



Province of the  
**EASTERN CAPE**  
EDUCATION

**SENIOR  
PHASE**

**GRADE 9**

**NOVEMBER 2011**

**TECHNOLOGY**

**MARKS: 100**

**TIME: 2 hours**

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This question paper consists of 14 pages.

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**INSTRUCTIONS AND INFORMATION**

1. This question paper consists of THREE SECTIONS: SECTIONS A, B, C, D, and E.
2. Answer ALL the questions from Sections A, B, C, D, and E.
3. Read ALL the questions carefully before you write the answers.
4. Number your questions exactly as they appear in the question paper.
5. Write neatly and legibly.
6. Sketches must be clear, neat and done in pencil.

**ALLOCATION OF MARKS**

SECTION A	MULTIPLE-CHOICE QUESTIONS	
	QUESTION 1	[10]
SECTION B	STRUCTURES	
	QUESTION 2	[15]
SECTION C	PROCESSING	
	QUESTION 3	[15]
SECTION D	SYSTEMS AND CONTROL (Mechanical Systems)	
	QUESTION 4	[30]
SECTION E	SYSTEMS AND CONTROL (Electrical Systems)	
	QUESTION 5	(5)
	QUESTION 6	(25)
		[30]

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

Choose the correct answer and write only the letter (A – D) next to the question number (1.1 – 1.10) in your answer book, e.g. 1.11 B.

- 1.1 Electricity can easily flow through a material because of this characteristic.
- A Malleability.
  - B Conductivity.
  - C Flexibility.
  - D Hardness.
- (1)
- 1.2 A skeleton is classified as a ... structure.
- A natural
  - B man-made
  - C shell
  - D mass
- (1)
- 1.3 Which of the following is NOT a type of wood?
- A Meranti
  - B Imbua
  - C Electroplating
  - D Pine
- (1)
- 1.4 During this process chemicals in the smoke prevent the growth of micro-organisms.
- A Smoking
  - B Salting
  - C Jamming
  - D Freezing
- (1)
- 1.5 Grooved wheels attached to each other by a rope or cable are ...
- A levers.
  - B gears.
  - C cams.
  - D pulleys.
- (1)
- 1.6 A gear placed between the driver and the driven gear is known as the ...
- A gear train.
  - B idler gear.
  - C driver gear.
  - D cog.
- (1)

- 1.7 ... are used on sailing boats to adjust and hold ropes.
- A Ratchets
  - B Cleats
  - C Valves
  - D Belt drives
- (1)
- 1.8 A component in an electrical system that is used to control the flow of electricity is known as a(n) ...
- A ohmmeter.
  - B resistor.
  - C voltmeter.
  - D ammeter.
- (1)
- 1.9 Which of the following does NOT form part of a system diagram?
- A Input
  - B Device
  - C Process
  - D Output
- (1)
- 1.10 Which of the following is NOT an output device?
- A Bulb
  - B Motor
  - C Transistor
  - D Buzzer
- (1)

