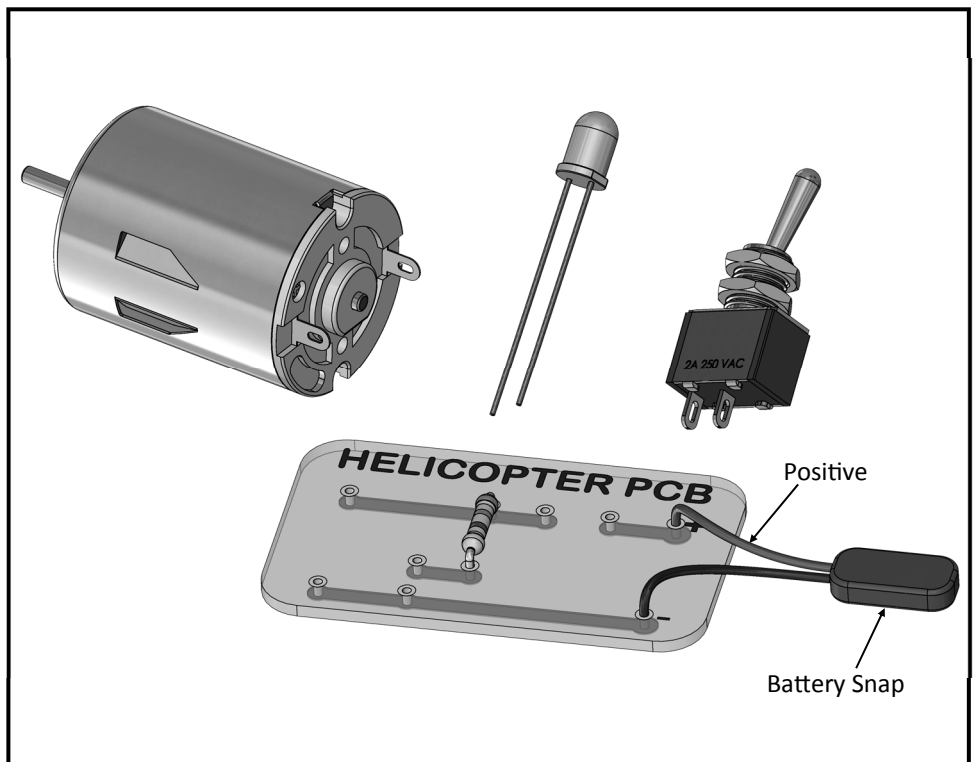
## Question 2

6 marks

- (c) A printed circuit board (PCB) is used to build the control circuit for the model helicopter.

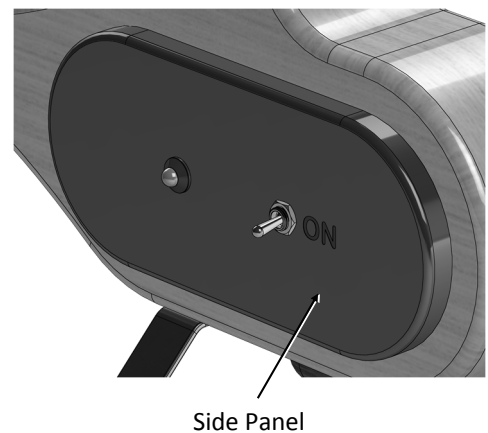
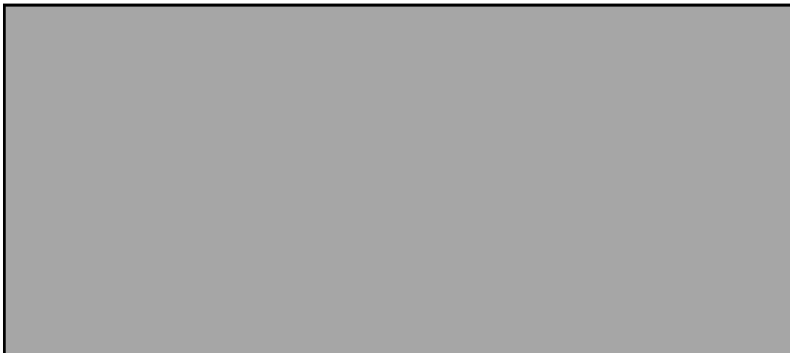
A resistor is included in the circuit to reduce the voltage across the LED.

Sketch in the wire connections from each component to the PCB so that the switch activates both the motor and the LED.



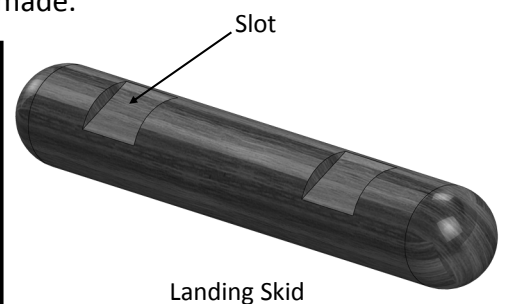
- (d) The smallest rectangular piece of plastic needed to make the side panel is shown below. On this plastic mark out the shape of the side panel. Show the positions of the holes for the LED and switch. (Estimate the dimensions for the hole positions).

