



Coimisiún na Scrúduithe Stáit  
State Examinations Commission

## **TECHNOLOGY**

Junior Certificate Examination, 2006

HIGHER LEVEL

200 Marks

Wednesday, 21st June, Afternoon, 2:00 to 4:00

## **SECTION A**

### **INSTRUCTIONS**

1. Answer Section A (short answer questions). 100 marks
2. Answer either (a) or (b) from each question in Section B. 50 marks
3. Answer one question from Section C. 50 marks
4. Hand up this paper at the end of the examination along with answer sheets for Section B and C.

Centre  
Number

Examination  
Number

<b>For Examiner</b>	
<b>Total Mark</b>	
<b>Question</b>	<b>Mark</b>
<b>Section A</b>	
<b>Section B Q1 (a)</b>	
<b>(b)</b>	
<b>Q2 (a)</b>	
<b>(b)</b>	
<b>Section C Q3</b>	
<b>Q4</b>	
<b>Q5</b>	
<b>Q6</b>	
<b>Total</b>	
<b>Grade</b>	

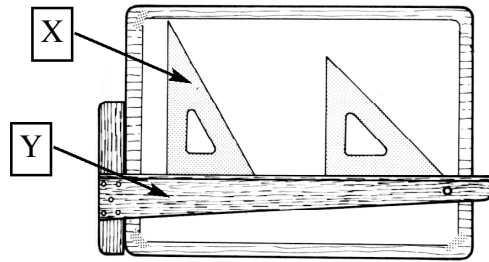
**MAKE SURE TO WRITE YOUR EXAMINATION NUMBER IN  
THE BOX PROVIDED ON THIS PAGE**

**Section A**

Answer 25 questions from this section - all questions carry equal marks.

100 marks

1. Name the drawing equipment shown.

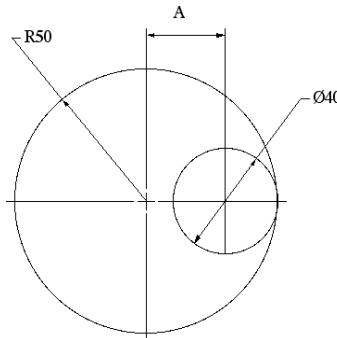


X: \_\_\_\_\_

Y: \_\_\_\_\_

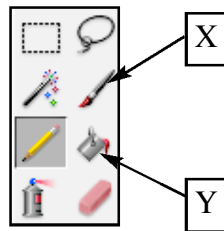
\_\_\_\_\_

2. Calculate the value of dimension A in the drawing shown.



A: \_\_\_\_\_

3. Explain the function of the symbols X and Y shown found in a graphics programme menu.



Function X: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Function Y: \_\_\_\_\_

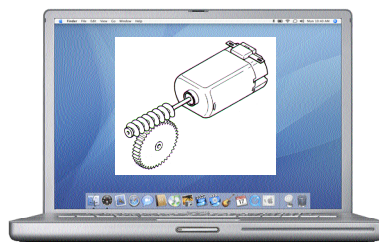
\_\_\_\_\_

\_\_\_\_\_

4. In relation to computers state the meaning of the following abbreviations:

(i) RAM

(ii) CAD



RAM: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

CAD: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

5. State where each of the symbols shown are found.



PS

X



Y

X: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Y: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

6. State **two** advantages of using plastic instead of aluminium in phone and credit cards.



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

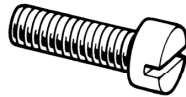
\_\_\_\_\_

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

\_\_\_\_\_

7. The sketch shows an M5 cheese head screw.

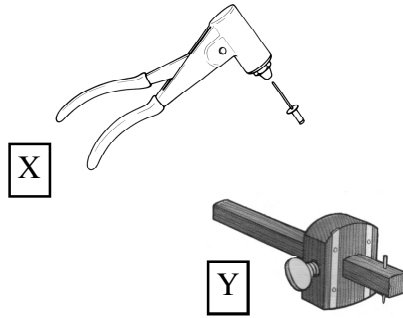
Explain the underlined term.



M: \_\_\_\_\_

5: \_\_\_\_\_

8. Name the tools shown.



X: \_\_\_\_\_

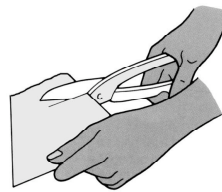
Y: \_\_\_\_\_

9. The sketch shows a shears cutting a non-ferrous metal.

Explain the underlined word

*and*

name **one** non-ferrous metal.



