



Coimisiún na Scrúduithe Stáit  
State Examinations Commission

## TECHNOLOGY

Junior Certificate Examination, 2007

HIGHER LEVEL

200 Marks

Wednesday, 20th 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

For Examiner	
Total Mark	<input style="width: 100%; height: 100%;" type="text"/>
Question	Mark
<b>Section A</b>	
<b>Section B Q1 (a)</b>	<input style="width: 100%; height: 100%;" type="text"/>
(b)	<input style="width: 100%; height: 100%;" type="text"/>
<b>Q2 (a)</b>	<input style="width: 100%; height: 100%;" type="text"/>
(b)	<input style="width: 100%; height: 100%;" type="text"/>
<b>Section C Q3</b>	
<b>Q4</b>	<input style="width: 100%; height: 100%;" type="text"/>
<b>Q5</b>	<input style="width: 100%; height: 100%;" type="text"/>
<b>Q6</b>	<input style="width: 100%; height: 100%;" type="text"/>
<b>Total</b>	<input style="width: 100%; height: 100%;" type="text"/>
<b>Grade</b>	<input style="width: 100%; height: 100%;" type="text"/>

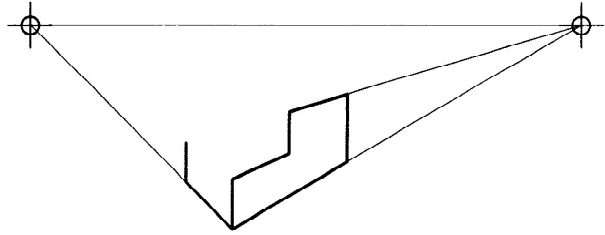
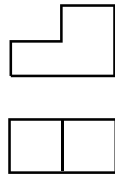
MAKE SURE TO WRITE YOUR EXAMINATION NUMBER IN  
THE BOX PROVIDED ON THIS PAGE

**Section A**

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

100 marks

1. Complete the perspective view of the object shown.



2. Shade the cylinder to indicate a light source from the direction shown.



3. State **two** reasons why a bar code graphic is used on consumer products.



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

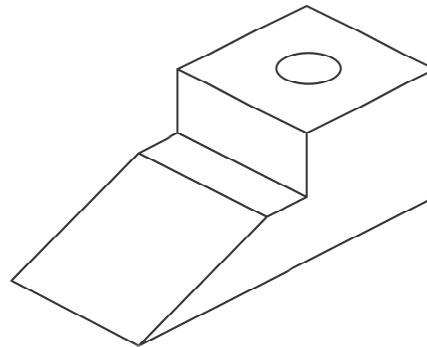
\_\_\_\_\_

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

\_\_\_\_\_

4. Show clearly on the sketch, the three dimension lines:

overall length (L),  
overall height (H) and  
diameter (D) of opening shown.



5. State the meaning of each of the symbols shown.



X



Y

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

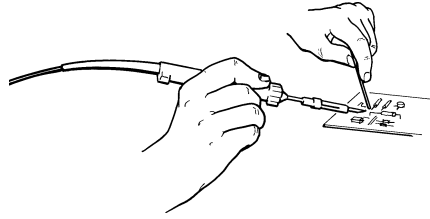
\_\_\_\_\_

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

\_\_\_\_\_

6. Electrical solder is an alloy of two metals.

Name the **two** metals.



Metal 1: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

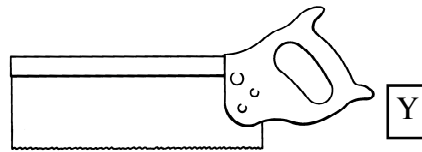
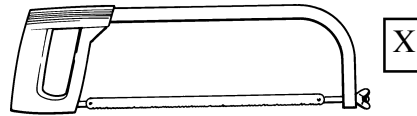
Metal 2: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

7. Name the saws shown

*and*

name a material suitable for cutting with each saw.



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

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

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

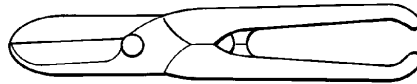
Material: \_\_\_\_\_

\_\_\_\_\_

8. Name the tool shown

*and*

state why it is **not** suitable for cutting acrylic sheet.