**TOTAL SECTION A: 10**

## **SECTION B: STRUCTURES**

### **QUESTION 2**

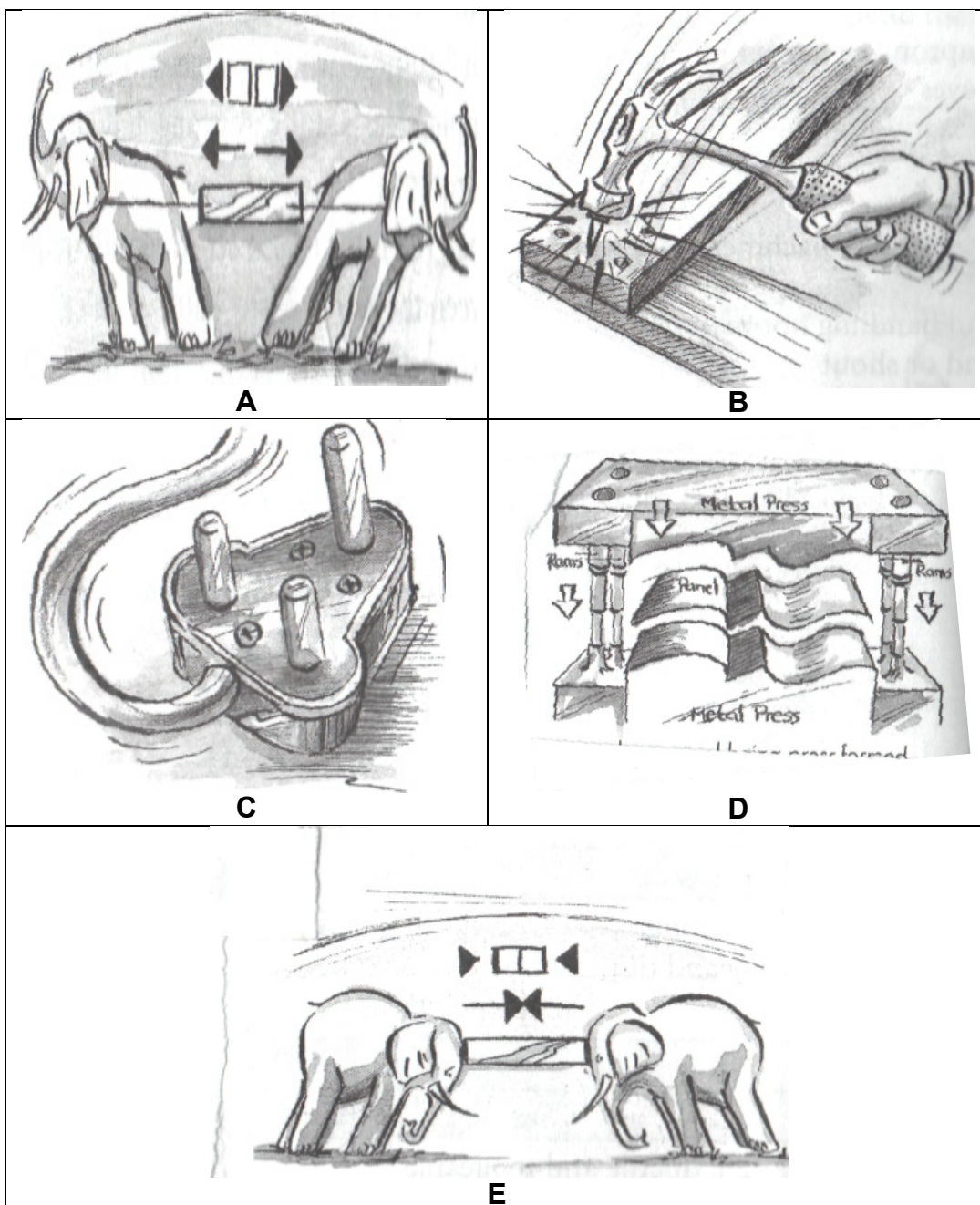
- 2.1 Read the following paragraph and then answer the questions that follow.

#### **Bridges**

Bridges allow us to cross rivers and valleys. They make life easier and distances shorter. They span a gap and provide access for vehicles. They save us a lot of time and money. Different materials have been used to build bridges. The first bridges were fallen trees that helped people to cross rivers. Nowadays engineers look at the availability, suitability and cost-effectiveness of materials to build stone, cable and iron bridges.

- 2.1.1 Give TWO reasons why bridges are built. (2)
- 2.1.2 Name ONE positive and ONE negative effect of building a bridge in the environment. (2)
- 2.1.3 Give TWO types of materials that are used when building bridges. (2)

