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GRADE 9

TERM 3

HOMEWORK ACTIVITIES



education

Department of
Education
FREE STATE PROVINCE

TECHNOLOGY

GRADE 9

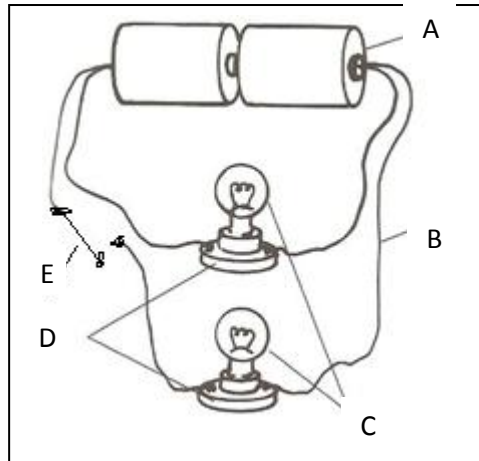
TERM 3

HOMEWORK / INFORMAL ACTIVITIES

WEEK 1**ACTIVITY 1**

1.1 Label the components in the electrical circuit below.

(5)



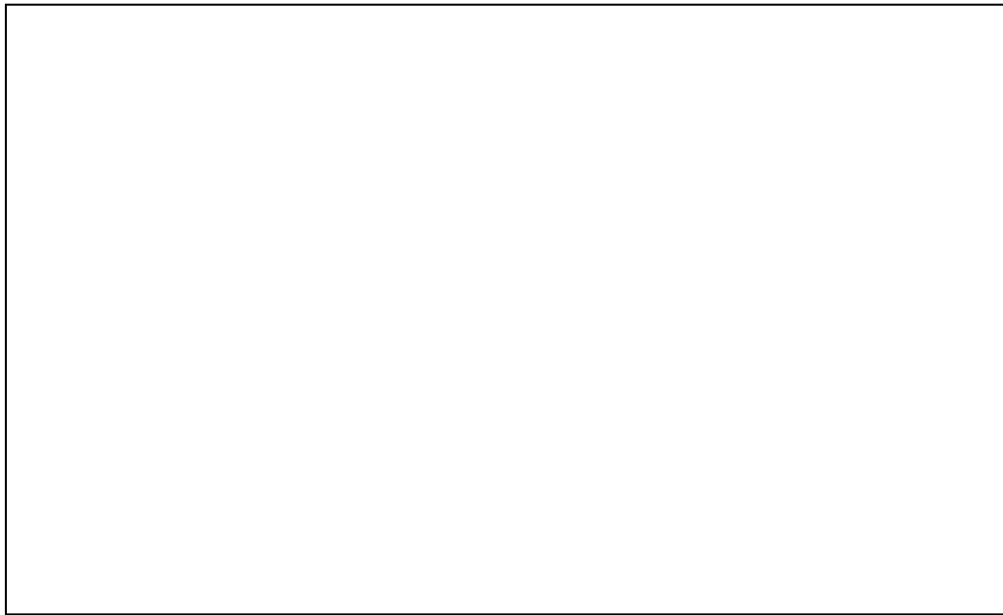
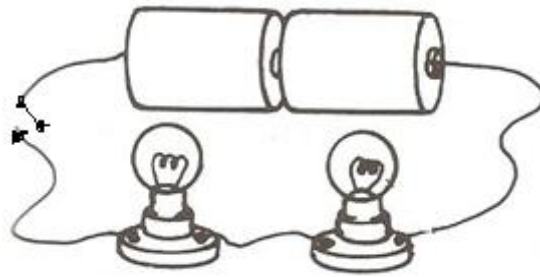
- A. _____
- B. _____
- C. _____
- D. _____
- E. _____

1.2 Draw the circuit diagram for the electrical circuit above.

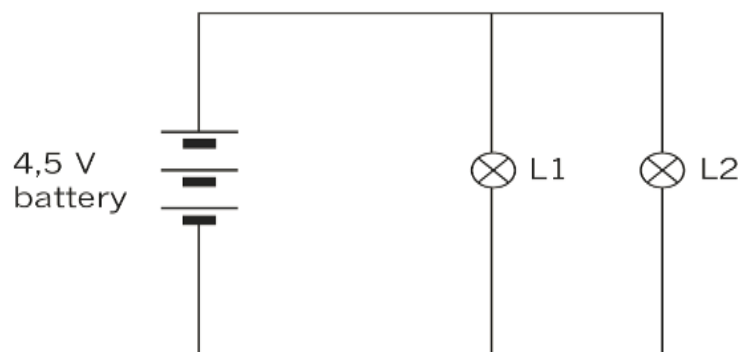
(4)



- 1.3 Draw the circuit diagram for the electrical circuit below. (4)



- 1.4 Study the circuit diagram below and answer the questions that follow.
The diagram shows two bulbs in an electric circuit.