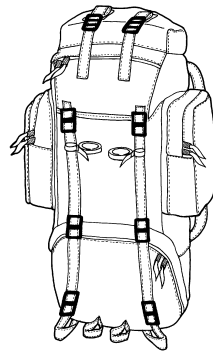
Tool: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

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

\_\_\_\_\_  
\_\_\_\_\_

9. Name **two** fabric properties which are found in a modern rucksack.



Property 1: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

Property 2: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

10. Name the type of drill bit shown

*and*

state where this drill bit should be used.



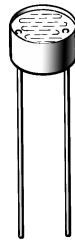
Drill bit: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

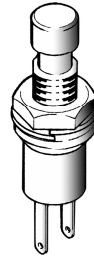
Where used: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

11. Sketch the electronic symbols for the components shown.



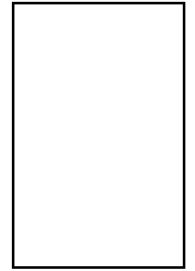
LDR



PTM switch

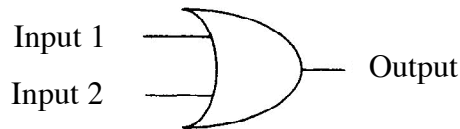


LDR symbol



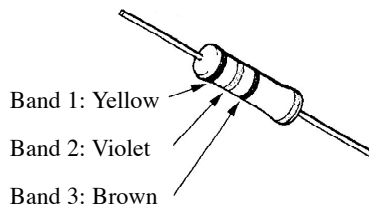
PTM switch symbol

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



Input1	Input 2	Output
1	1	
1	0	
0	1	
0	0	

13. Using the table shown, determine the resistance of the resistor.



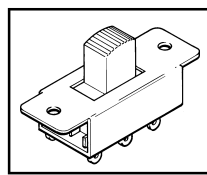
Colour	Value
Black	0
Brown	1
Red	2
Orange	3
Yellow	4
Green	5
Blue	6
Violet	7
Grey	8
White	9

Resistance: \_\_\_\_\_

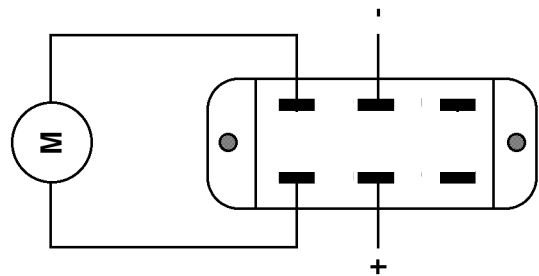
\_\_\_\_\_

\_\_\_\_\_

14. Indicate on the sketch, how the double pole double throw switch should be wired to allow a motor to turn clockwise or anticlockwise.

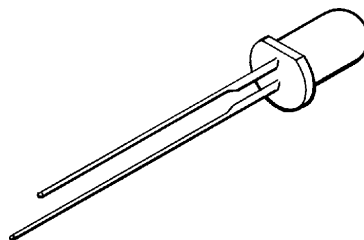


Double pole double throw switch



15. The sketch shows an LED.

State **two** ways in which the negative leg could be identified.



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

\_\_\_\_\_

\_\_\_\_\_

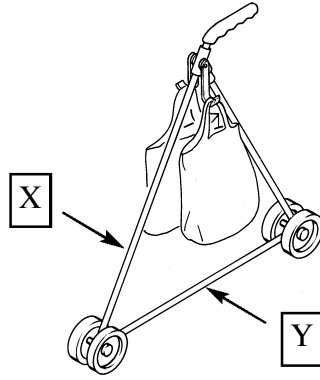
2: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

16. The sketch shows a bag carrier.

Name the main forces acting on the members X and Y shown.



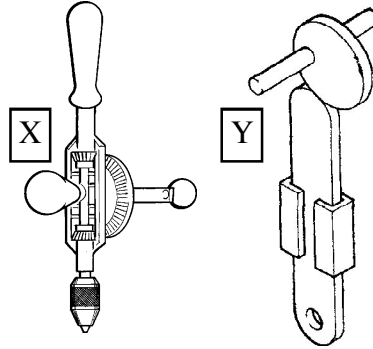
Force on X: \_\_\_\_\_

\_\_\_\_\_

Force on Y: \_\_\_\_\_

\_\_\_\_\_

17. Name the mechanisms shown.



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

\_\_\_\_\_

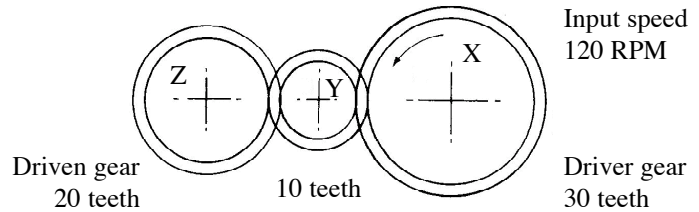
Y: \_\_\_\_\_

\_\_\_\_\_

18. Indicate the direction of motion

and

calculate the speed of the gear Z in the gear train shown.