2.2 Match the following pictures to the list of properties given below:



**List of properties:** compressive strength; conductivity; malleability; toughness; tensile strength

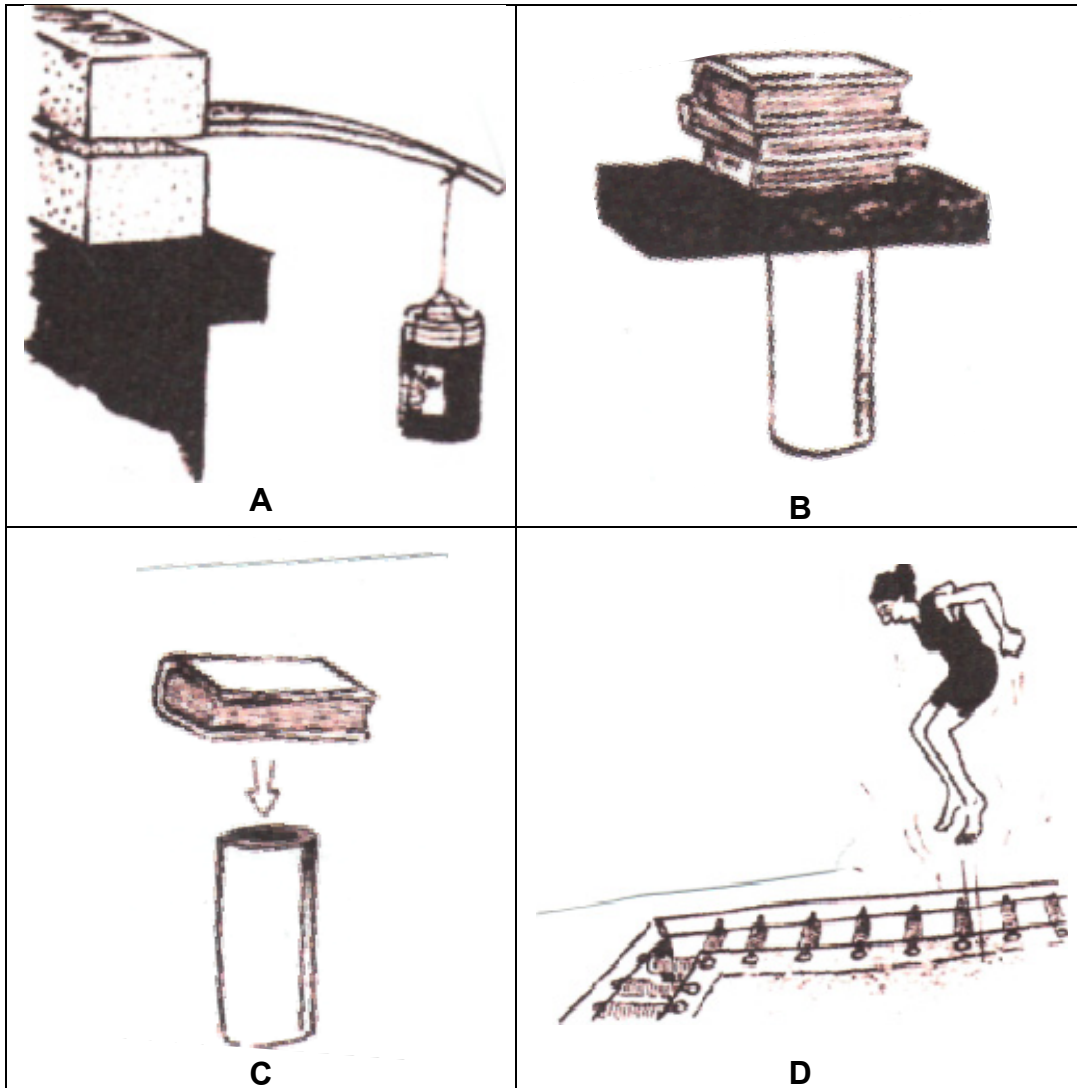
Copy the following table in your answer book and fill in the correct answers.

e.g.

Picture	Property
F	Hardness

(5)

- 2.3 Look at the illustration below and indicate (in your answer book) whether the four loads A, B, C and D are static or dynamic.



(4)

**TOTAL SECTION B: 15**

**SECTION C: PROCESSING****QUESTION 3**

- 3.1 Match the food processing methods in COLUMN A with the way each method works in COLUMN B. Write down only the number of the method in COLUMN A and the letter of the correct description in COLUMN B. e.g. 3.1.6 G.