8 marks



- (e) The image shows a wooden landing skid for the helicopter. Describe with labelled sketches how one of the slots could be made.

8 marks



### Question 3

40 Marks

(a) A working model of a solar-powered buggy is shown.

10 marks

- (i) Name the type of gear mechanism used to drive the buggy and suggest **two** reasons why this mechanism was selected.

Name: \_\_\_\_\_

Reason 1: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Reason 2: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

- (ii) The rear single wheel of the buggy is a *castor* wheel. Explain why this is necessary.

Answer: \_\_\_\_\_

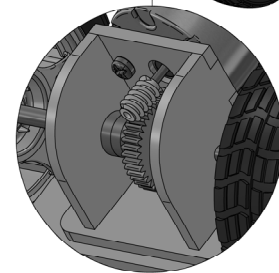
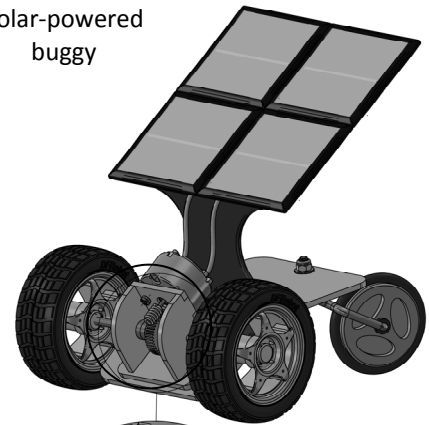
\_\_\_\_\_

\_\_\_\_\_

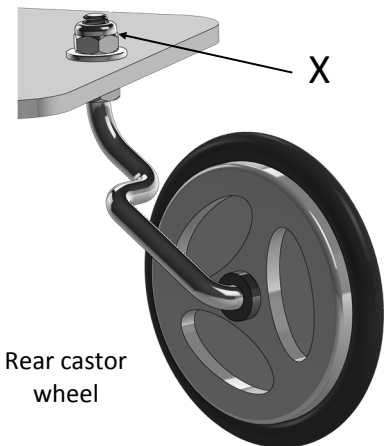
- (iii) Name the type of nut used at position 'X'.

Name: \_\_\_\_\_

Solar-powered buggy



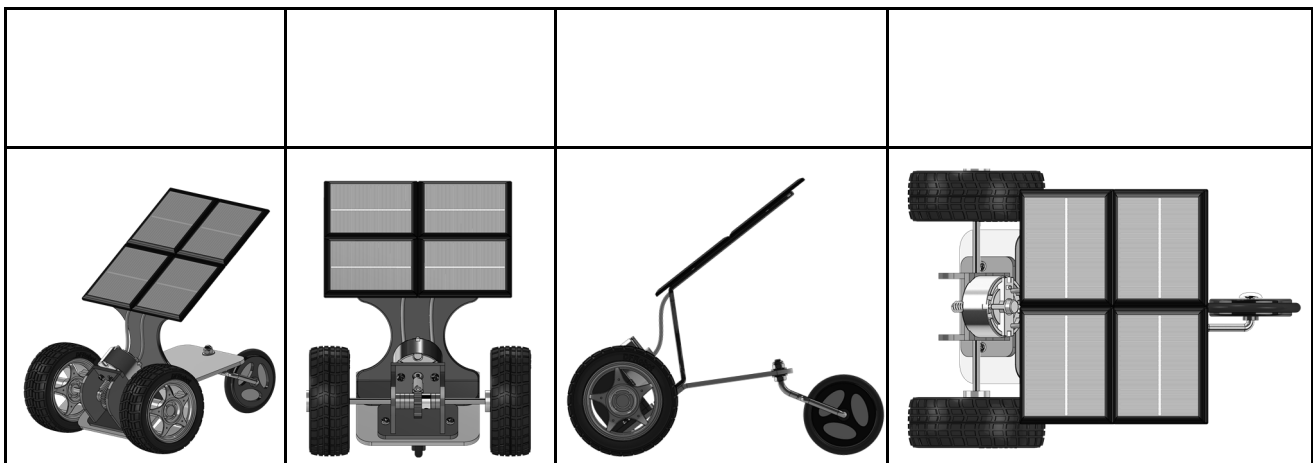
Enlarged view of gear mechanism.



Rear castor wheel

(b) Four views of the buggy are shown below. Name **each** view.

8 marks



### Question 3

14 marks

(c) The flat-pattern of the part used to support the solar cells is shown.