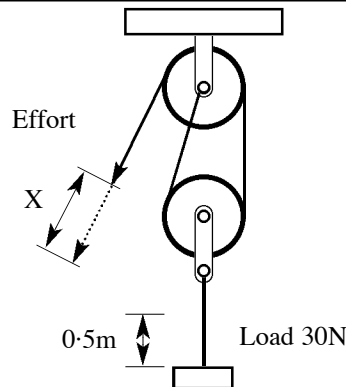


Speed : \_\_\_\_\_

\_\_\_\_\_

19. The pulley system shown lifts a load of 30N a height of 0.5m.

Calculate  
(i) the effort force,  
(ii) the distance moved, X.



Effort force: \_\_\_\_\_

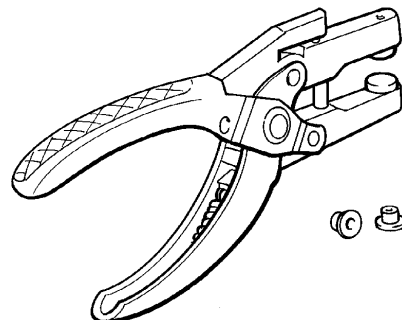
\_\_\_\_\_

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

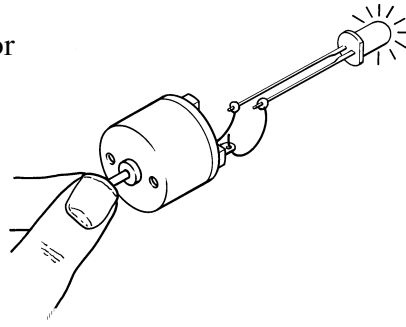
\_\_\_\_\_

20. Mark clearly on the rivet punch shown the position of:

the Load (L),  
and  
the Fulcrum (F).



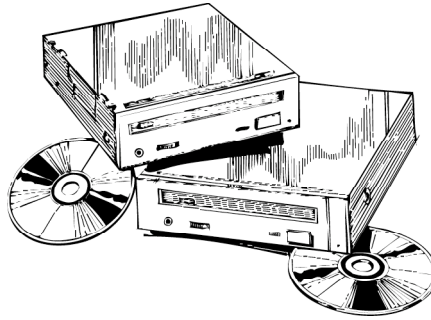
21. Name **two** energy conversions taking place when the generator shown lights the LED.



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

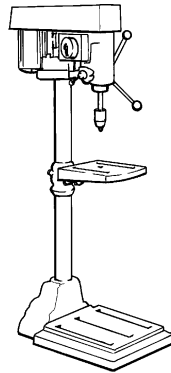
22. State the meaning of the following abbreviations:

- (i) CD,
- (ii) DVD.



CD: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
  
DVD: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

23. State **two** safety precautions which must be observed when using a pillar drill.



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

24. Indicate clearly on the frame (*fig.1*) the location of a tie which will stop the frame deforming as shown (*fig. 2*).

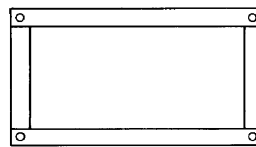


fig.1

Explain how the tie works.