COLUMN A		COLUMN B	
3.1.1	Irradiation	A	The acid in the vinegar prevents the growth of micro-organisms
3.1.2	Refrigeration	B	This destroys micro-organisms by removing moisture from food
3.1.3	UHT – Ultra Heat Treatment	C	Makes food lasts longer by storing it at temperatures between 1°C and 8°C
3.1.4	Drying	D	Radio-active beams that kill micro-organisms are passed through the food
3.1.5	Pickling	E	Heated at high temperatures, chilled immediately, packed and sealed in sterile conditions

(5)

- 3.2 Wood can be preserved by coating it with suitable preservative products.

Name FOUR methods of preserving wood.

(4)

- 3.3 What does the symbol below mean, and where would you find it?



(2)

- 3.4 Read the following case study and answer the questions that follow.

**CASE STUDY: ARTIFICIAL PRESERVATIVES AND HEALTH**

Dr Benjamin Feingold carried out a study on hyperactive children. Hyperactive Children have difficulty concentrating and focusing on a task. They are easily distracted, cannot sit still in class and are always 'on the go'. Feingold concluded from his studies that chemicals added to food, such as colourants, artificial flavourings and artificial preservatives led to hyperactive behaviour in children, or made it worse. When the children in the studies were put on a diet without these additives many of them became calmer and less hyperactive. They were able to concentrate better and focus on tasks.

Some people are allergic to artificial preservatives. They may feel restless, or get a rash on their skin, or find it difficult to concentrate. In severe cases, the artificial preservatives cause the air passages to swell so the person has difficulty breathing. If one wants to reduce the amount of artificial preservatives and other additives in the diet, one should start by comparing food labels of different brands of the same foods. Some brands use fewer artificial preservatives than others, and some brands are preservative free.

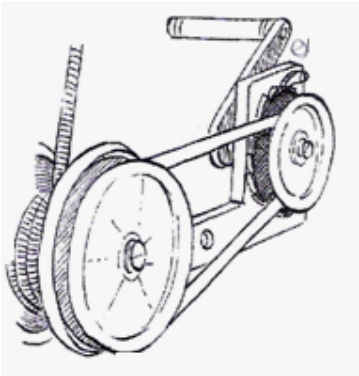
- 3.4.1 Name ONE reason that causes hyperactive behaviour in children. (1)
- 3.4.2 How could hyperactive behaviour be prevented? (1)
- 3.4.3 Name ONE negative effect of artificial preservatives. (1)
- 3.4.4 Give ONE way in which the amount of artificial preservatives and other additives can be reduced. (1)

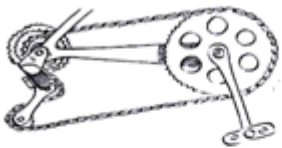

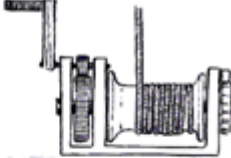

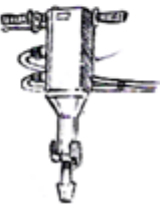
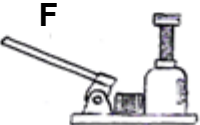
**TOTAL SECTION C: 15**



