Centre Number	Candidate Number	Candidate Name

NAMIBIA SENIOR SECONDARY CERTIFICATE

DESIGN AND TECHNOLOGY ORDINARY LEVEL 4129/1

PAPER 1 2 hours

Marks 100 **2017**

Additional Materials: A3 drawing paper for Question 11 only
Non-programmable calculator
Standard drawing equipment

INSTRUCTIONS AND INFORMATION TO CANDIDATES

- Write your Centre Number, Candidate Number and Name in the spaces at the top of this page and on all separate answer sheets used.
- Write in dark blue or black pen.
- You may use a soft pencil for any rough work, diagrams or graphs.
- Do not use correction fluid.
- Do not write in the margin *For Examiner's Use*.
- You may use blank pages for workings or when answers are crossed out and corrected.
- The number of marks is given in brackets [ ] at the end of each question or part question.
- You may use a non-programmable calculator.

Part A

- Answer **all** questions.
- Write your answers in the spaces provided on the Question Paper.
- You should spend about 30 minutes on **Part A.**

Part B

- Answer **one** question.
- **Question 11** should be answered on the separate A3 drawing paper.
- At the end of the examination fasten your A3 work to this question paper.
- **Questions 12** and **13** should be answered in the spaces provided on the question paper.

For Examiner's Use		
Part A		
Part B	**11**	.....
	12	.....
	13	.....
TOTAL		

Marker	
Checker	

This document consists of **26** printed pages and **2** blank pages.

Republic of Namibia

MINISTRY OF EDUCATION, ARTS AND CULTURE

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Part A

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Answer the questions from **Part A** in the spaces provided.

1 Fig. 1 shows an electric arc welding machine.

Fig. 1

(a) Name **two** types of safety equipment that must be used when operating the electric arc welding machine.

1 .....

2 ..... [2]

(b) State the purpose of each of the types of safety equipment mentioned in **1(a)**.

1 .....

.....

2 .....

..... [2]

2 Fig. 2 shows a see-saw.

Fig. 2

(a) Suggest **four** possible improvements that could be made to the see-saw to improve its aesthetics and safety.

1 .....

.....

2 .....

.....

3 .....

.....

4 .....

..... [4]

3 Give **three** benefits of solar energy.

1 .....

.....

2 .....

.....

3 .....

..... [3]

For Examiner's Use

4 Fig. 3 shows a rubbish heap with redundant material.

Fig. 3

(a) Define *redundant material.*

.....

.....

.....

..... [2]

(b) Describe **one** method in which redundant material could be disposed of.

.....

.....

.....

..... [2]

5 Fig. 4 shows an egg holder with an egg inside.

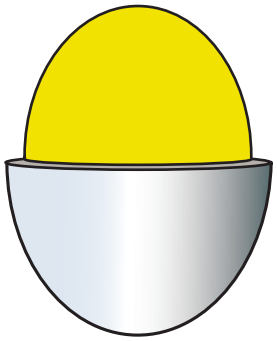

Fig. 4

(a) Evaluate the egg holder in terms of stability and shape.

Stability .....

.....

Shape.....

..... [2]

(b) Use sketches and notes to show **one** improvement that could be made to the egg holder.

[3]

6 Fig. 5 shows two types of garden gate. Gate **A** is made from wood and gate **B** is made from metal.

A **B**

Fig. 5

(a) Explain the purpose of the diagonal bar on gate **A**.

.....

.....

.....

..... [2]

(b) Give a reason why this type of hinge is used on gate **A**.

.....

..... [1]

(c) For gate **B**, give **two** possible surface treatments, other than paint, to prevent corrosion.

1 .....

.....

2 .....

..... [2]

7 Fig. 6 shows the laminated under frame for a small stool.

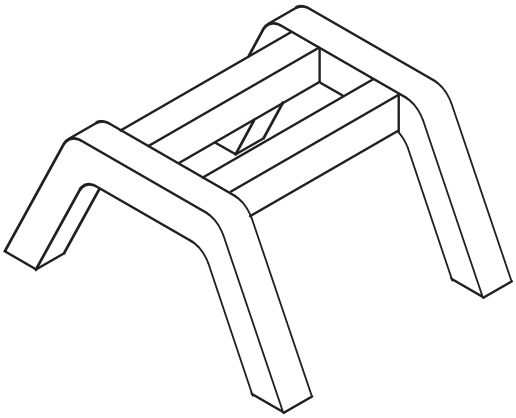

Fig. 6

Use sketches and notes to explain *laminated.*

[4]