- 1.4.1 How many cells are there in this circuit? (1)

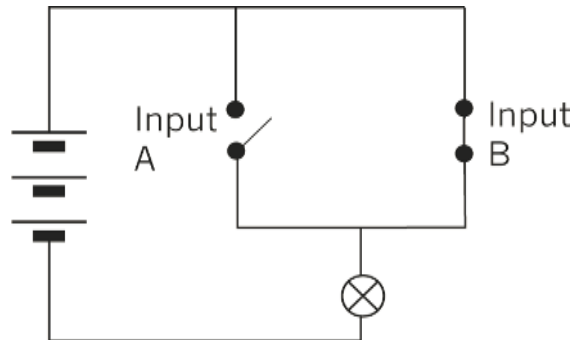
- 1.4.2 Will the two bulbs glow the same? (1)

- 1.4.3 If bulb L1 is removed, will bulb L2 glow? (1)

ACTIVITY 2

Study the diagrams of the electric circuits below and answer the questions that follow.

2.1 This diagram shows two switches in an electric circuit.

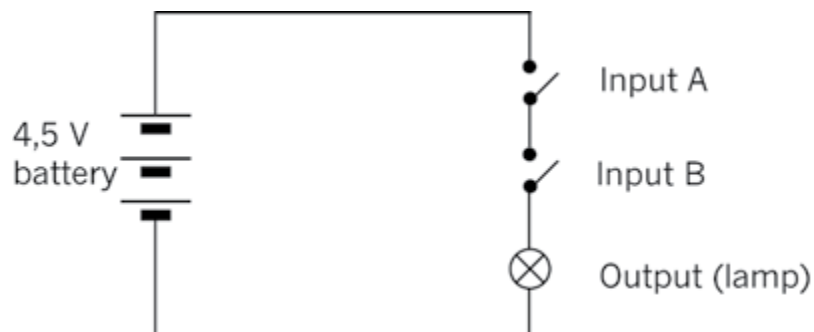


2.1.1 Are the two switches connected in AND or OR logic? (1)

2.1.2 Complete the truth table for the circuit. (8)

Input A	Input B	Output

2.2 Study the control circuit below and answer the questions.



2.2.1 Name the logic control gate.

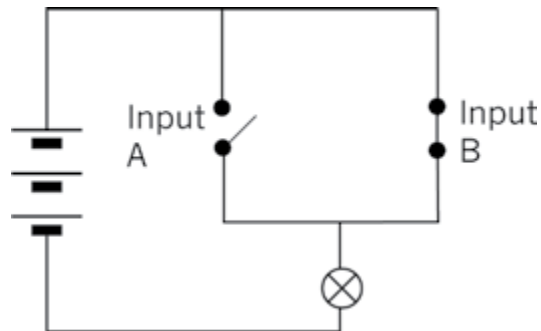
(1)

2.2.2 Draw the truth table for the logic gate.

(8)

A	B	Output

2.3 Study the control circuit below and answer the questions.



2.3.1 Name the logic control gate.

(1)

2.3.2 Draw the truth table for the logic gate.

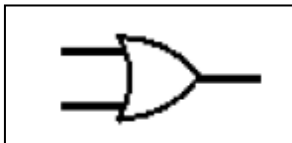
(8)

A	B	Output

2.4 Identify the logic gates for the following symbols and fill in the output in the truth table next to each symbol.

(5)

2.4.1 _____ logic gate.

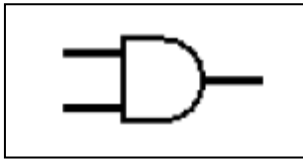


Truth table

Input		Output
A	B	Z
0	0	
0	1	
1	0	
1	1	

2.4.2 _____ logic gate.

(5)



Truth table

Input		Output
A	B	Z
0	0	
0	1	
1	0	
1	1	

ACTIVITY 3

3.1 Use the following **Word Bank** to complete the sentence by inserting the correct words in the spaces:

Word Bank

Circuit
High
OHMS (Ω)
Control
Low

Resistors _____ the flow of current through a _____. Resistance is measured in _____. When resistance is high, the flow of current is _____. When resistance is low, the flow of current is _____.

3.2 What is meant by:

3.2.1 Electrical current?

(3)

3.2.2 Potential difference?

(3)

3.2.2 Resistance?

(3)

3.3 Complete the table:

(4)

Quantity	Abbreviation of quantity	Unit of measurement	Abbreviation of unit
Potential difference	V	3.3.1 _____	V
Current	3.3.2 _____	Ampere	3.3.3 _____
Resistance	R	OHM	3.3.4 _____

3.4 Answer the questions about the following two electric circuits.

Circuit A has three cells of 1.5 volts each and are connected in series;

Circuit B has three cells of 1.5 volts each and are connected in parallel.