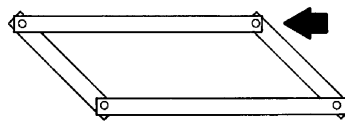
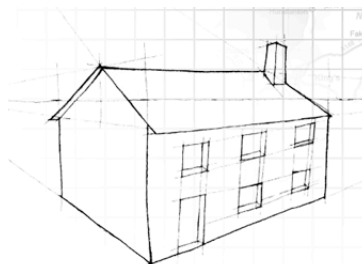


fig.2

Ans: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

25. State **two** ways in which technology has contributed to energy conservation in the home.



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

26. State **two** safety features found in modern cars.



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

\_\_\_\_\_

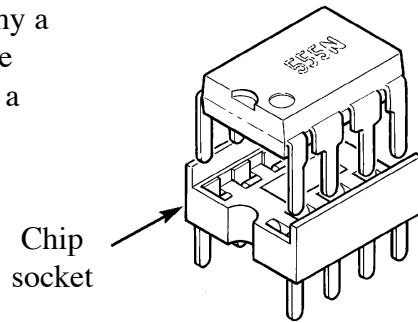
\_\_\_\_\_

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

\_\_\_\_\_

\_\_\_\_\_

27. State **two** reasons why a chip socket should be used when attaching a chip to a circuit.



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

\_\_\_\_\_

\_\_\_\_\_

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

\_\_\_\_\_

\_\_\_\_\_

28. Name **two** energy sources, other than fossil fuels, which could be used in public transport.



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

\_\_\_\_\_

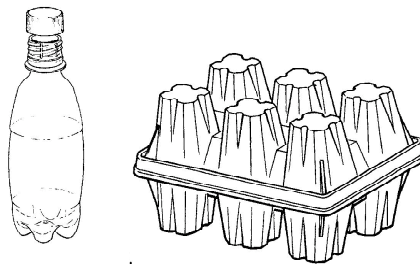
\_\_\_\_\_

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

\_\_\_\_\_

\_\_\_\_\_

29. Name **two** processes by which plastic packaging can be formed.



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

\_\_\_\_\_

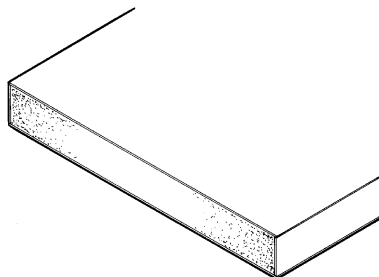
\_\_\_\_\_

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

\_\_\_\_\_

\_\_\_\_\_

30. State **two** advantages to manufactured boards over natural wood.



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

\_\_\_\_\_

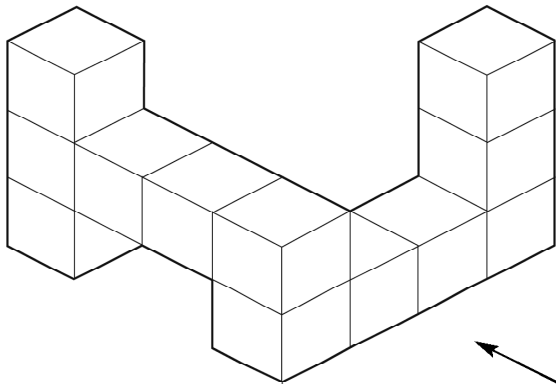
\_\_\_\_\_

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

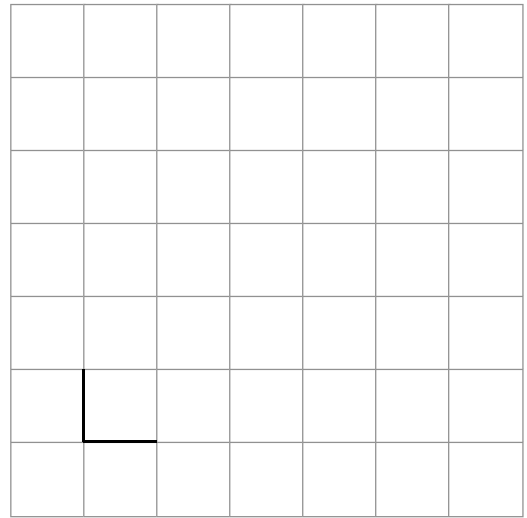
\_\_\_\_\_

\_\_\_\_\_

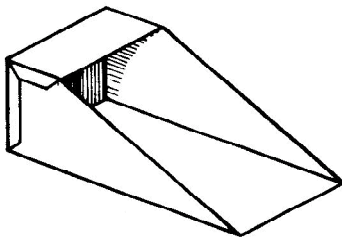
31. Complete the end view of the component shown.