Non-ferrous: \_\_\_\_\_

\_\_\_\_\_

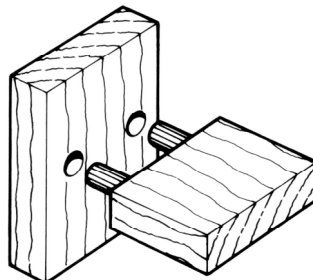
Name: \_\_\_\_\_

\_\_\_\_\_

10. Name the type of joint shown

*and*

name **one** place where this joint should be used.



Joint: \_\_\_\_\_

\_\_\_\_\_

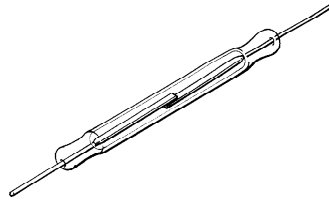
Where used: \_\_\_\_\_

\_\_\_\_\_

11. Name the type of switch shown

and

name the additional component required to activate this switch.



Switch: \_\_\_\_\_

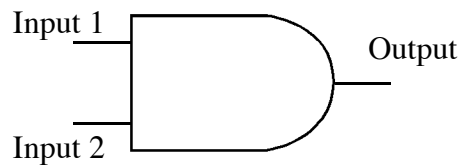
\_\_\_\_\_

\_\_\_\_\_

Component: \_\_\_\_\_

\_\_\_\_\_

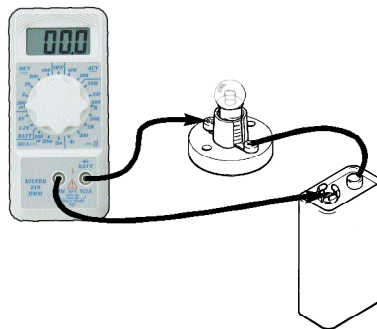
12. Complete the truth table for the logic gate shown.



Input 1	Input 2	Output
0	0	
1	0	
0	1	
1	1	

13. In relation to the operating circuit shown what is being measured by the multimeter?

What units are used in this measurement?



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

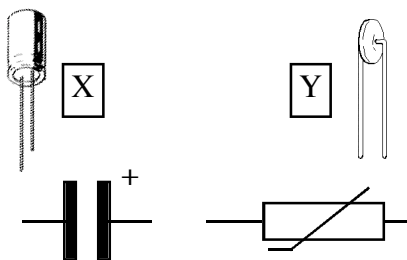
\_\_\_\_\_

\_\_\_\_\_

Units: \_\_\_\_\_

\_\_\_\_\_

14. Name the electrical components represented by the symbols shown.



X: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

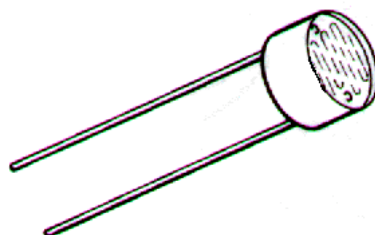
Y: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

15. The sketch shows an LDR.

Explain the meaning of the underlined term.

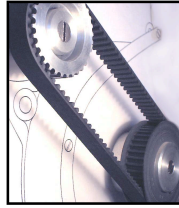


LDR: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

16. State **two** advantages to using a toothed belt over a chain in an inkjet printer.



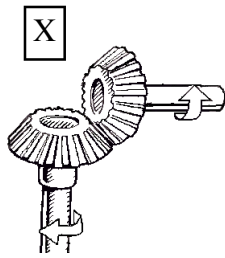
Advantage 1: \_\_\_\_\_

\_\_\_\_\_

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

\_\_\_\_\_

17. Name the mechanisms shown.



X: \_\_\_\_\_

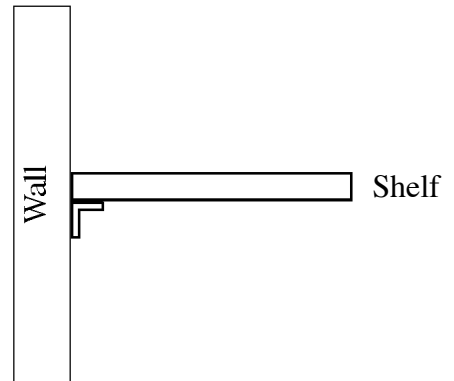
\_\_\_\_\_

Y: \_\_\_\_\_

\_\_\_\_\_

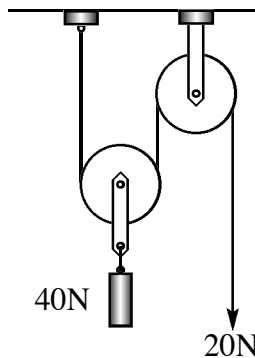
18. Identify clearly on the sketch where a tie should be placed to better support the shelf.