3.4.1 What voltage will be provided by parallel connection?

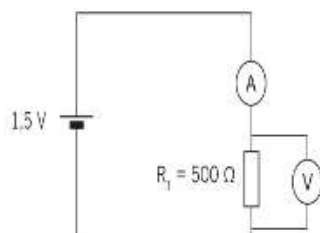
(1)

3.4.2 What voltage will be provided by series connection?

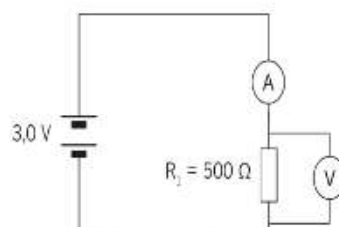
(1)

ACTIVITY 4

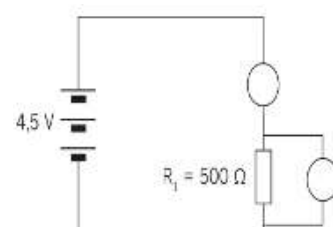
4.1 Study the electrical circuits below and answer the questions that follow. The readings on the voltmeter and ammeter are provided for each circuit.



A = 3.0 mA
V = 1.5 V



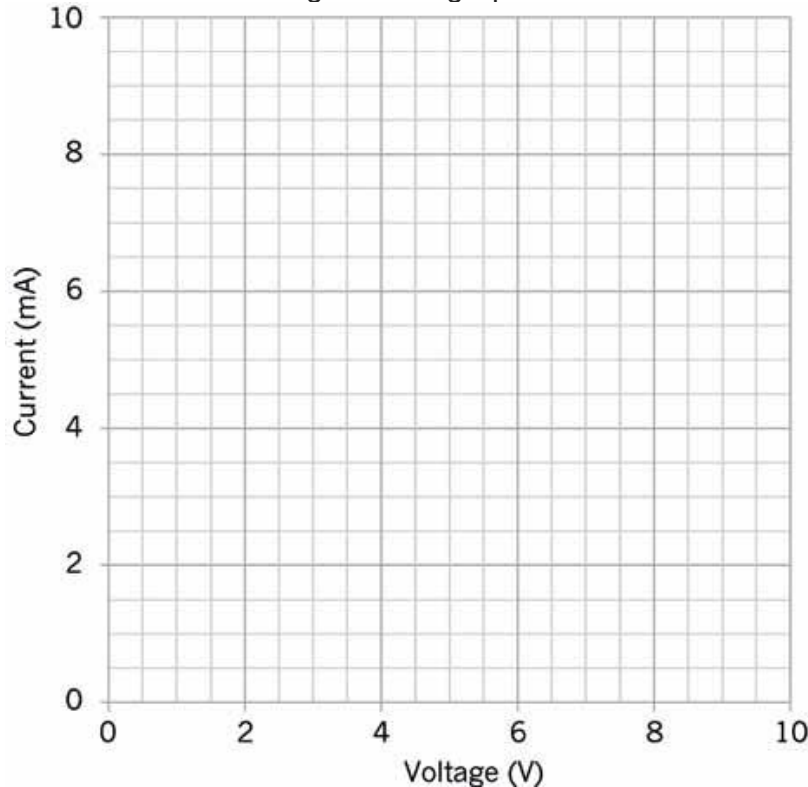
A = 6.0 mA
V = 3.0 V



A = 9.0 mA
V = 4.5 V

4.1.1 Plot the readings on the graph below.

(4)



4.1.2 Describe the relationship between voltage and current for a 500W resistor. (2)

4.1.3 What is this law called?

(1)

4.2 Choose the correct DESCRIPTION in COLUMN B and match it with the TERM in COLUMN A. Write the correct letter of the alphabet in the answer column. (9)

COLUMN A TERM	ANSWER	COLUMN B DESCRIPTION
4.1.1 Variable		A. Used to measure the current and is always connected in series.
4.1.2 Emits		B. The amount of electricity.
4.1.3 Constant		C. A quantity that can have a different value.
4.1.4 Resist		D. Used to measure the potential and is always connected in parallel.
4.1.5 Ammeter		E. Allows something to pass through.
4.1.6 Voltmeter		F. Source of
4.1.7 Current		G. A quantity that always has the same value.
4.1.8 Potential		H. Try to prevent.
4.1.9 Conduct		I. The flow of electricity.

