



Province of the
EASTERN CAPE
EDUCATION

**SENIOR
PHASE**

GRADE 9

NOVEMBER 2010

TECHNOLOGY

MARKS: 100

TIME: 2 hours

This question paper consists of 14 pages.

INSTRUCTIONS AND INFORMATION

1. This question paper consists of FIVE SECTIONS: SECTIONS A, B, C, D and E.
2. Answer ALL the questions from SECTIONS A, B, C and D, and ONE question from SECTION E.
3. Read ALL the questions carefully before you write down the answers.
4. Number your questions exactly as they appear in the question paper.
5. Write neatly and legibly.
6. Write in blue or black ink only.
7. When drawing or sketching, use a pencil only.

ALLOCATION OF MARKS			
SECTION A:	MULTIPLE-CHOICE QUESTIONS		
	QUESTION 1		[10]
SECTION B:	STRUCTURES AND SYSTEMS AND CONTROL (Mechanical Systems)		
	QUESTION 2	(15)	
	QUESTION 3	(15)	[30]
SECTION C:	PROCESSING		
	QUESTION 4	(14)	
	QUESTION 5	(6)	[20]
SECTION D:	SYSTEMS AND CONTROL (Electrical Systems)		
	QUESTION 6	(11)	
	QUESTION 7	(9)	[20]
SECTION E:	PROCESSING (QUESTION 8) OR	(20)	[20]
	ELECTRICAL SYSTEMS (QUESTION 9)	(20)	

SECTION A: MULTIPLE CHOICE QUESTIONS**QUESTION 1**

Various possible answers are provided for the following questions. Choose the correct answer and write down only the letter (A – D) next to the question number (1.1 – 1.10), in your answer book.

1.1 A spider web can be classified as a ... structure.

- A natural
- B solid
- C man-made
- D shell

(1)

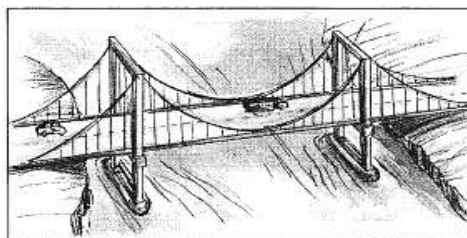
1.2 A good example of this force is seen in a pair of scissors. The two handles exert forces in different directions on the pin holding the blades together.

- A Compression force
- B Torsion force
- C Shearing force
- D Tension force

(1)

1.3 The adjacent sketch is an example of ...

- A a suspension bridge.
- B an arch bridge
- C a beam bridge
- D a cantilever bridge.



(1)

1.4 Which of the following is NOT an aspect of a system?

- A Input
- B Control or Process
- C Energy
- D Output

(1)

1.5 This gear mechanism is used in an eggbeater:

- A Spur gears
- B Rack and spur gears
- C Worm and spur gears
- D Bevel gears

(1)

1.6 Brass is an alloy of ...

- A copper and tin.
- B copper and zinc.
- C lead and tin.
- D copper and lead.

(1)

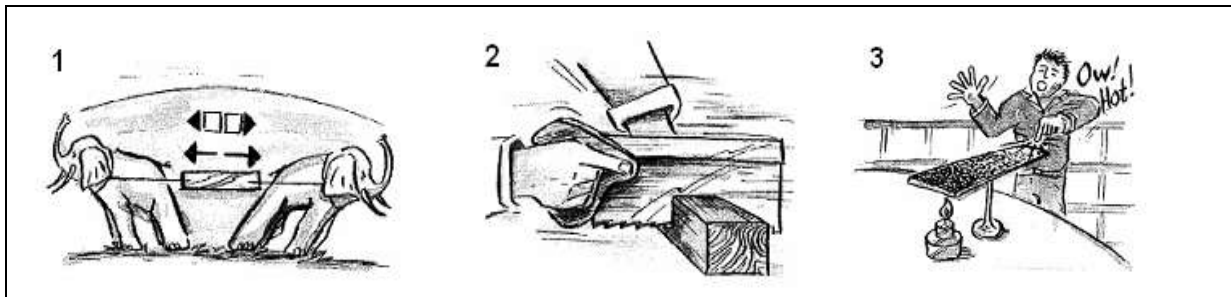
- 1.7 Which ONE of the following preservation methods is also known as a chemical protection?
- A Painting
 - B Electroplating
 - C Galvanising
 - D Varnishing
- (1)
- 1.8 Which ONE of the following additives is used to prevent ingredients from clumping together?
- A Colourant
 - B Antioxidants
 - C Anti-caking agents
 - D Flavouring
- (1)
- 1.9 Ohmmeters are used to measure the ... in a circuit.
- A resistance
 - B voltage
 - C current
 - D energy
- (1)
- 1.10 Variable resistors or potentiometers are the devices needed to ...
- A store and release electrical energy.
 - B change or control the flow of electricity.
 - C stop the current from flowing.
 - D converts electrical energy into light energy.
- (1)