Name the force acting on the tie.



Force: \_\_\_\_\_

19. Calculate the mechanical advantage of the pulley system shown.

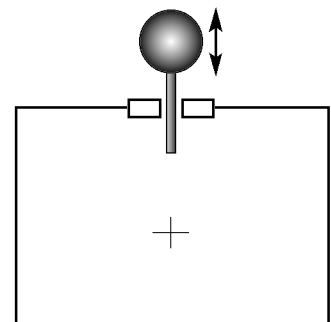


Mechanical advantage: \_\_\_\_\_

\_\_\_\_\_

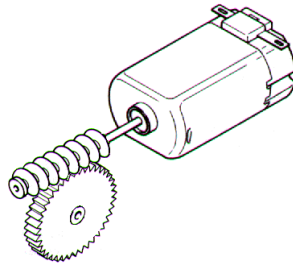
\_\_\_\_\_

20. Name and sketch a rotating mechanism which will produce the reciprocating motion shown.



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

21. Name **two** energy conversions taking place in an operating electric motor.



(i): \_\_\_\_\_  
to: \_\_\_\_\_  
\_\_\_\_\_

(ii): \_\_\_\_\_  
to: \_\_\_\_\_  
\_\_\_\_\_

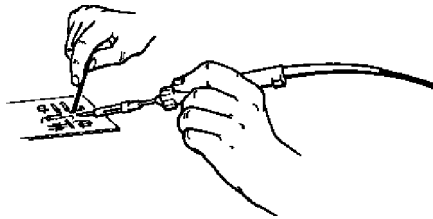
22. Name **two** properties found in man-made fabrics not found in natural fabrics.



(i): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(ii): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

23. State **two** safety precautions which must be observed when using a soldering iron.



(i): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(ii): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

24. State **two** advantages to digital cameras over film cameras.



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

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

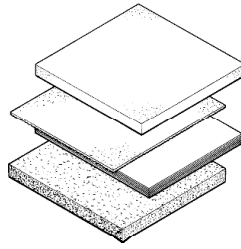
25. State **two** reasons why additives are used in modern food processing.



(i): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(ii): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

26. In relation to manufactured boards, explain the terms **MDF** and **Veneer**.



MDF: \_\_\_\_\_

\_\_\_\_\_

Veneer: \_\_\_\_\_

\_\_\_\_\_

27. Name **two** methods of transferring data between computers, other than through floppy discs.



(i): \_\_\_\_\_

\_\_\_\_\_

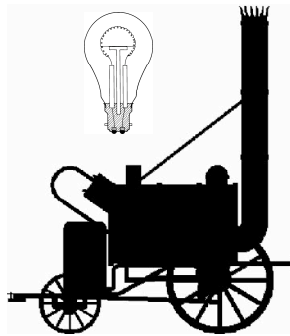
(ii): \_\_\_\_\_

\_\_\_\_\_

28. From the list of inventors shown identify the inventor associated with each of the named inventions.

Inventors:

G. Eastman, T. Edison,  
M. Faraday, G. Marconi,  
G. Stephenson, J. Dunlop.



**INVENTION**

**INVENTOR**

Light Bulb

Steam Train

Electric Motor

29. State **two** reasons why a completed task project should be evaluated.



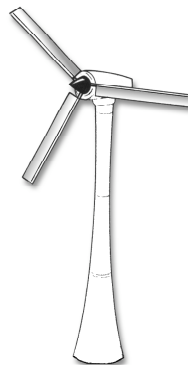
(i): \_\_\_\_\_

\_\_\_\_\_

(ii): \_\_\_\_\_

\_\_\_\_\_

30. State **two** disadvantages to wind energy as an alternative energy source.



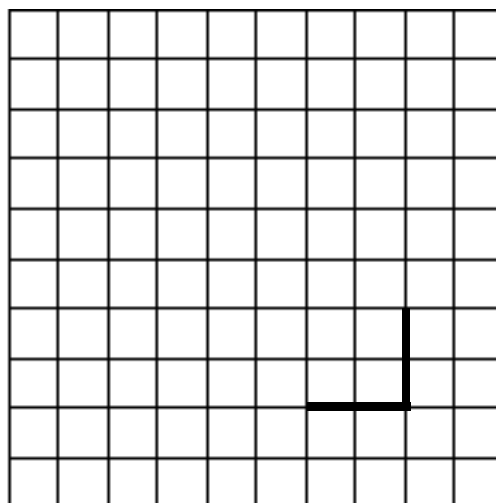
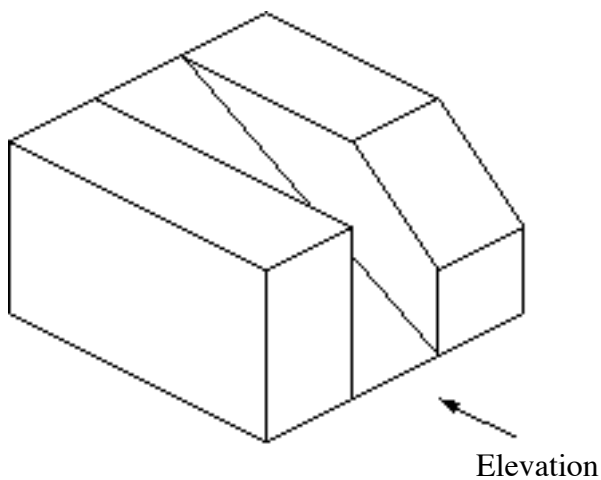
Disadvantage 1: \_\_\_\_\_

\_\_\_\_\_

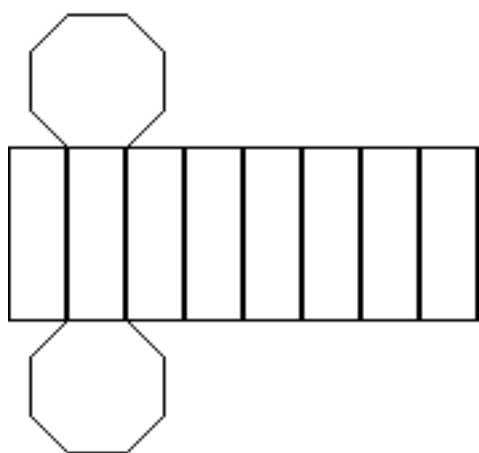
Disadvantage 2: \_\_\_\_\_

\_\_\_\_\_

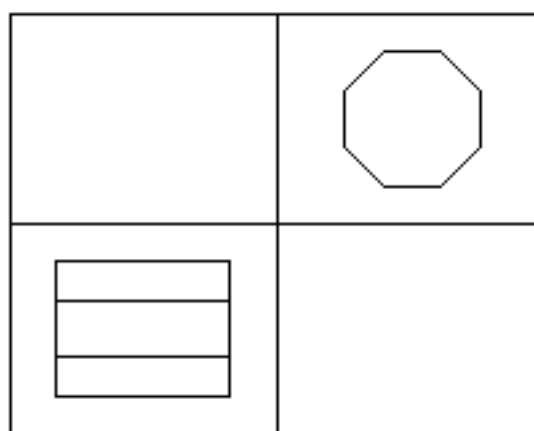
31. Complete the elevation of the component shown.



32. Sketch the missing orthographic view of the development shown.



Development



Orthographic view





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State Examinations Commission

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## **TECHNOLOGY**

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Junior Certificate Examination, 2006  
HIGHER LEVEL

200 Marks

Wednesday, 21st June, Afternoon, 2:00 to 4:00

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### **SECTION B and SECTION C**