WEEK 2

ACTIVITY 1

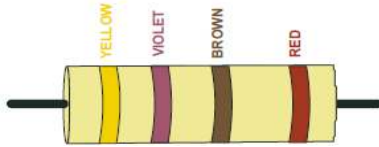
- 1.1 Calculate the resistance across the filament in a lamp with a current of 0,5 A when it is connected to a supply of 220V. (3)

- 1.2 A lamp operates from a 220V supply. The resistance is 550Ω . Calculate the strength of the current when it is lit. (3)

- 1.3 An electronic circuit needs a potential difference of 3,6V across a resistor when a current of 30mA is in it. Will the voltage be 3,6V if the resistor had a resistance of 96Ω ? (4)

ACTIVITY 2

2.1 Interpret the resistance value and accuracy rating of the resistor below. (2)



2.1.1 _____

2.1.2 Accuracy/tolerance rating = _____

2.2 Complete the colour codes of the resistors below:

2.2.1 $52\Omega \pm 5\%$

Band 1: _____ Band 2: _____ Band 3: _____

Tolerance: _____

2.2.2 $46\text{ k}\Omega \pm 2\%$

Band 1: _____ Band 2: _____ Band 3: _____

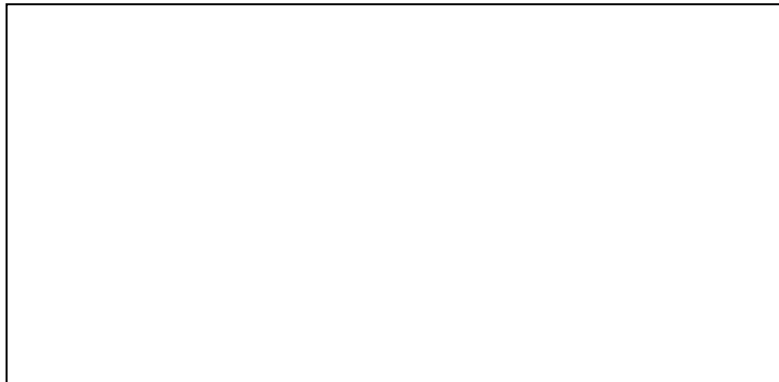
Tolerance: _____

2.3 Use the information in **TABLE 1** below to determine the resistance of the resistors in **TABLE 2**:

TABLE 1			
Colours	Band 1	Band 2	Band 3
black	0	0	
brown	1	1	0
red	2	2	00
orange	3	3	000
yellow	4	4	0000
green	5	5	00000
blue	6	6	000000
violet	7	7	0000000
grey	8	8	00000000
white	9	9	000000000

TABLE 2					ANSWER
	Band 1	Band 2	Band 3	Band 4	
2.3.1	yellow	blue	brown	silver	
2.3.2	orange	white	orange	red	
2.3.3	brown	black	red	gold	
2.3.4	green	grey	violet	silver	

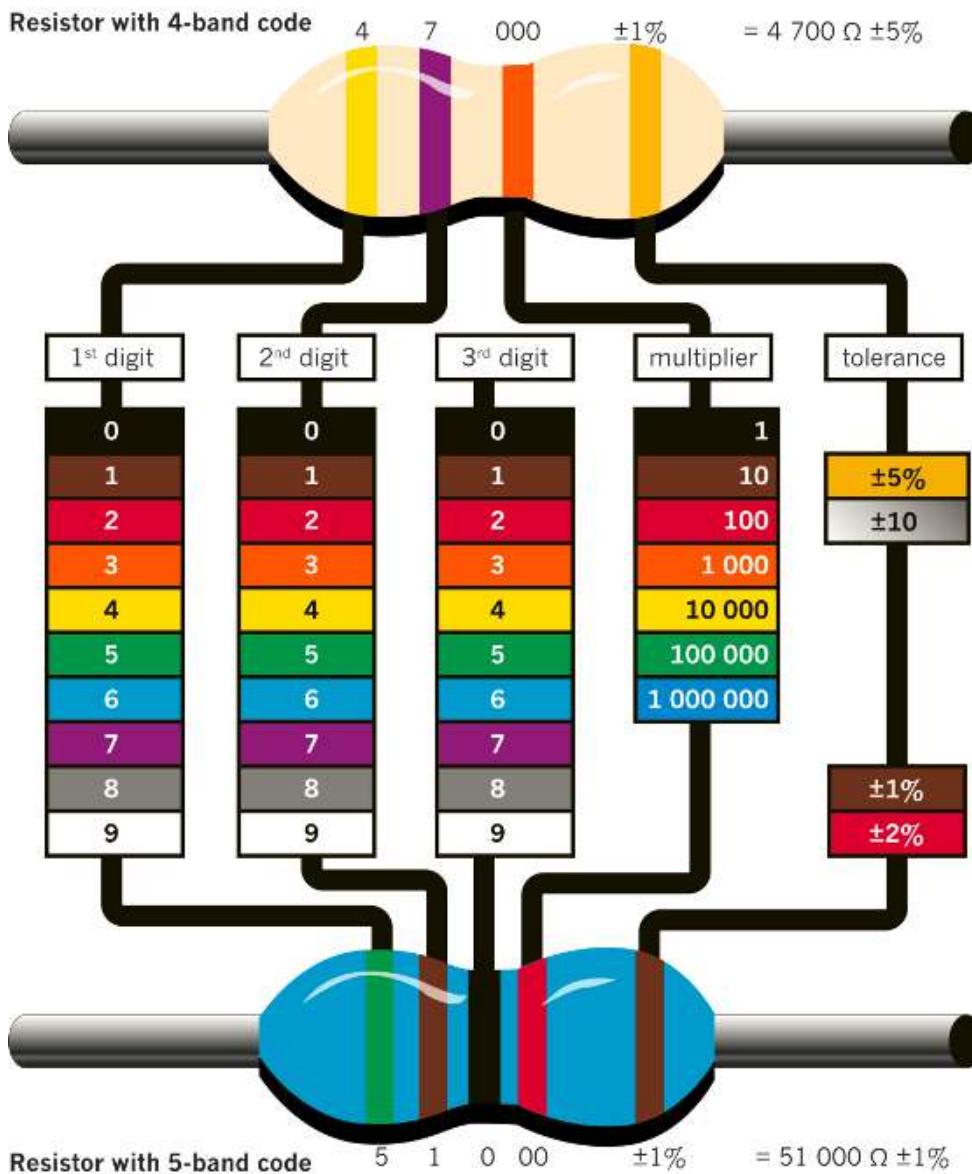
- 2.4 Draw a fixed resistor, indicating the colour of the bands, which has a resistance of 670Ω and a 5% tolerance. (4)