8 Fig. 7 shows a tap and a garden hose.

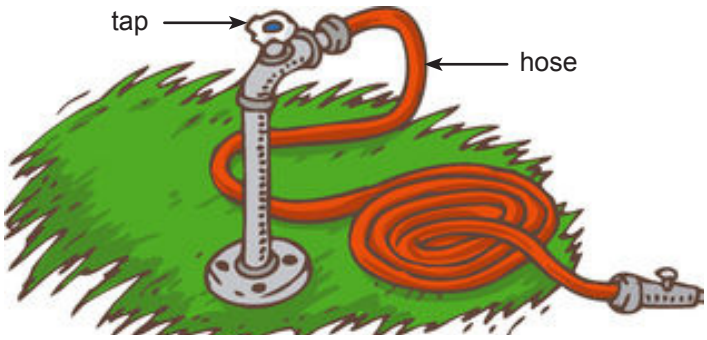

Fig. 7

(a) Name a plastic forming process that could be used to produce the garden hose.

..... [1]

(b) Give **two** reasons why brass could be used to make the tap.

1 .....

.....

2 .....

..... [2]

9 Fig. 8 shows a container made of card.

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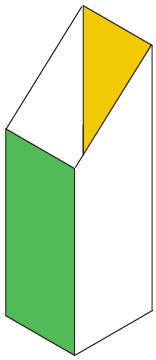

Fig. 8

Draw a freehand sketch to show the development (net) of the container.

Indicate possible tabs on the development.

[4]

10 Fig. 9 shows a garden rake.

For Examiner's Use

Fig. 9

Write a very concise design brief for the rake in Fig. 9.

.....

.....

.....

.....

.....

.....

.....

..... [4]

[40]

Part B

Answer one question from Part B.

11 Design Communication (pages 10 to 13 of this booklet)

Answer the whole of this question on separate A3 drawing paper.

Fig. 10 shows a front view of a dome tent which provides outdoor accommodation for tourists on a camping site.

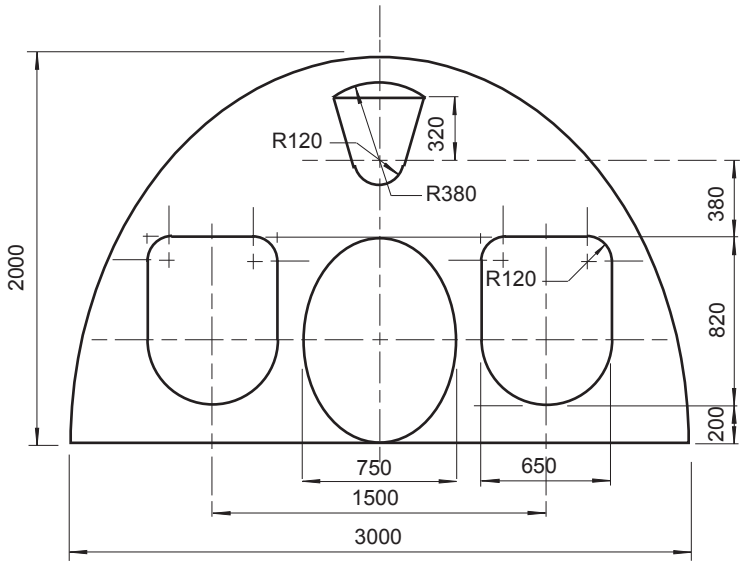

Fig. 10

(a) Use instruments to accurately draw to **scale 1:20** a front view of the dome tent.

Show all construction lines. [20]

(b) Fig. 11 shows a sign that will be displayed at the entrance to the camping site.

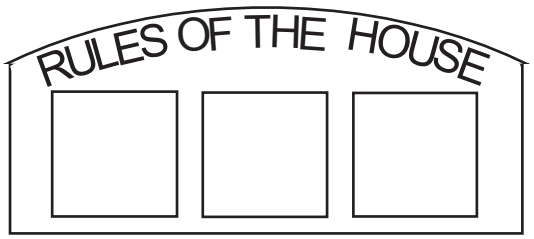

Fig. 11

Symbols are to be added to the sign to show the rules of the camping site.

The rules are:

- No alcohol
- No noise after 21:00
- No open fires

(i) Sketch **one** idea for each symbol. Add colour to enhance your design. [9]

(ii) Accurately draw **one** of your ideas in a 60 x 60mm square. [6]

(c) A folding chair is shown in Fig. 12.