(i) List **three** tools used in the *marking-out* of this part.

Tool 1: \_\_\_\_\_

Tool 2: \_\_\_\_\_

Tool 3: \_\_\_\_\_

(ii) Suggest a suitable material for this part and outline **three** processes that can be used to produce a smooth edge on the material.

Material: \_\_\_\_\_

Process 1: \_\_\_\_\_

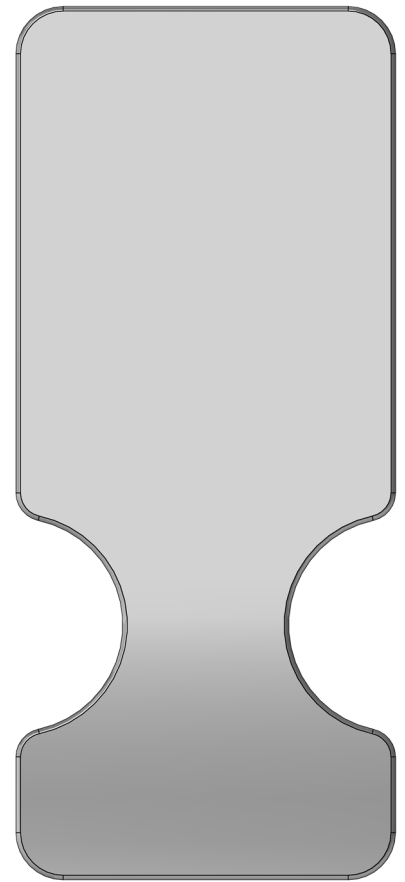
\_\_\_\_\_

Process 2: \_\_\_\_\_

\_\_\_\_\_

Process 3: \_\_\_\_\_

\_\_\_\_\_

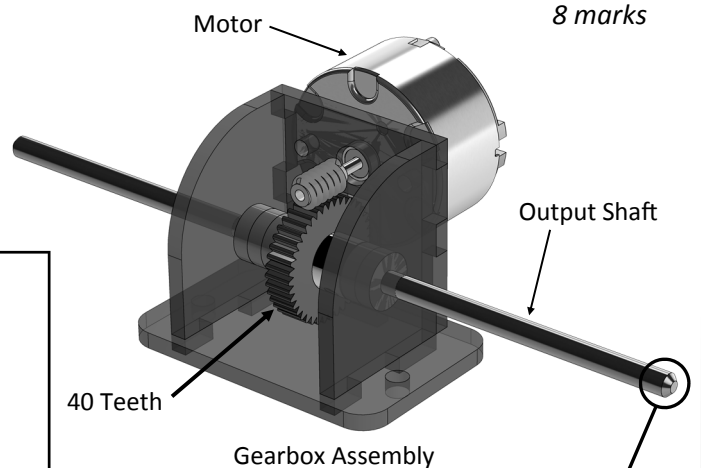


(d) A view of the gearbox for the buggy is shown.

8 marks

(i) If the gear attached to the output shaft has 40 teeth, calculate the speed of the output shaft if the motor rotates at 400 RPM.

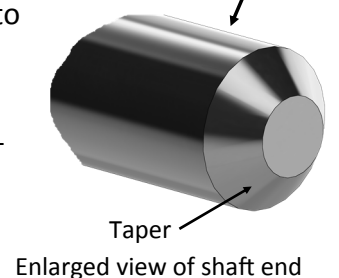
Calculation



(ii) The output shaft is *tapered* at both ends. Name the machine used to taper the shaft and give a reason for doing this to both ends.

Machine name: \_\_\_\_\_

Reason for tapering: \_\_\_\_\_



## Question 4

40 Marks

- (a) 3D printing has become popular in manufacturing many kinds of products.

Describe **three** advantages of 3D printing over other production methods.



12 marks  
3D printed  
Electric Guitar

Advantage 1: \_\_\_\_\_

\_\_\_\_\_

Advantage 2: \_\_\_\_\_

\_\_\_\_\_

Advantage 3: \_\_\_\_\_

\_\_\_\_\_

- (b) A handcycle as used in the Paralympics is shown. The frame and wheel rims are made from carbon fibre.



12 marks

- (i) Suggest **two** reasons for using carbon fibre.

Reason 1: \_\_\_\_\_

Reason 2: \_\_\_\_\_

- (ii) Why is a chain drive considered suitable for the handcycle?

\_\_\_\_\_

\_\_\_\_\_

- (c) Drones are a product of modern design and engineering.  
(i) Suggest **two** possible uses for drones that would help society in some way:

Use 1: \_\_\_\_\_

\_\_\_\_\_

Use 2: \_\_\_\_\_

\_\_\_\_\_

- (ii) Suggest **two** ways in which drones could prove to be a nuisance to society.

1. \_\_\_\_\_

2. \_\_\_\_\_



16 marks

Drone