TOTAL SECTION A: 10

SECTION B: STRUCTURES AND SYSTEMS AND CONTROL (Mechanical Systems)

QUESTION 2

- 2.1 Match the following pictures to the list of properties below and give a clear definition of each one:



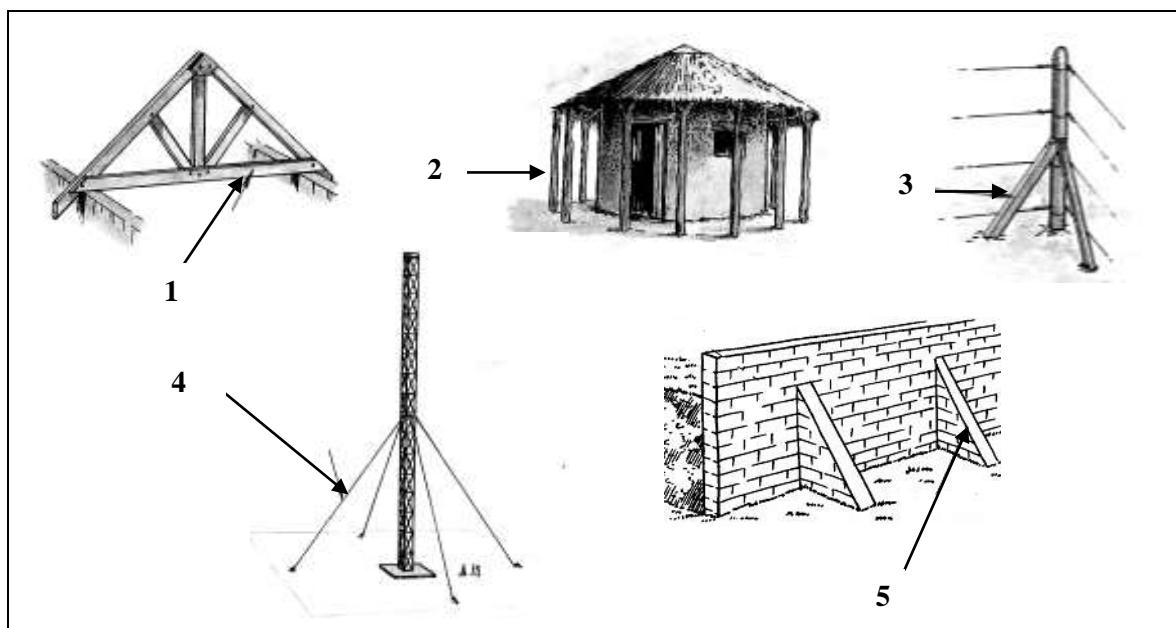
List of properties: malleability; tensile strength; conductivity; ductility; hardness

Copy the following table and fill in the correct answers:

	Property	Definition
1		
2		
3		

(6)

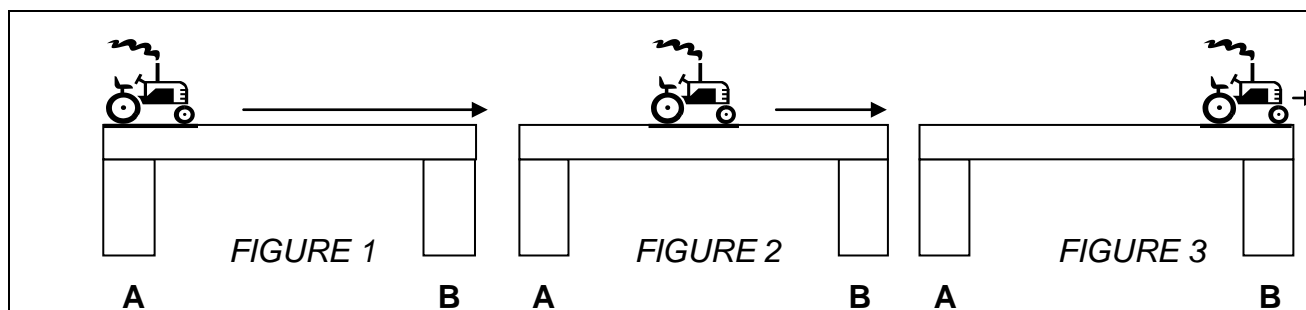
- 2.2 Identify the structural parts used to strengthen each of the following structures: Write down the numbers 1 – 5 and the correct name of the structural part next to each number.