Fig. 12

Orthographic views of the 30mm thick plastic tray are shown in Fig. 13.

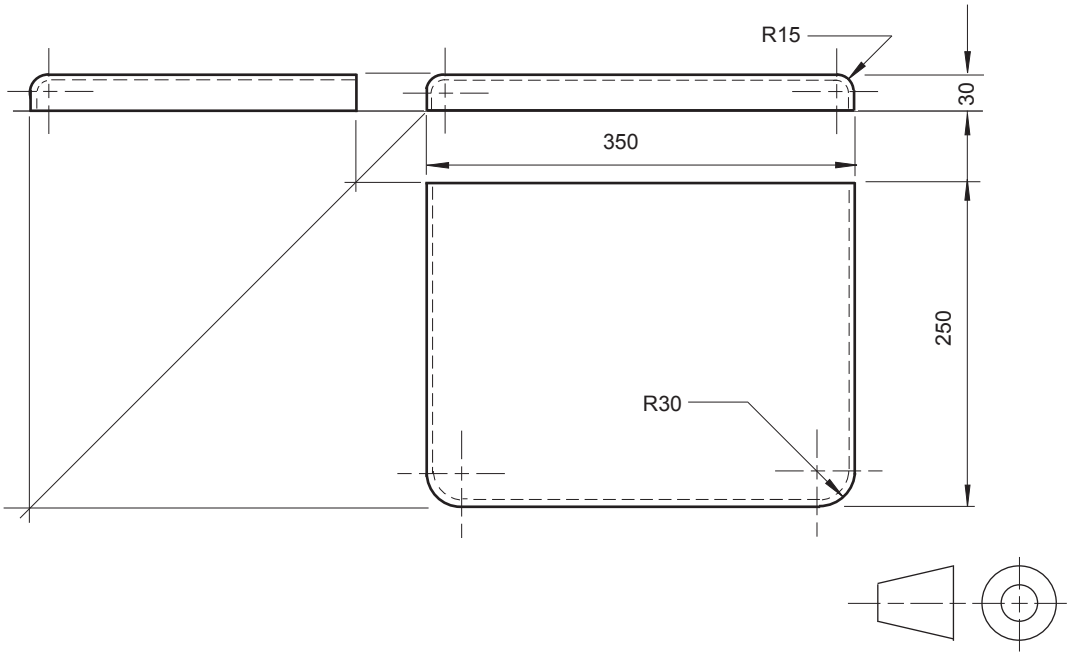

Fig. 13

Draw to a **scale of 1:2** an isometric view of the tray. Do not include hidden detail, but apply shading so that the tray would have a shiny appearance. [15]

(d) The tray is fixed to the chair with a hinge mechanism stay shown in Fig. 14.

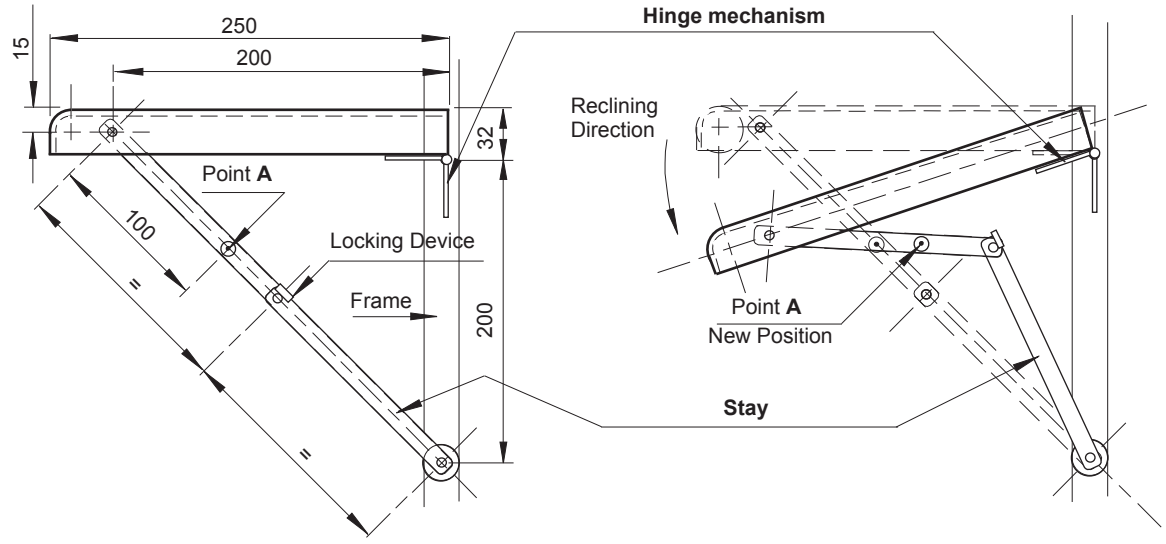

Fig. 14

Using a suitable method draw, to a **scale 1:2**, the locus of point **A** as the tray moves from a horizontal to a vertical position. [10]