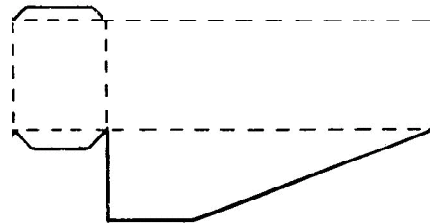
End view



32. Complete the development of the scoop shown.



Scoop



Development





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State Examinations Commission

## TECHNOLOGY

Junior Certificate Examination, 2007  
HIGHER LEVEL

200 Marks

Wednesday, 20th June, Afternoon, 2:00 to 4:00

### SECTION B and SECTION C

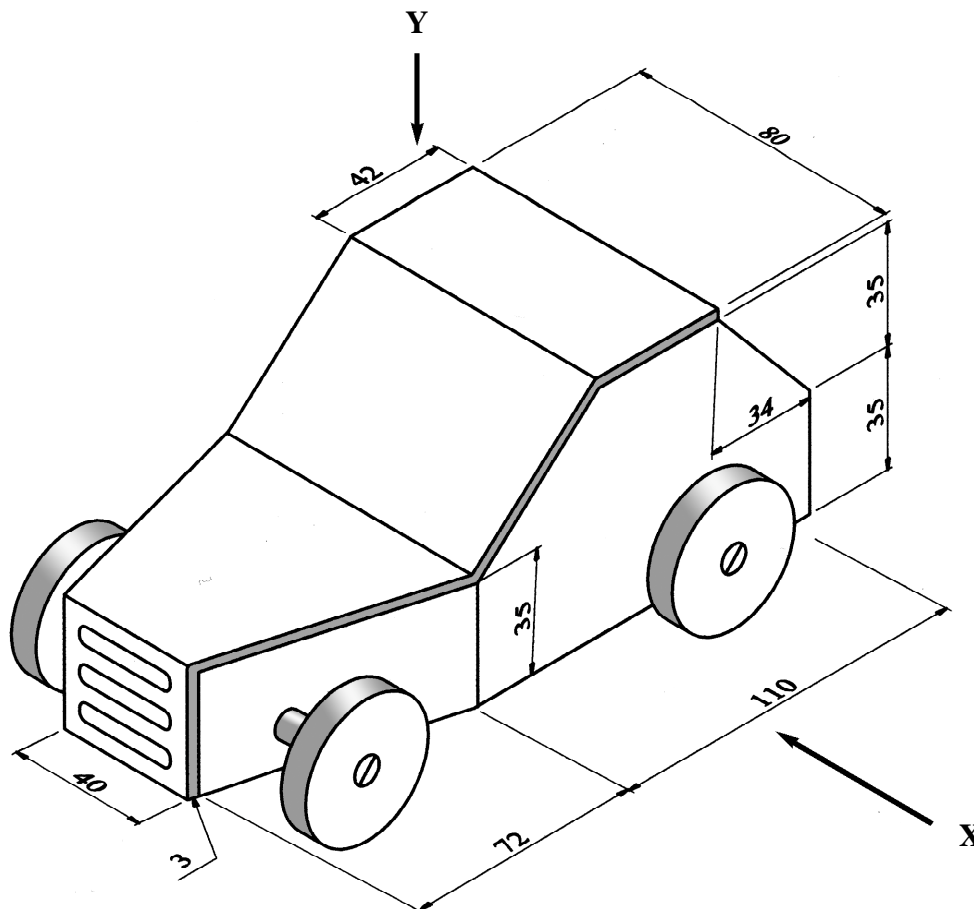
SECTION B - 50 Marks

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 student design for a motorised toy beach buggy. The buggy will be manufactured from yellow acrylic (top surface) and red acrylic (all other panels).



*All dimensions are in millimeters*

- (i) Using a suitable scale sketch the following views:

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

Omit the axle and wheels in your sketch.  
Include all dimension lines in your sketch.

10 marks

- (ii) 1. Describe the steps required to shape and finish the acrylic top surface of the buggy. Name the tools required.
2. Indicate, using a suitable sketch, how the battery for the motor could be easily accessed and changed.