(5)

- 2.3 As the tractor travels across the bridge (below), the stresses in the bridge change although the weight of the tractor remains the same (constant). The weight of the tractor is called the external load and the weight of the bridge is called the internal load. The bridge supports are marked **A** and **B**.

Study the illustrations and answer the questions that follow:



If the weight of the tractor is 8000 N and the weight of the bridge is 40 000 N:

- 2.3.1 What is the total load (bridge and tractor)? (1)
- 2.3.2 What is the total load on each support in FIGURE 2? (1)
- 2.3.3 Which figure in the above illustration represents an uneven load? Give a reason for your answer. (2)

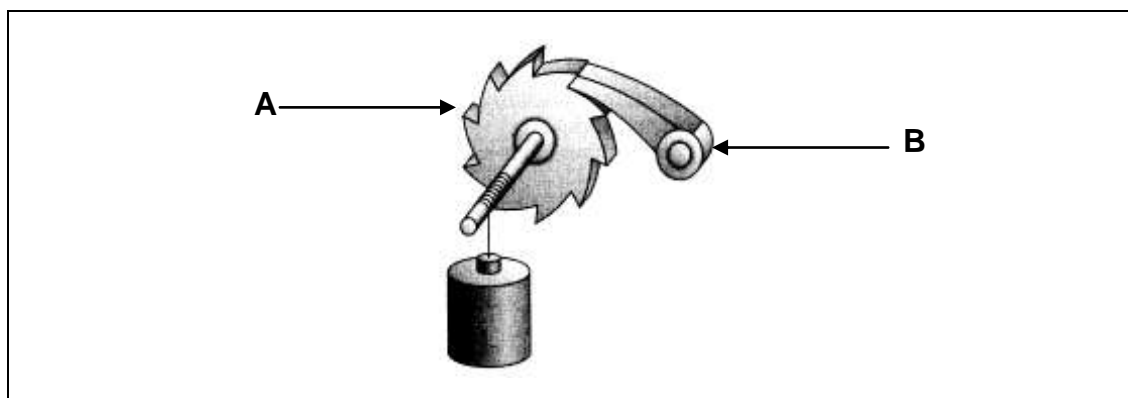
[15]

QUESTION 3

- 3.1 Answer the following questions:

- 3.1.1 What is a pulley? (1)
- 3.1.2 What is the difference between a driver pulley and a driven pulley? (1)
- 3.1.3 How will you reverse the rotation direction of a driven pulley? (1)
- 3.1.4 Draw a neat sketch to illustrate your answer in 3.1.3 and indicate the direction of each pulley. (4)

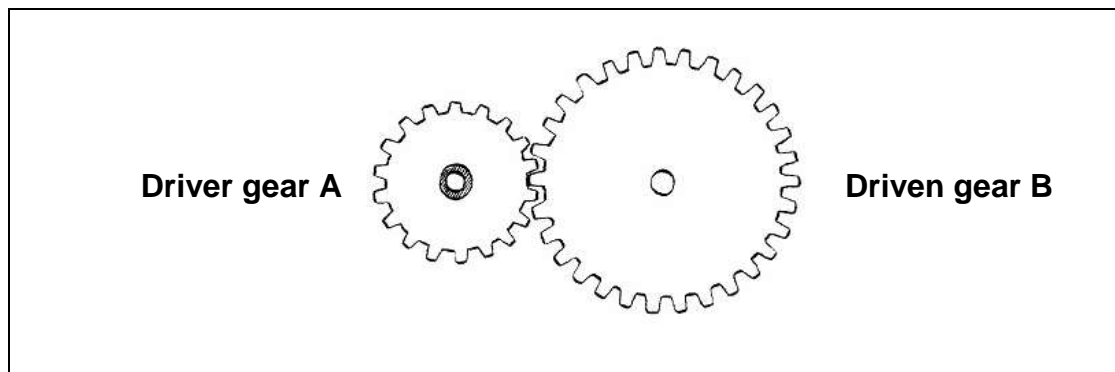
- 3.2 The mechanism shown below is an important control device and adds additional safety when lifting systems. Name the parts labelled **A** and **B**.