[60]

12 Resistant Materials (pages 14 to 19 of this booklet)

For Examiner's Use

Answer Question 12 in the spaces provided on the question paper.

(a) Fig. 15 shows two wooden toy boxes made from natural timber. The sliding lid of box **A** is made from manufactured board.

A **B**

Fig. 15

(i) Name, giving a reason, a specific type of

timber for box **B**.....

.....

..... [2]

manufactured board for the sliding lid of box **A** .....

.....

..... [2]

(ii) Use sketches and notes to show a type of joint that could be used to join the walls of box **A**.

[4]

(iii) Describe how the groove for the sliding lid could be made.

.....

.....

.....

.....

.....

..... [4]

(iv) Box **B** should be moved with ease in the play room.

Use sketches and notes to show a method that could be used to allow easy movement (mobility) of the box.

[4]

(v) Suggest a method that could be used to prevent damage to walls when a child moves box **B** around in the house.

.....

.....

..... [2]

(vi) Use sketches and notes to show a type of handle to easily open and close the sliding lid.

[4]

(b) Fig. 16 show some of the plastic toys in the toy boxes.

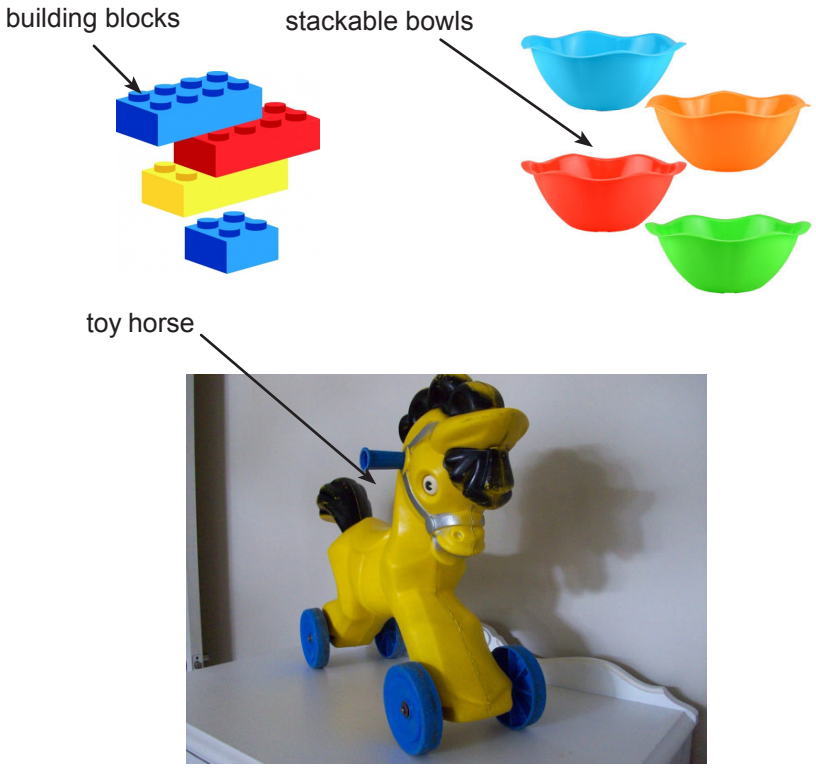

Fig. 16

(i) Give **three** reasons why plastic is a very suitable material to make toys for children.

1 .....

.....

2 .....

.....

3 .....

..... [3]

(ii) Name a specific plastic to make the building blocks.

..... [1]

(iii) Use sketches and notes to describe a process to make the building blocks.

[5]

(iv) Name the forming processes to make the

stackable bowls.....

toy horse ..... [2]

(v) Write short notes on the aesthetic features of the toy horse.

.....

.....

.....

.....

.....

..... [3]

(vi) Describe, using sketches and notes, how the wheels for the toy horse (with axle holes) could be made from a square piece of thermoplastic.

[5]

[Turn over

For Examiner's Use

(c) Fig. 17 shows a metal toy tipper truck.