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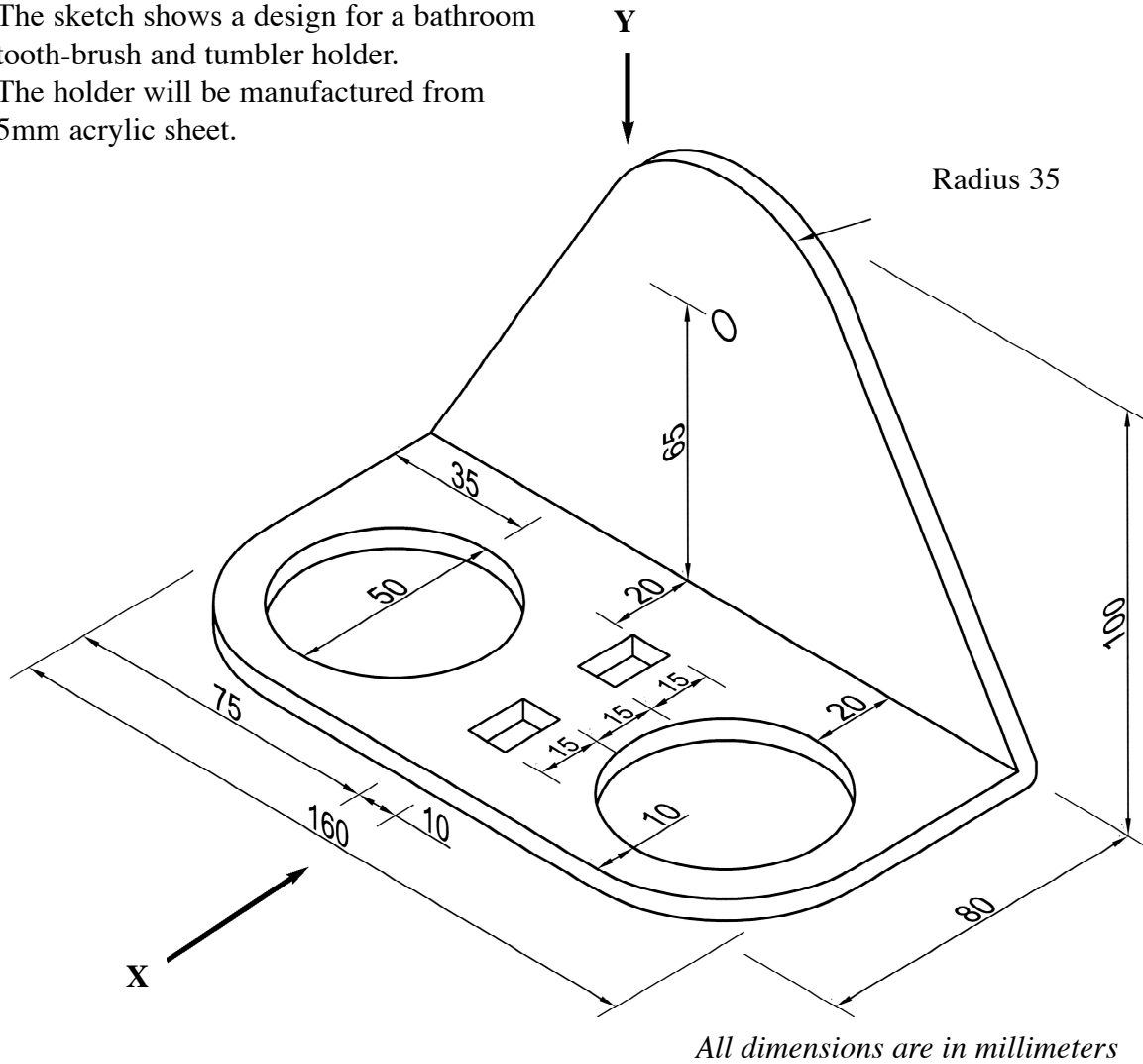
SECTION B - 50 Marks

SECTION C - 50 Marks

#### INSTRUCTIONS

1. Answer either (a) or (b) from each question in Section B.
2. Answer one question from Section C.
3. Make sure to hand up Section A with your answer sheets to this paper.

- 1 (a) The sketch shows a design for a bathroom tooth-brush and tumbler holder. The holder will be manufactured from 5mm acrylic sheet.



- (i) Using a suitable scale sketch:

1. An elevation looking in the direction of arrow 'X'.
2. A plan view looking in the direction of arrow 'Y'.

Include all dimension lines in your sketch.

10 marks

- (ii) 1. Describe the steps required to cut the circular and rectangular holes in the acrylic.
2. Describe the steps required to bend acrylic sheet to the angle shown.