(2)

- 3.3 The diagram shows a typical gear train. Driver gear **A** has 40 teeth. When gear **A** turn 10 times, gear **B** turns 5 times.

Look at the diagram and answer the questions that follow.



- 3.3.1 How many teeth does the driven gear have? (1)
- 3.3.2 If gear **A** rotates at 70 revolutions per minute, at what speed does gear **B** rotate? (1)
- 3.3.3 If gear **A** rotates clockwise, in which direction does gear **B** rotate? (1)
- 3.3.4 Calculate the mechanical advantage of this gear system.

Formula:

$$\text{Mechanical Advantage} = \frac{\text{number of teeth on driven gear}}{\text{number of teeth on driver gear}} \quad (3)$$

[15]

TOTAL SECTION B: 30

SECTION C: PROCESSING**QUESTION 4**

Read the following article and then answer the questions that follow.

4.1 Case Study: Food additives and behavioural problems

Additives are not foods on their own; they are substances that are added to food during processing for specific reasons.

The more highly food is processed; the more likely it is to contain additives. Many people are concerned about the use of additives in food.

“Food additives are causing behavioural problems in an entire generation of youngsters”, an alarming government-backed British study confirmed this week. Artificial colourings and preservatives fuel temper tantrums and hyperactivity in children as young as three, experts found.

Some also suffer runny noses, which could affect sleep, creating a vicious cycle of tiredness and bad behaviour. These children are then given drugs such as Ritalin to calm them. Many of the worst cases are diagnosed with Attention Deficit Disorder (ADD).

“We looked at additives and preservatives used extensively in a vast array of food and drinks, from sweets, cakes and biscuits, to tinned foods, fizzy drinks and ready prepared foods such as fish fingers. These findings suggest that significant changes in children’s hyperactive behaviour could be produced by the removal of artificial colourings and sodium benzoate from their diet,” a source was quoted as saying.

4.1.1 Name ONE reason why food manufacturers add additives to food. (1)

4.1.2 Give ONE negative behavioural effect of additives. (1)

4.1.3 Name any ONE of the foods that contain harmful additives. (1)

4.1.4 How could hyperactive behaviour be improved or prevented? (2)

4.2 Many of the foods we eat have been processed before we buy and eat them. It is also common knowledge that some foods are more highly processed than others.

4.2.1 Name any THREE reasons why people process food. (3)

4.2.2 Name ONE disadvantage of processed food (1)

- 4.3 Match the food processing methods in COLUMN A with the correct description in COLUMN B. Write down only the number of the process in COLUMN A and the letter of the correct description in COLUMN B next to it.

COLUMN A		COLUMN B	
4.3.1	Pasteurisation	A	Allows food to be stored for longer periods
4.3.2	Drying	B	A heat treatment that kills most bacteria
4.3.3	Freezing	C	Heating foods in airtight, vacuum-sealed containers
4.3.4	Canning	D	A process where food is heated to very high temperatures. It sterilises the product completely
4.3.5	UHT – Ultra Heat Treatment	E	During this process, all moisture is removed from the food

(5)
[14]

QUESTION 5

- 5.1 Corrosion (rust) occurs when a metal slowly changes to a new substance while the original metal is eaten away. Corrosion can also affect the properties of plastics.

Name TWO factors that cause iron corrosion.

(2)

- 5.2 Choose the correct protection method, from the list that best describes the processes mentioned below. Write down the letters A – D and the correct name of the process next to each letter.

galvanising, varnishing, electroplating, painting

- A** Steel is given a copper coating in a process called electrolysis.
- B** Wood or metal is given a coating to keep out the moisture and/or oxygen that could cause the wood to rot and the metal to rust.
- C** Wood is given a protective coating to prevent rotting.
- D** Iron and steel is given a protective coating of zinc to prevent corrosion.