Fig. 17

(i) Name **two** suitable metals that could be used to make the body of the toy tipper truck in Fig. 17.

1 .....

2 ..... [2]

(ii) Give **one** reason for your choice of **each** metal in **(c)(i)**.

1 .....

.....

2 .....

..... [2]

(iii) Use sketches and notes to describe a process that could be used to form the load bin of the tipper truck.

[5]

(iv) The tipper truck is painted in a bright colour to lure children into convincing parents to buy it.

Describe the preparation and procedure to be followed to ensure that the tipper truck is painted in a bright appealing colour.

.....

.....

.....

.....

.....

.....

..... [5]

(v) Fig. 18 shows part of the rear end of the tipper truck.

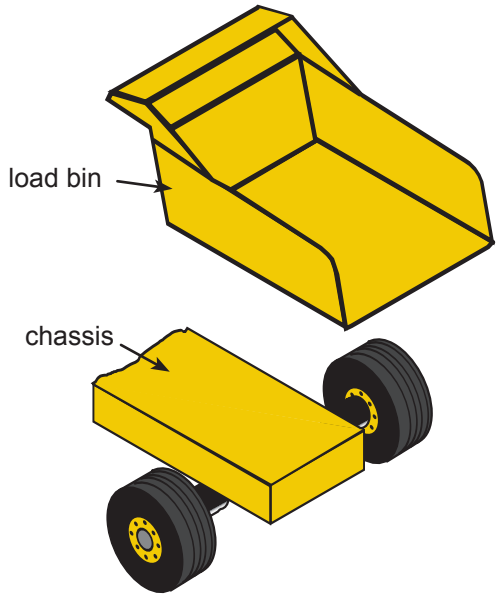

Fig. 18

Use sketches and notes to show how the load bin could be joined to the chassis of the truck enabling the load bin to tip when off-loading sand.

[5]

[60]

For Examiner's Use

13 Technology (pages 20 to 26 of this booklet)

Answer Question 13 in the spaces provided on the question paper.

(a) Fig. 19 shows two simple circuit diagrams, **A** and **B**, for driving a LED (light emitting diode).

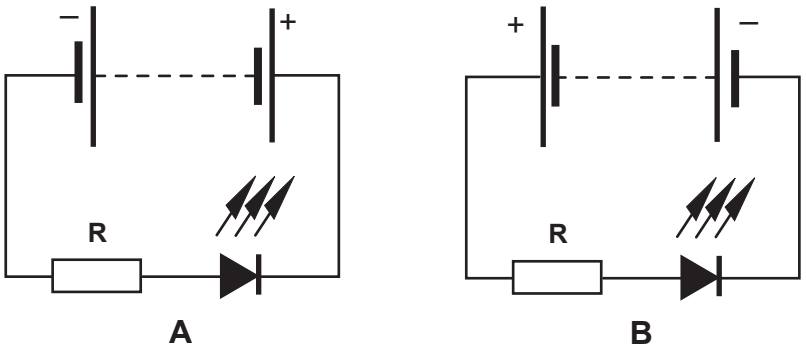

Fig. 19

The power supply to one of the circuits in Fig. 19 has been connected incorrectly.

(i) State which one of the circuits, **A** or **B**, has been connected incorrectly.

..... [1]

(ii) Give an explanation for your choice in **(a)(i)** by referring to the effects on the LED if the power supply is connected incorrectly to the circuit.

.....

.....

.....

.....

.....

.....

..... [4]

(iii) Explain the purpose of the resistor **R** in Fig. 19.

.....

.....

.....

..... [2]

(b) The LED in Fig. 19 has a forward voltage drop of 2.5V and the current through it should be limited to 20mA.

Calculate the value for the resistor **R** if the circuit supply is 9V.

.....

.....

.....

.....

..... [4]

(c) A diode logic circuit for an OR-gate is shown in Fig. 20.

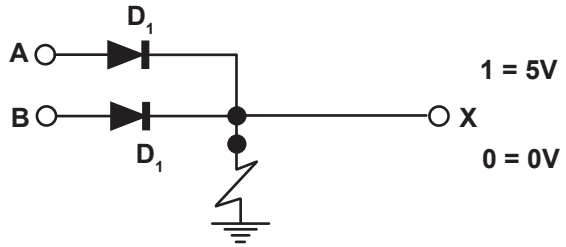

Fig. 20

(i) Explain how the logic gate in Fig. 20 operates.