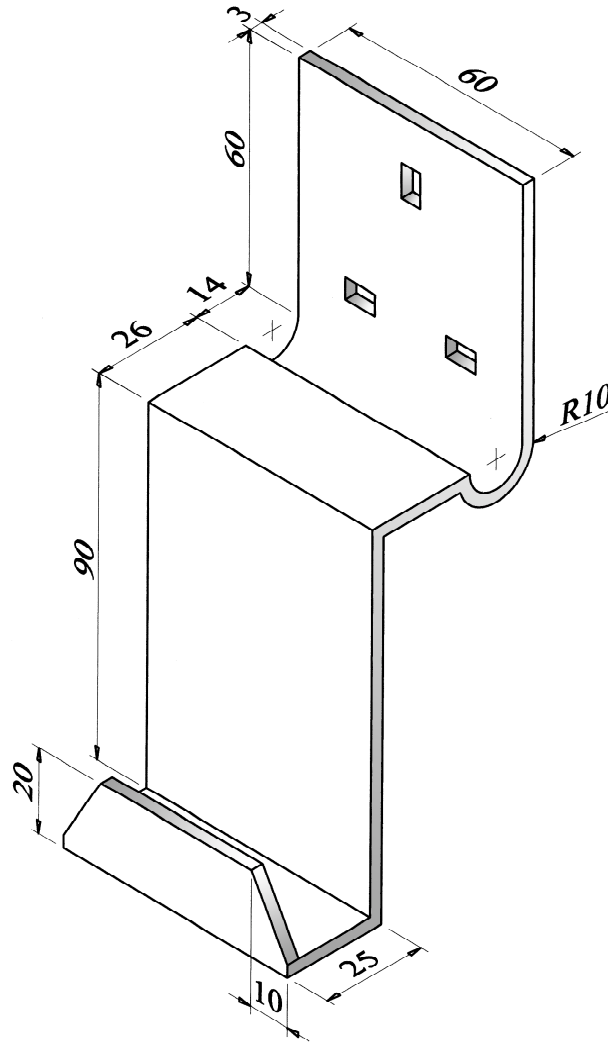
10 marks

- (iii) During testing, the buggy wheels became embedded in sand. Sketch a design modification which will correct this fault.

5 marks

- OR -

- 1 (b) The sketch shows a student design for an acrylic mobile phone holder with a built in socket attachment. The holder is designed to support the phone when charging.



*All dimensions are in millimeters*

- (i) Using a suitable scale, sketch a development of the material required to manufacture the holder.

Indicate clearly all bend lines and show the overall dimensions.

10 marks

- (ii) 1. Name the equipment used and describe the steps required to shape the acrylic.

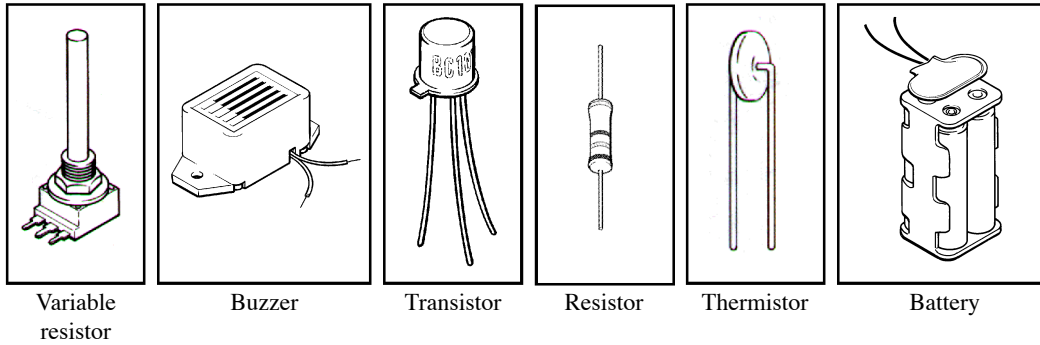
2. State **two** reasons why acrylic is a suitable material for this holder.

10 marks

- (iii) Sketch a design modification to prevent the phone falling out of the unit when charging.

5 marks

- 2 (a) A temperature sensitive circuit is required to sound a buzzer when low temperatures are detected. The components shown below are available to construct the circuit.



- (i) Sketch the electronic symbol for each component shown.