**SECTION D: SYSTEMS AND CONTROL (Mechanical Systems)****QUESTION 4**

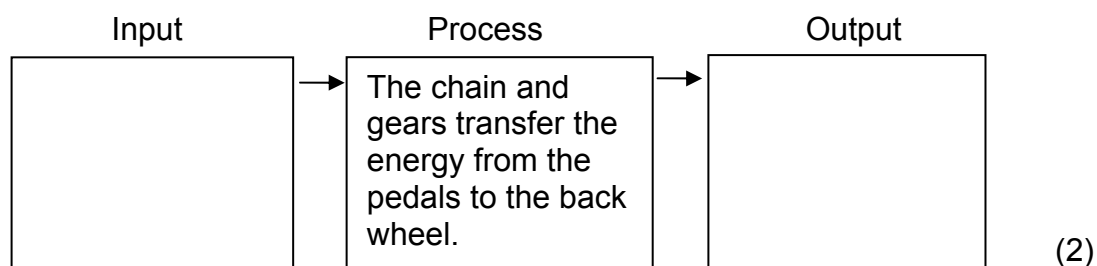
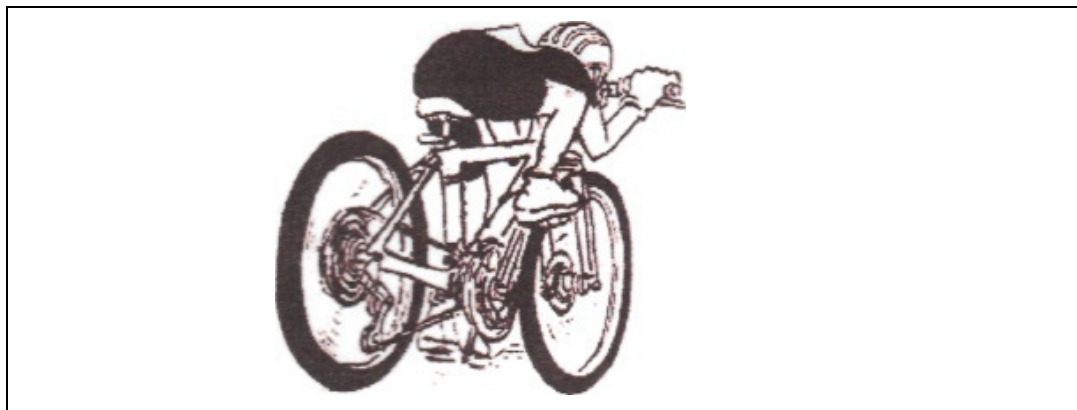
- 4.1 Mechanisms are used to make a job easier by controlling movement and force. They produce an output that is of benefit to people. Components are mechanical or electrical. Use the table below and state of what benefit is a mechanism to people and whether it is mechanical or electrical. Use pictures to complete the table.

Example		Benefit to people	Mechanical or electrical
 <p>Hand-driven pulley winch</p>		Makes lifting loads easier	Mechanical
A	Bicycle gear system		
B	A torch		
C	Gear winch		
D	Radio		
E	Jackhammer		
F	Hydraulic car jack		

<b>A</b>  Bicycle gear	<b>B</b>  A torch	<b>C</b>  Gear winch
<b>D</b>  Radio	<b>E</b>  Jackhammer	<b>F</b>  Hydraulic car jack

- 4.2 A mechanism is a simple machine, for it to work there must be an input, process and an output.

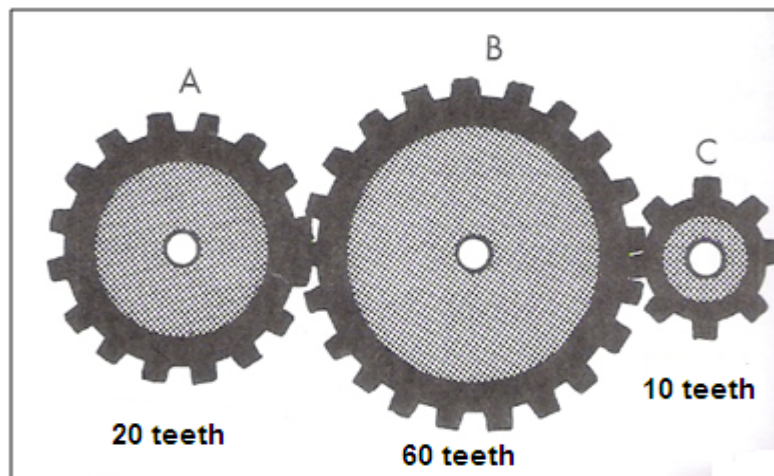
Complete the following systems diagram for a cyclist on a bicycle.  
Indicate the input and output.