.....

.....

.....

.....

.....

..... [3]

(ii) Draw up a truth table that will show the output for all the possible inputs.

[5]

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(d) Fig. 21 shows a circuit diagram consisting of a network of resistors.

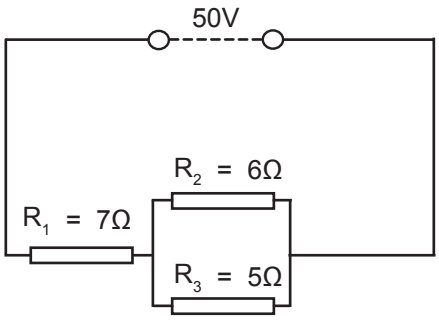

Fig. 21

Calculate the

(i) total resistance

.....

.....

.....

.....

.....

..... [4]

(ii) supply current

.....

.....

.....

.....

..... [4]

(iii) voltage drop across R_3

.....

.....

.....

.....

.....

..... [5]

(iv) current flowing through R_2

.....

.....

.....

..... [3]

(e) Fig. 22 shows a light activated switching device.

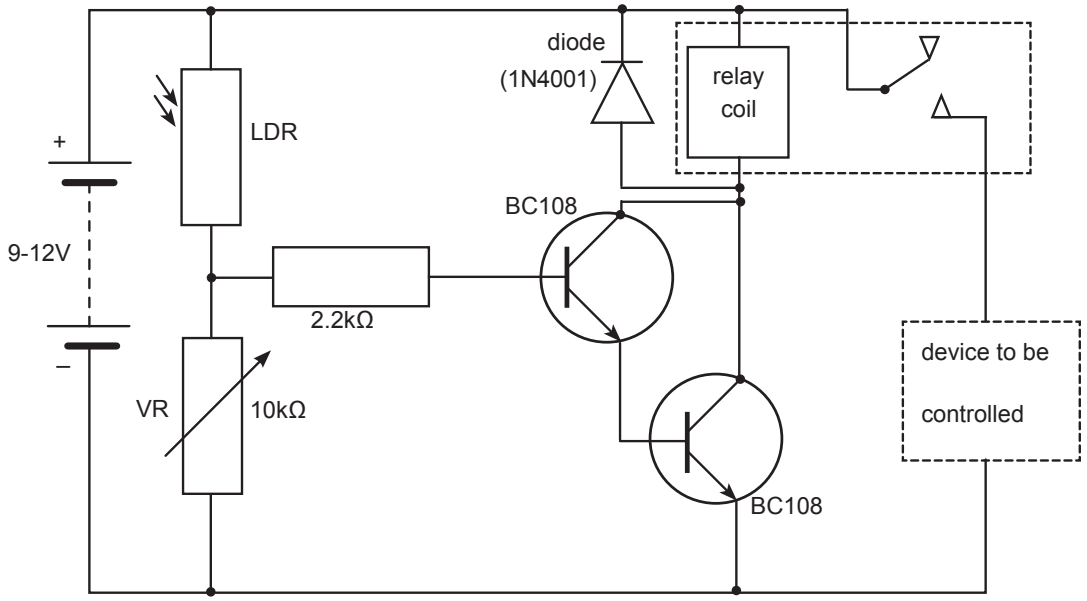

Fig. 22

(i) Explain the function of the diode.

.....

.....

.....

..... [2]

(ii) Describe the operation of the circuit in Fig. 22.

.....

.....

.....

.....

.....

.....

.....

..... [5]

(iii) The LDR can be replaced by a ..... to produce a temperature activated switch. [1]

(iv) The relay can be replaced by a ..... to show that the circuit has been activated. [1]

(f) Fig. 23 shows a bulldozer and a front loader.

For Examiner's Use

bulldozer front loader

Fig. 23

(i) Describe the motion conversion when the bulldozer is driven.

.....

..... [2]

(ii) Name the class lever when the front loader scoops up sand.

..... [1]

(iii) Draw a labelled line diagram to illustrate the class of lever named in **(f)(ii)**.

[4]

(iv) Explain why hydraulics are used instead of pneumatics on this type of earth moving equipment.

.....

.....

.....

.....

..... [3]

(g) Fig. 24 shows three types of switch.

A

B

C

Fig. 24

(i) Identify each of the switches in Fig. 24.

A.....

B.....

C..... [3]

(ii) Write short notes on the operation of each of the switches in Fig. 24.

A.....

.....

B.....

.....

C.....

..... [3]

[60]

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