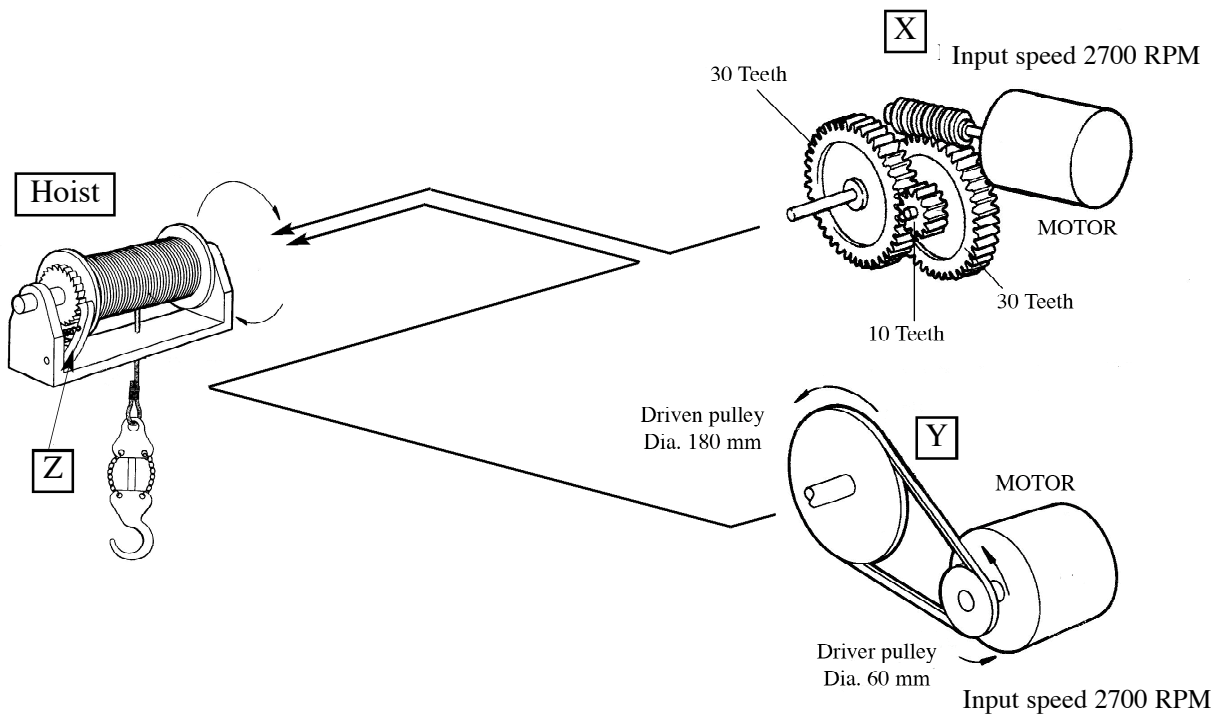
10 marks

- (ii) 1. Explain which of the three contacts on the variable resistor should be used in constructing the potential divider for this circuit.
2. Sketch the circuit diagram for this circuit.
3. If the components of the potential divider are interchanged, what effect will this have on the operation of the circuit?
4. Sketch a modification to the circuit to include a PTB switch which will test if the circuit is working without reaching low temperatures.

15 marks

- OR -

- 2 (b) A student intends to attach a motor driven mechanism to the hoist shown. The mechanisms labelled X and Y are available to drive the hoist.



- (i) 1. Name the mechanisms attached to the motor in X.  
2. State **two** advantages to mechanism X over mechanism Y in driving the hoist.

10 marks

- (ii) The motor turns at 2700 RPM in both mechanisms.  
1. Calculate the output speed in mechanism X.  
2. Calculate the output speed in mechanism Y.

10 marks

- (iii) Name and state the function of the feature identified at Z on the hoist.

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

Advanced electronics technologies are at the core of modern handheld communication and music devices.

Many of these devices can:

- (i) take digital images,
- (ii) play mp3 files and
- (iii) download files.



- (a) (i) Explain each of the three functions above.
- (ii) Explain why many of these devices are considered 'disposable'.

20 marks

The development of the world wide web, and the supporting technology, has brought about great changes to society in recent years.

- (b) Explain, using **two** appropriate examples, the impact the world wide web has on society.

10 marks

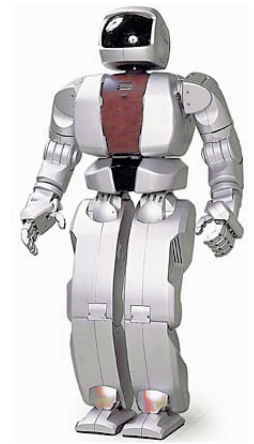
Forecasters warn of an energy crisis in the developed world.

- (c) (i) Explain, using **two** appropriate examples, the reason for this energy crisis.
- (ii) Outline, using **two** appropriate examples, how technology might be used to reduce the impact of this energy crisis.