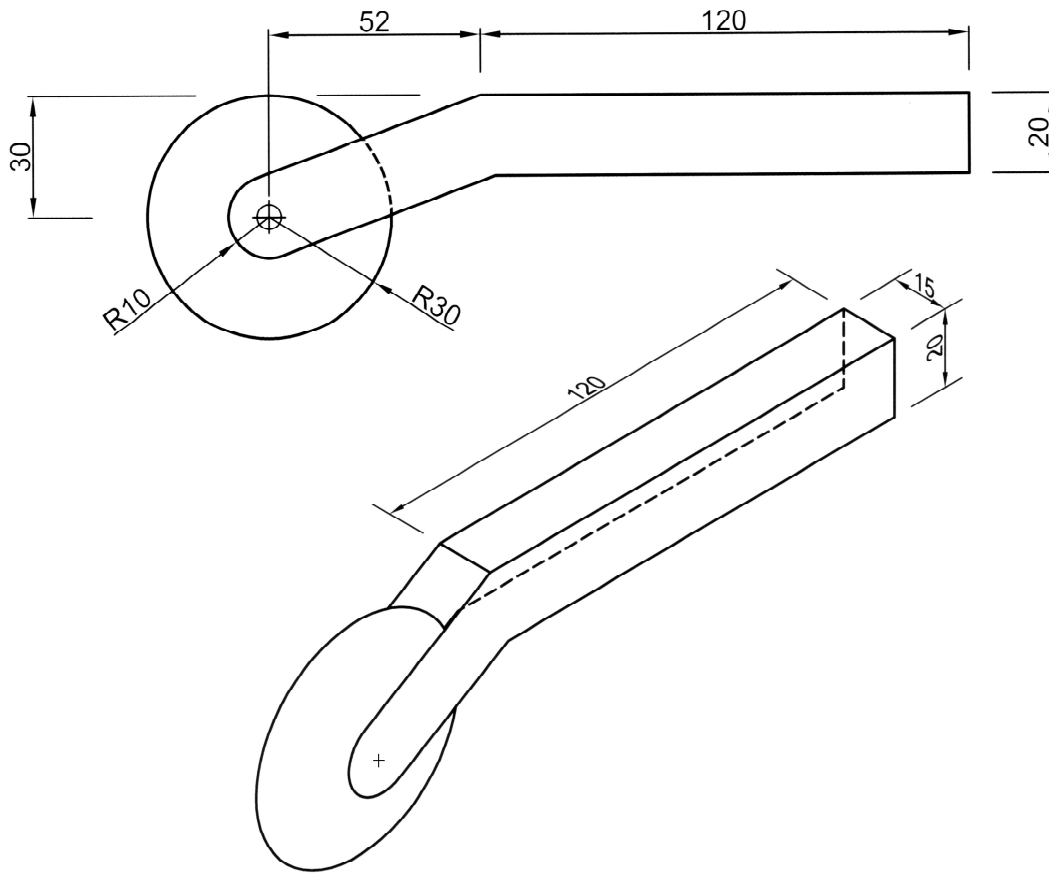
10 marks

- (iii) State **two** reasons why acrylic is a suitable material for this holder.

5 marks

- OR -

1 (b) The sketch shows a design for a pizza cutter in elevation and isometric view.