WEEK 2

ACTIVITY 3

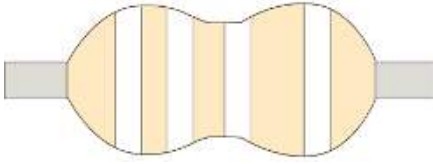
3.1 Use the diagram to work out and record the resistance of the resistors in the table below. (5)



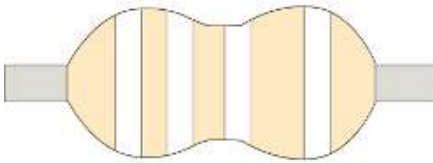
	RESISTOR	MEASURED VALUE
3.1.1	R1 (brown, black, red)	
3.1.2	R2 (red, orange, black)	
3.1.3	R3 (blue, grey, yellow)	
3.1.4	R4 (green, yellow, black)	
3.1.5	R5 (white, violet, orange)	

3.2 Fill in the colour codes on these blank resistors to show the given resistance or write the codes. (2)

3.2.1 $700\ \Omega$



3.2.2 $4300\ \Omega$



ACTIVITY 4

4.1. A bulb is connected to a 12 V electrical supply and controlled by a switch. Calculate the resistance of the bulb when the switch is ON and the current through the bulb is 3 A. (3)

4.2 Aisha sets up a circuit with a fully charged 9V cell and three resistors of unknown values. The ammeter reading is 2,5 A. What is the total resistance of the resistors in the circuit? (3)

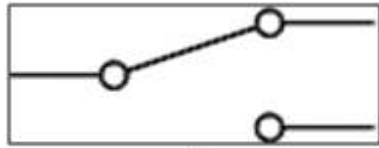
- 4.3 Mabu sets up a circuit consisting of a battery of three cells and a $3,5 \Omega$ lamp. The voltmeter measures $4,2 \text{ V}$ over the lamp. Calculate the current strength in the circuit. (3)

- 4.4 A battery has a potential difference of 9V in a circuit with a 4Ω resistor and $3,5 \Omega$ lamp. What is the current strength in the circuit? (3)

WEEK 3 & 4

ACTIVITY 1

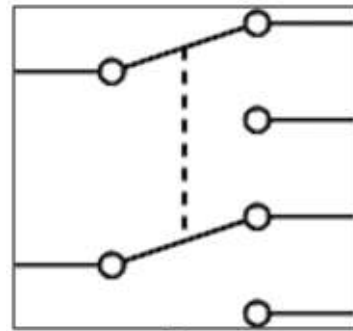
1.1 Look at the different symbols of switches indicated below and complete the table: (6)



A



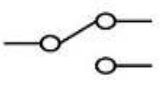
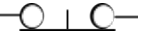
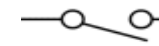
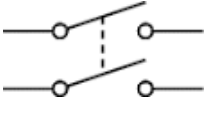
C

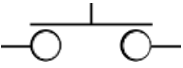
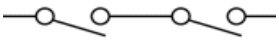


B

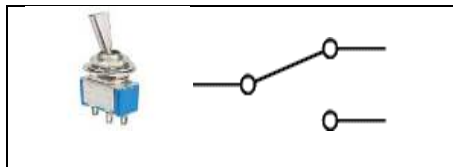
Switch	Acronym	Full Name
A.		
B.		
C.		