- 4.3 Answer the following questions.

- 4.3.1 Explain the meaning of the word 'gear'. (1)
- 4.3.2 In what way can you make a driver and a driven gear rotate in the same direction? (1)
- 4.3.3 Draw a neat sketch to illustrate your answer in QUESTION 4.3.2. (4)

- 4.4 The illustration below shows a compound gear train consisting of three gears. Look at the diagram and answer the questions that follow.



This table indicates the number of teeth of each gear

Gear A	Gear B	Gear C
20 teeth	60 teeth	10 teeth

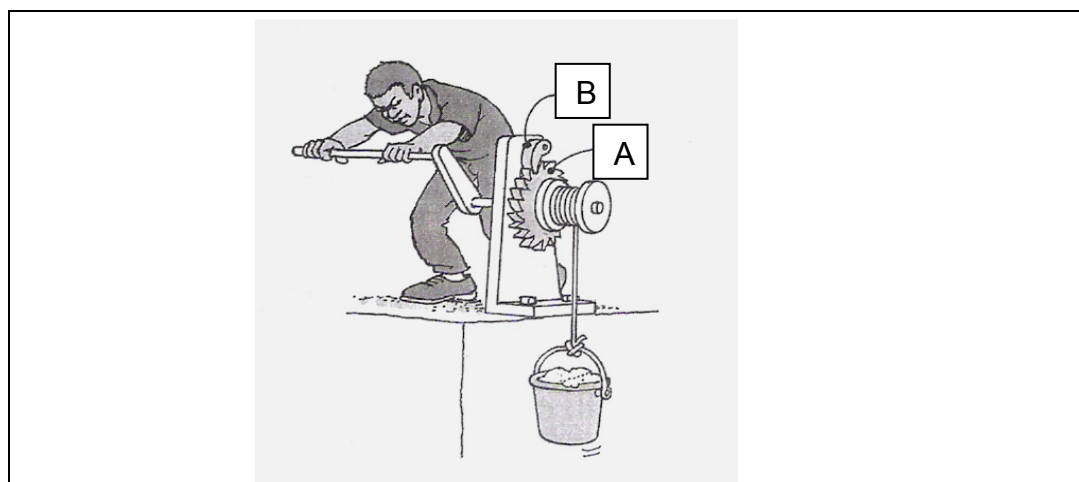
Formula of Gear Ratio = \_\_\_\_\_

$$= \frac{\text{Teeth of Gear B}}{\text{Teeth of Gear A}} = \frac{60}{20} = 3$$

\_\_\_\_\_ = 20 revolutions at B

- 4.4.1 What is the output in revolutions per minute in Gear C? (5)

- 4.5 The following diagram shows a system that will turn in only one direction.



- 4.5.1 Label the parts A and B. (2)

- 4.5.2 Mention the purpose of a one way valve. (1)

4.5.3 Give an example of where each of the following components is used in a real life.

- (a) Cleats (1)
- (b) One way valve (1)