(4)
[6]

TOTAL SECTION C: 20

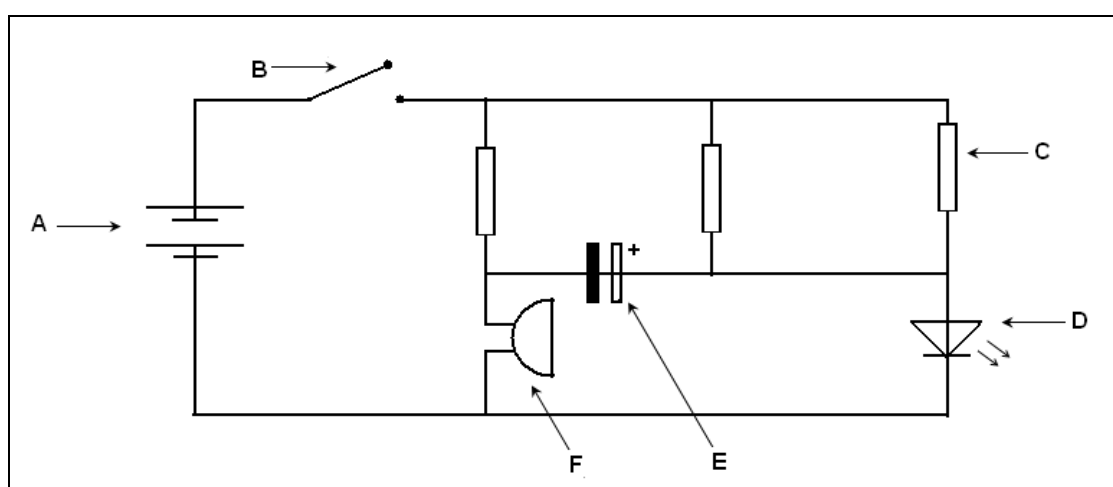
SECTION D: SYSTEMS AND CONTROL (Electrical Systems)**QUESTION 6**

6.1 Study the electronic circuit below. Choose any FOUR of the components, labelled A – F, from the circuit and answer the following questions:

6.1.1 Identify the components. (2)

6.1.2 State whether each of the chosen components is an **input**, **process** or **output** component. (2)

6.1.3 Give a brief explanation of the function of each of the chosen components. (4)



Copy and complete the following table in you answer book:

Letter of Component (A, B, C, D, E or F)	Name of component	Input / Process / Output	Function

(8)

6.2 A light-dependent resistor (LDR) is an input device in an electric circuit.

Explain briefly how this device can be used to control an electric circuit.

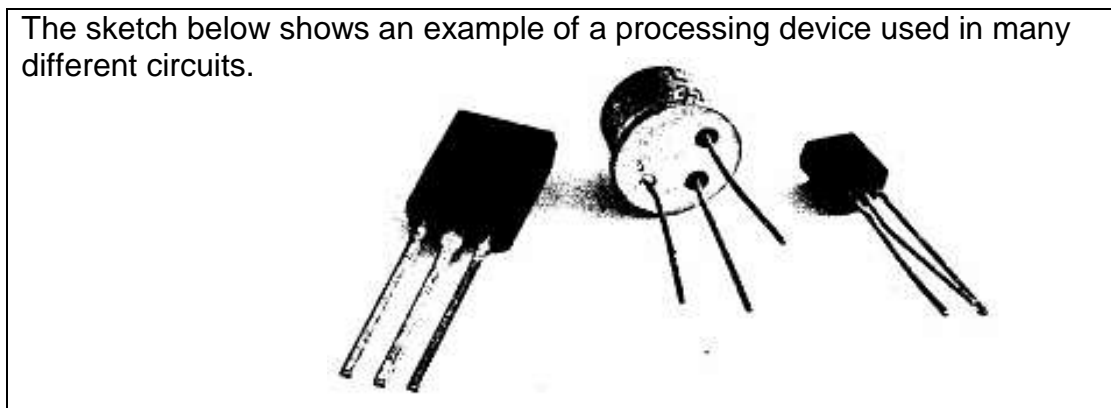


(3)

[11]

QUESTION 7

- 7.1 The sketch below shows an example of a processing device used in many different circuits.



- 7.1.1 Name this device. (1)
- 7.1.2 Name the TWO basic functions performed by this device. (2)
- 7.1.3 Draw a neat diagram of the symbol used to represent the above-mentioned device in a circuit. Label the THREE different terminals. (6)
- [9]**