1.2 Choose the symbol in COLUMN B that matches the description of the switch in COLUMN A. Write only the correct letter (A – F) in the ANSWER column. (5)

NO	COLUMN A - DESCRIPTION	ANSWER	COLUMN B - TERMINOLOGY
1.2.1	This switch momentarily pass current when released.		A  SPDT
1.2.2	Both switches should be closed to allow current to flow. Normally connected in a AND logic gate circuit		B 
1.2.3	Momentary switch that pass current when pressed. Known as NO switches.		C  SPST
1.2.4	Change over switch that directs the current to one of the two available routes. Connected in an OR logic gate circuit.		D  DPST

1.2.5	A toggle switch is used		E	
			F	 SPST

1.3 Study the picture of the switch below and answer the questions that will follow: (3)



1.31. Give a full name of this type of a switch?

1.3.2. What is the function of this type of a switch in a circuit?

1.3.3. What type of logic gate is this switch used for?

ACTIVITY 2

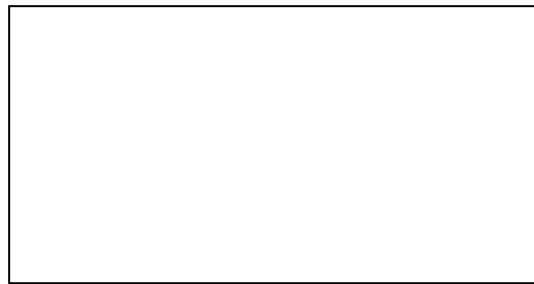
2.1 What is the name of this electrical component?
(1)



2.2 Is this electronic component polarised or non-polarised? (1)

2.3 How do you determine the anode and cathode of this component? (2)

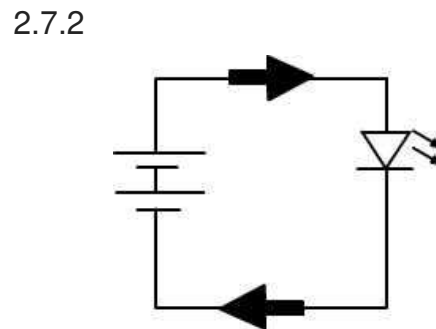
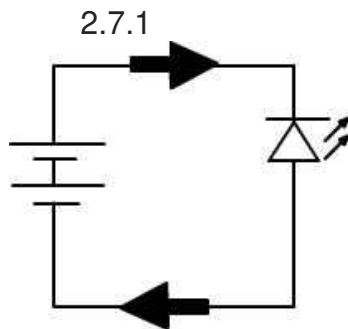
2.4 Draw the circuit symbol for this component. (2)



2.5 What is meant by the barrier potential of an LED? (2)

2.6 Name four advantages of LEDs. (4)

2.7 Look at the two circuits below. Identify the circuit which is forward-biased and the circuit which is reverse-biased. (2)



2.7.1 _____

2.7.2 _____

2.8 Why is it advisable to use a fixed resistor with an LED? (2)

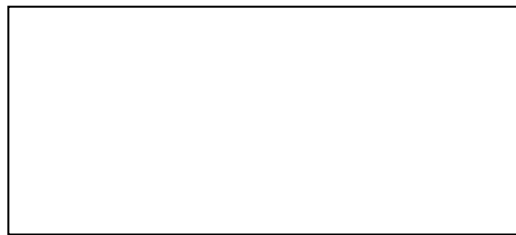
- 2.9 Which of the following resistors are more suitable to use with an LED if there is a supply voltage greater than 3V: 180Ω or 230Ω? (1)

- 2.10 Give two examples of where we could find LEDs in our everyday lives. (2)

ACTIVITY 3

Draw the circuit symbol for a:

- 3.1 Light-dependent resistor (LDR) (2)

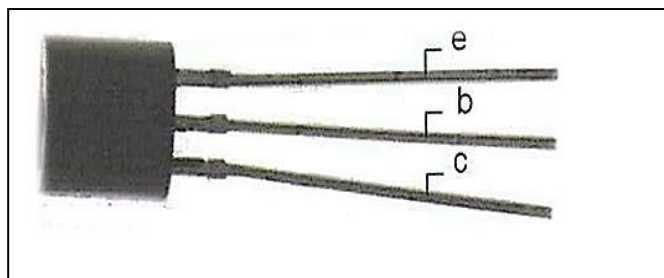


- 3.2 Thermistor (2)



ACTIVITY 4

The picture below shows an example of a processing device that is used in many different circuits. Answer the questions that follow.