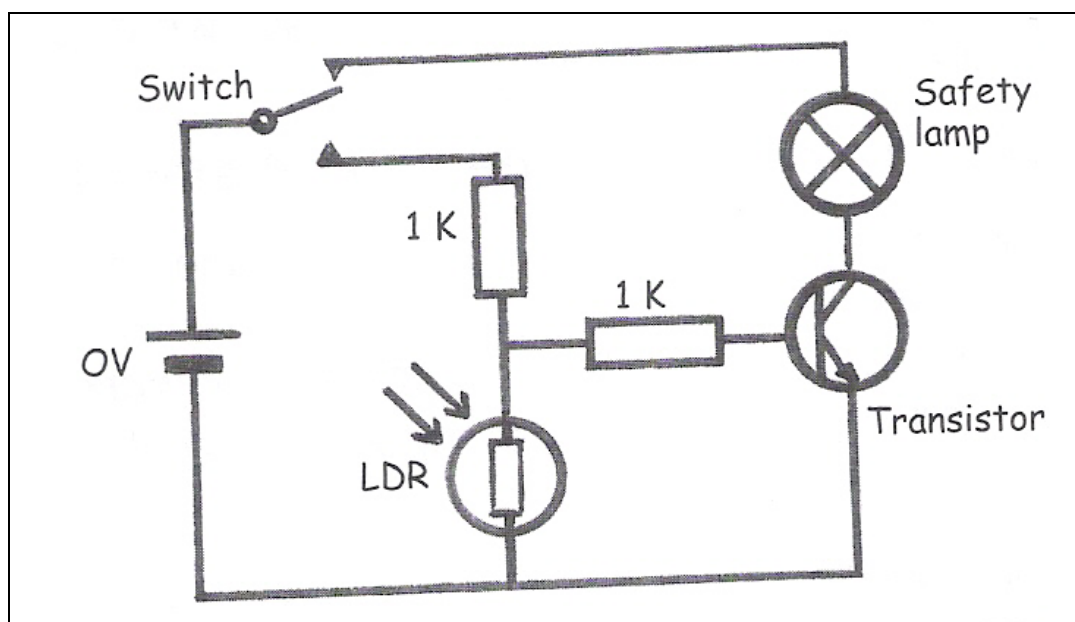
**TOTAL SECTION D: 30**

## SECTION E: SYSTEMS AND CONTROL (Electrical Systems)

### QUESTION 5

5.1 The following diagram represents a circuit for a safety lamp. The lamp comes on automatically as soon as it gets dark.

Study the electronic circuit and answer the questions that follow:



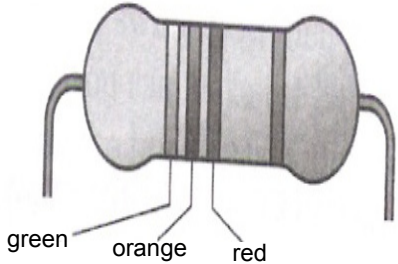
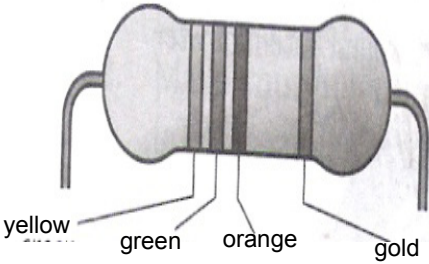
- 5.1.1 What electronic component is used to detect when it gets dark? (1)
- 5.1.2 What happens to the resistance of this component when it gets dark? (1)
- 5.1.3 Why is it that the safety lamp does not turn off when it gets dark? (2)
- 5.1.4 What component is used as an automatic switch to turn the safety lamp on? (1)

**[5]**

**QUESTION 6**

- 6.1 Look at the following colour code chart and work out the resistance of the resistors below.

Colour	1 <sup>st</sup> Band	2 <sup>nd</sup> Band	3 <sup>rd</sup> Band	4 <sup>th</sup> 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	

Resistor 1	Resistor 2
 <p>green orange red</p>	 <p>yellow green orange gold</p>

- 6.1.1 What is the resistance of resistor 1? (3)
- 6.1.2 What is the resistance of resistor 2? (3)
- 6.1.3 What is the tolerance of resistor 2? (1)
- 6.1.4 Work out the colour code for the following resistors:
- (a) 470
  - (b) 1 500
  - (c) 89 000
- (9)

- 6.2 Read the following scenario and answer the question that follows:

Sam has to choose between two electrical motors. They are of the same physical size and rating, except that motor A has a rating of 120  $\Omega$  for the windings while motor B has 50  $\Omega$  for the windings.

- 6.2.1 Which motor would be stronger (higher torque)? Give a reason for your answer. (3)

6.3 Answer the following questions.

6.3.1 What is the purpose of the capacitor? (1)

6.3.2 Mention THREE factors that determine the charge on a capacitor. (3)

6.4 Buzzers are used for many different purposes. Name at least TWO. (2)

**[25]**

**TOTAL SECTION E: 30**

**GRAND TOTAL: 100**