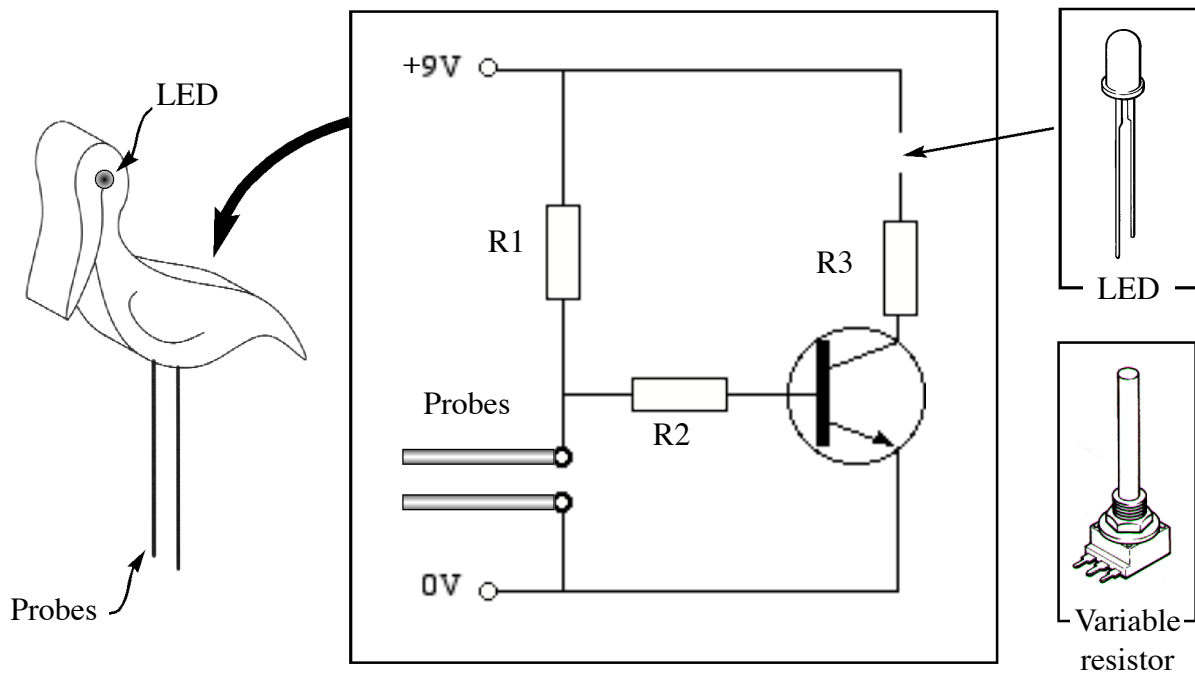


*All dimensions are in millimeters*

- (i) Using a suitable scale, draw a development of the material required to manufacture the handle. Indicate clearly all bend lines and show the overall dimensions.
- 10 marks
- (ii) Name a suitable material and describe the steps required to shape the material into the handle design shown.
- 5 marks
- (iii) 1. Indicate clearly how the wheel is mounted into the handle and sketch a means to allow the wheel to rotate freely on its axle.
2. When using the pizza cutter, the handle was found to be uncomfortable to hold. Sketch a design modification to correct this fault.

10 marks

- 2 (a) A moisture sensitive circuit, mounted in the body of the wooden bird, is required to light a red LED when the metal probes (legs) sense dry soil.

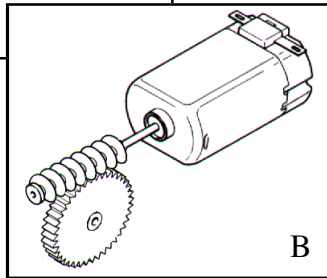
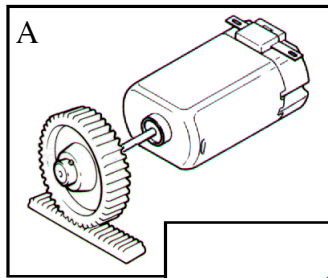


- (i)
1. Sketch the electronic symbol for the LED and show how the LED should be connected to the +9V line in the circuit shown.
  2. Using a sketch of the transistor symbol shown, name and identify the three contacts on the transistor.
- 10 marks
- (ii)
1. Explain the effect on the circuit of changing the positions of R1 and the probes.
  2. Explain why a variable resistor is recommended as a replacement for R1. Sketch the symbol for a variable resistor.
- 10 marks
- (iii) The manufacturer data for the LED is as follows:  $V_f = 2V$ ,  $I_{max} = 20mA$ . Ignoring the resistance of the transistor, use this data to calculate the value of R3.

5 marks

- OR -

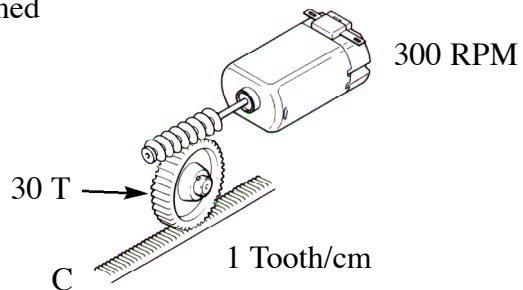
- 2 (b) A student intends to build a model of a motor driven car lift based on the image shown. The mechanisms labelled A and B are available for use in the model.



- (i)
1. Name the mechanisms attached to the motor in A.
  2. Name the mechanisms attached to the motor in B.
  3. State **two** advantages of mechanism B over mechanism A.

10 marks

- (ii) The student decided to use the combined mechanism shown.



1. If the motor speed is 300RPM, calculate the distance moved by part C in 2 minutes.
2. Name the type of switch required to allow the motor turn clockwise and anticlockwise.

10 marks

- (iii) A pneumatic version of this car lift is also available.

1. Explain the underlined word.
2. Name one other everyday use of pneumatics.

5 marks

## Section C - 50 Marks

Answer **one** question from this section - all questions carry equal marks.

This section relates to **Technology & Society, Control Systems** and **Design & Manufacture**.

### 3. Technology and Society

Green technology has been described as any technology which is environmentally friendly.



- (a) (i) Explain, giving **two** reasons, why it is important that technology should be 'Green'.
- (ii) Explain, using **two** appropriate examples, how 'Green' technologies are used in modern transport systems.
- (iii) Explain, using **two** appropriate examples, how 'Green' technologies are used in modern buildings.

30 marks

Communication technologies are an important part of a modern business.

- (b) (i) Outline, using **two** appropriate examples, how these technologies operate in a modern business.
- (ii) Outline, using **two** appropriate examples, the benefits these technologies have brought to consumers.

20 marks

#### 4. Control Systems & Technology and Society

Microprocessor controlled robotic devices are available to vacuum and clean in the home. The robot shown recharges from a wall power socket when required.



- (a) (i) Explain why these devices are referred to as ‘robots’.
- (ii) Explain **two** functions of a ‘microprocessor’ in these devices.
- (iii) Explain how these devices could ‘identify’ and ‘avoid’ a wall in a room.
- (iv) Explain how these devices could ‘remember’ where to go to recharge.