- 4.1 Name this device. (1)

4.2 Identify the THREE different terminals marked e, b and c. (3)

e - _____

b - _____

c - _____

4.3 Draw the circuit symbol for this electronic device. (4)



4.4 Give at least ONE basic function performed by this device. (1)

ACTIVITY 5

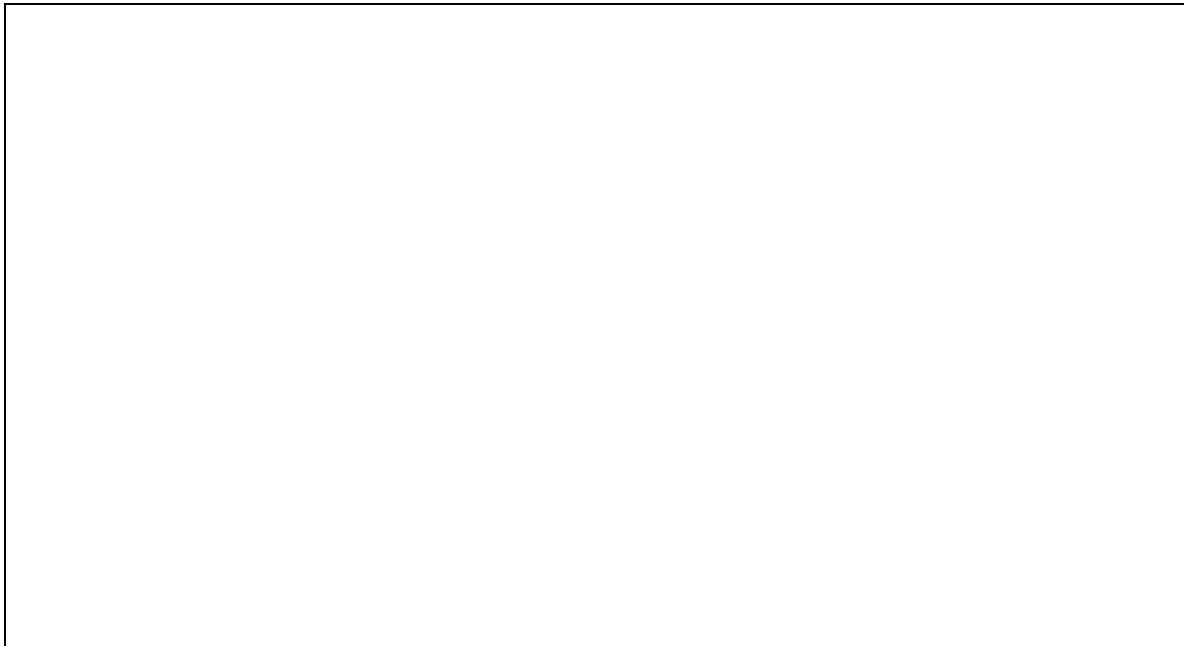
Read the Case Study below and answer the questions that follow.

Mr Bumnandi owns a fish tank which has a light installed to keep the water warm. He wants an electrical system that will automatically switch the light on when it is dark, and also switch the circuit on and off when the water becomes too hot or too cold.

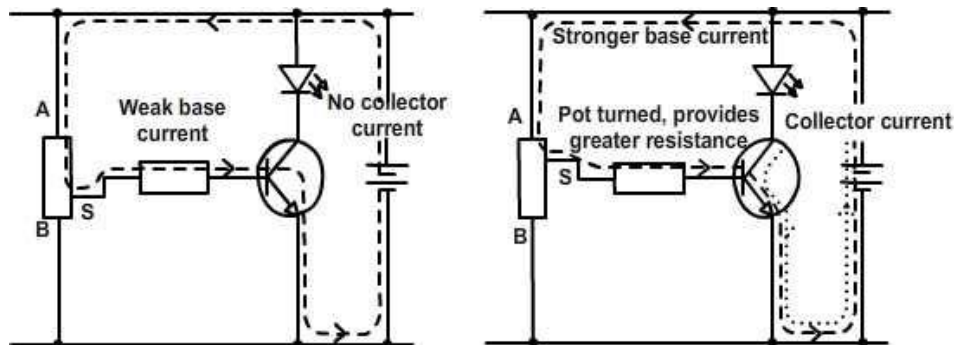
5.1 Name one electronic component that will be needed in the circuit to switch the light automatically on when it gets dark? (1)

5.2 Which input component will be needed to switch the circuit on and off when the water is too hot or too cold? (1)

5.3 Draw the circuit diagram for the electronic circuit that automatically switches the light on when it is dark. Give the circuit diagram a title. (6)

**ACTIVITY 6**

Explain how a transistor works, by following the two circuit diagrams below. (6)