20 marks

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

Robotic figures are commonly available as microprocessor controlled toys.



- (a) (i) Describe **two** functions available in these robot toys.
- (ii) Explain the role of a 'microprocessor' in the operation of these robots.
- (iii) Explain why the movements of these robots are slow.

20 marks

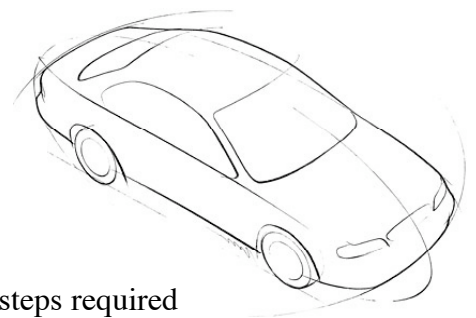
Industrial robots are commonly used in motorcar production lines.

- (b) (i) Explain, giving **two** reasons, why industrial robots are preferred to workers on production lines.
- (ii) Explain, giving **two** reasons, why it is unlikely that industrial robots will replace all workers in production industry.
- (iii) Explain, giving **two** reasons, why many companies have moved manufacturing plants from the developed world to developing countries.

30 marks

#### 5. Design and Manufacture

A student is required to manufacture a motorised model car based on the design shown.



- (a) (i) Describe, with the aid of suitable sketches, the steps required to manufacture the body from plastic sheet by vacuum forming.
  - (ii) Describe, with the aid of suitable sketches, how the body could be attached to an aluminium baseplate. The body must be easily attached and removed from the baseplate.
- (b) (i) Describe, with the aid of suitable sketches, the steps required to motorise the design shown.
  - (ii) Sketch the circuit diagram required to light two white LED headlights and two red LED tail-lights in the design shown.

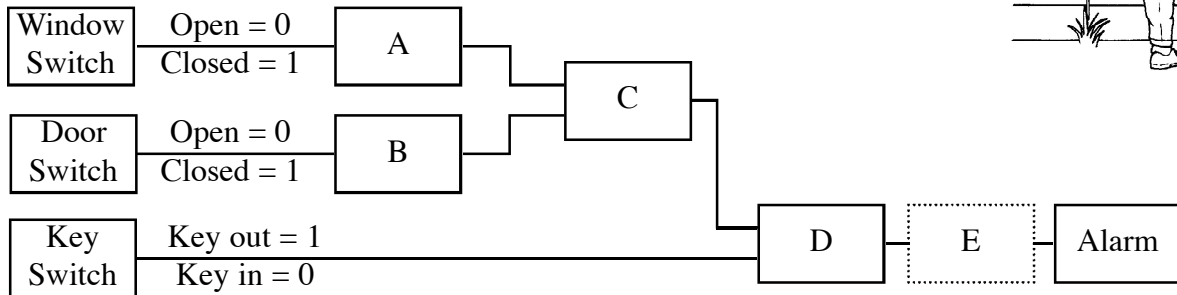
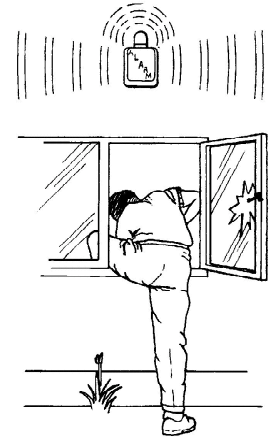
30 marks

20 marks

**6. Control Systems**

A block diagram for a burglar alarm control system is shown.

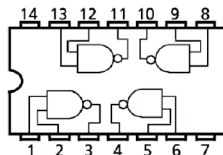
The system, controlled by a master key, will sound an alarm if a window or door is opened. The window and door switches produce a logic state of '0' when opened. A master key must be inserted to turn off the system and produce a logic state of '0'.



- (a) (i) Explain why a reed switch is suitable for use in the door and window.
- (ii) Identify the logic gates required at A, B, C and D.
- (iii) Sketch and complete a truth table for logic gates A and D.
- (iv) A latch is required at E. Explain the function of a latch in the system.

30 marks

- (b) A NAND logic gate is a combination of an AND gate followed by a NOT gate. These logic gates are available in a single chip similar to the one shown.



- (i) Sketch and complete a truth table for a NAND gate.
- (ii) Use a truth table to identify the logic gate produced when two NAND gates are combined as shown.

20 marks