30 marks

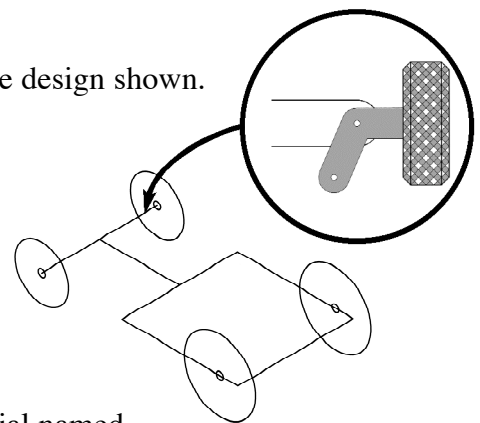
Industry robots are commonly used in cleaning, storage and manufacturing.

- (b) (i) Outline **two** advantages to using robots in industry.
- (ii) Explain, using **two** appropriate examples, the job skills required to operate or maintain industrial robots.

20 marks

#### 5. Design and Manufacture

A student is required to manufacture a racing cart based on the design shown.



- (a) (i) Name **two** materials from which the cart frame could be manufactured. State **one** advantage and **one** disadvantage to each material.
- (ii) Outline **one** manufacturing and **one** finishing process required for each material named.

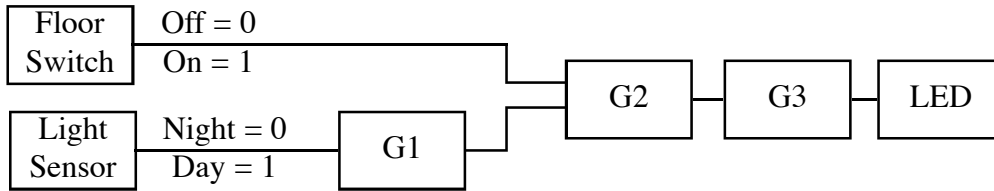
20 marks

- (b) (i) Sketch in plan and elevation, a suitable lightweight body structure for the cart.
- (ii) Sketch and label a suitable steering system for the cart design shown.
- (iii) Sketch and label a suitable brake system for the cart.

30 marks

## 6. Control Systems

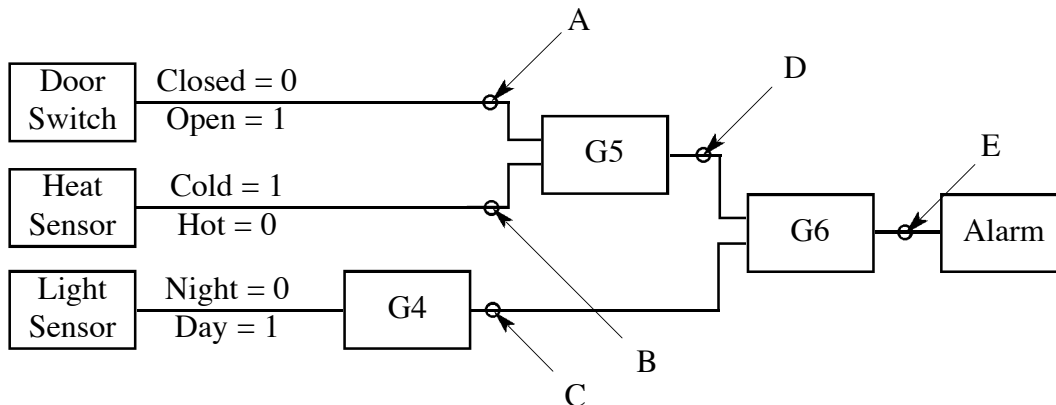
The parents of a young child require a system to light a flashing LED in the parent's bedroom, if the child gets out of bed during the night. The automatic system should operate only in the dark. A block diagram of a possible system is shown. A latch is required at G3.



- (a) (i) Identify the logic gates required at G1, and G2.  
 (ii) Sketch and complete a truth table for logic gate G1.  
 (iii) Explain why a latch is required at G3.

20 marks

A second system is required to sound an alarm, if the bedroom temperature drops or if the child leaves the bedroom at night.



- (b) (i) Identify the logic gates required at G4, G5 and G6.  
 (ii) Copy and complete the line from the truth table for this system for the logic states shown.

A	B	C	D	E
0	1	1		

20 marks

- (c) Many modern household appliances contain electronic control systems.

Name **two** such appliances and outline the features provided by the electronic control systems.

10 marks