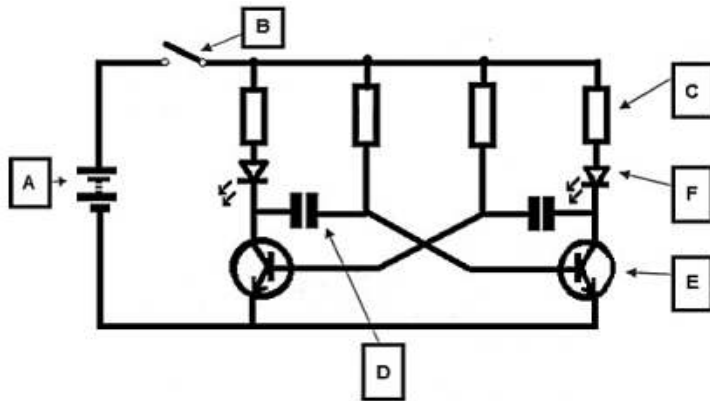


ACTIVITY 7

Study the electronic circuit below and answer the questions that follow

7.1 Identify all the different components marked **A–F**.

(6)



- A) _____
- B) _____
- C) _____
- D) _____
- E) _____
- F) _____

7.2 State whether each of the following is an INPUT, PROCESS or OUTPUT device.

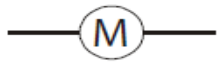
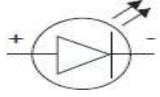
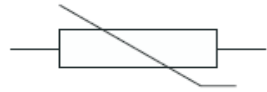
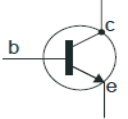
(3)

7.2.1. Thermistor – _____

7.2.2 LED – _____

7.2.3 Photovoltaic panel/cell – _____

7.3 Complete the table below by mentioning the name as well as the function of the component. (10)

	Symbol	Name	Function
7.3.1			
7.3.2			
7.3.3			
7.3.4			
7.3.5			

ACTIVITY 8

Match the correct description in **Column B** with the term in **Column A**. Write only the letter of the alphabet in the **Answer** column. (5)

Column A Term	Answers	Column B Description
8.1 Collector		A. Resistor that is sensitive to heat.
8.2 Detector		B. Device for increasing the strength of electrical signal.
8.3 Thermistor		C. Part of an atom that carries a negative charge.
8.4 Capacitor		D. Device which gives a warning of conditions that could cause damage.
8.5 Amplifier		E. Device used to store electric charge.
		F. One of the three terminals of a transmitter.
		G. One of the three terminals of a transistor.

ACTIVITY 9

Study the pictures below and complete the table.

(15)

Component	Name of the component	Input; Process; OR Output	Function.
9.1 			
9.2 			
9.3 			
9.4 			
9.5 			

ACTIVITY 10

Complete the table below by writing down the name of the component and the graphic symbol. (12)

Electronic Component	Name	Graphic symbol
10.1 		
10.2 		
10.3 		
10.4 		
10.5 		
10.6 		

ACTIVITY 11

State whether the following functions are true or false about the electronic components.

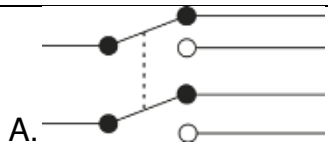
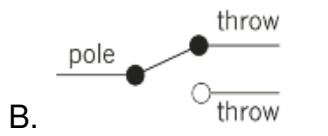
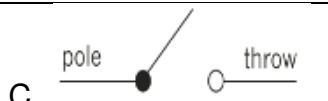
(4)

Electronic Component	Name	Functions
11.1 	Push Button switch	Used to protect other components. _____
11.2 	LED - Light Emitting Diode	Shines brightly and uses little electrical power. _____
11.3 	Transistor	It is a type of a sensor used to detect light /dark. _____
11.4 	Capacitor	Stores and discharge electricity. _____

ACTIVITY 12

12.1 Study the table below and match name with the correct symbol, correct example and correct function. Write the correct letters next to the numbers in the table that follows.

(9)

Name	Symbol	Example in real life	Function
12.1.1 Single- pole, single-throw	A. 	D. On TV, stoves or where the road cross over the railway stations.ect.	G. Used to change the direction of the flow of current.
12.1.2 Double- pole, double-throw	B. 	E. Light switch	H. Used to divert the flow of current from one output component to another.
12.1.3 Single-pole, double-throw	C. 	F. Automatic car gate	I. Used to open and close a circuit.

Use the table below

Name	Symbol	Example in real life	Function
12.1.1			
12.1.2			
12.1.3			

12.2 A pupil has designed and manufactured a model based on the automatic control of streetlights. When the light level drops the street light comes on automatically.

Complete the system diagram below to show how the pupil's circuit works.

(3)