TOTAL SECTION D: 20

SECTION E**ANSWER QUESTION 8 OR QUESTION 9****QUESTION 8: PROCESSING**

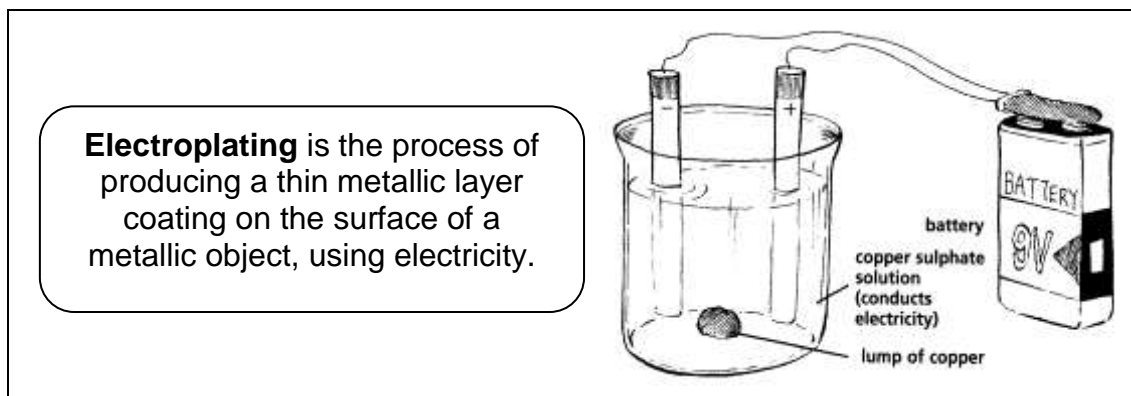
- 8.1 Food products can be preserved using a variety of methods.

Copy and use the table beneath to identify suitable methods for preserving the given food products. Choose any TWO suitable preserving methods for each of the given food products listed below and place a tick in the corresponding blocks.

FOOD PRODUCTS	PRESERVING METHODS				
	Freezing	Drying	Canning	Pickling	Salting
Beef					
Peaches					
Beans					
Tomatoes					
Fish					

(10)

8.2 The process illustrated below is called **electroplating**.



8.2.1 List TWO reasons why materials are electroplated. (2)

8.2.2 What happens when you scratch the surface of an electroplated item? (1)

8.2.2 Electroplating is professionally done for both functional and decorative purposes. Name any THREE items that are electroplated for those purposes. (3)

8.2.3 Name any FOUR types of coating layers found in electroplating. (4)

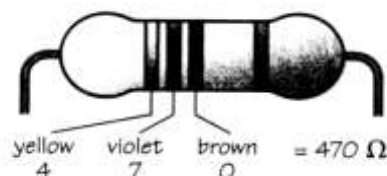
[20]

QUESTION 9

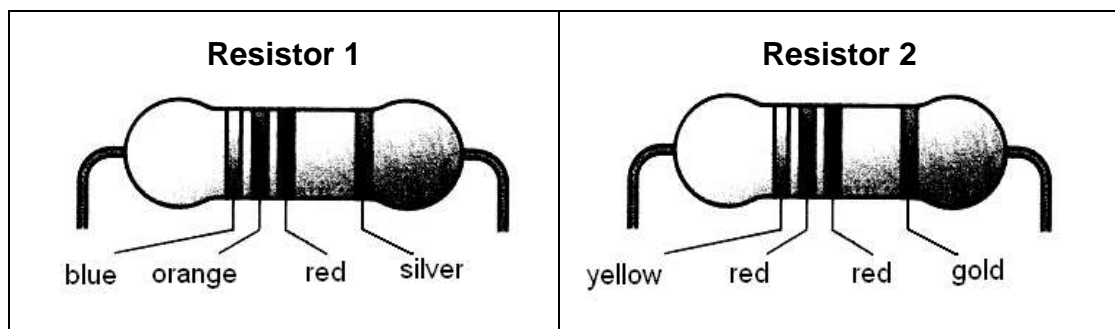
9.1 Use the resistor colour code chart and the example of a resistor to answer the questions below.

Colour	1 st Band	2 nd Band	3 rd Band	4 th Band
Black	0	0		Accuracy/ Tolerance Gold = $\pm 5\%$ Silver = $\pm 10\%$ None = $\pm 20\%$
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	

Example:



9.1.1 Determine the resistance of the two resistors below:



(6)

9.1.2 What is the tolerance of Resistor 1?

(1)

9.1.3 State the colours found in the following resistors.

(a) 390 000 Ω

(b) 20 Ω

(6)

9.2 Read the following scenario and answer the questions that follow.

Mr Bumandi 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.

9.2.1 What electronic device is needed to switch the circuit on and off when the water is too hot or too cold?

(1)

9.2.2 Draw a neat diagram of the symbol that represents the electronic device mentioned in QUESTION 9.2.1.

(2)

9.2.3 Name any FOUR electrical household appliances that use the above-mentioned device to control the temperature.

(4)

[20]

TOTAL FOR SECTION E: 20

GRAND TOTAL: 100