Province of the
EASTERN CAPE
EDUCATION

SENIOR PHASE

GRADE 9

NOVEMBER 2012

TECHNOLOGY MEMORANDUM

MARKS: **100**

This memorandum consists of 9 pages.

INSTRUCTIONS AND INFORMATION

1. A learner must answer ALL the questions from SECTIONS A, B, C, D, and E.

2. Sketches must be clear, neat and done in pencil.

ALLOCATION OF MARKS

SECTION A	MULTIPLE-CHOICE QUESTIONS		
	QUESTION 1		[15]
SECTION B	STRUCTURES		
	QUESTION 2		[10]
SECTION C	PROCESSING		
	QUESTION 3		[10]
SECTION D	SYSTEMS AND CONTROL (Mechanical Systems)		
	QUESTION 4		[33]
SECTION E	SYSTEMS AND CONTROL (Electrical Systems)		
	QUESTION 5	(14)	[32]
	QUESTION 6	(18)	

SECTION A: MULTIPLE-CHOICE QUESTIONS

QUESTION 1

1.1	1.1.1	B √	(1)
	1.1.2	D √	(1)
	1.1.3	A √	(1)
	1.1.4	C √	(1)
	1.1.5	A √	(1)
	1.1.6	B √	(1)
	1.1.7	D √	(1)
	1.1.8	C √	(1)
	1.1.9	B √	(1)
	1.1.10	D √	(1)
1.2	1.2.1	Drying √	(1)
	1.2.2	Varnishing √	(1)
	1.2.3	Freezing √	(1)
	1.2.4	Electroplating √	(1)
	1.2.5	Irradiation √	(1)

TOTAL SECTION A: 15

SECTION B: STRUCTURES

QUESTION 2

2.1 2.1.1
- Disruption of traffic √
- Safety of construction workers √
- Safety of the community √
- Use of local labour √
- Cost and time √
- Training of unskilled workers √
- Job creation √

(Any 1 x 1) (1)

2.1.2
- Steel sections √
- Steel cables √
- Steel reinforced concrete √
- Sand √
- Cement √
- Stone √
- Wood √
- Iron √

(Any 2 x 1) (2)

2.1.3 Dynamic (or uneven) and √ /
Static (or even) √ (Any 1 x 1) (1)

2.1.4
- Tension √
- Compression √
- Shearing √
- Torsion √ (Any 1 x 1) (1)

2.2
1 beam) √
2 column √
3 strut √
4 stay / guy √
5 buttress √ (5)

TOTAL SECTION B: 10

SECTION C: PROCESSING

QUESTION 3

3.1 3.1.1 To compensate for the nutrition lost in the processing of food. √ (1)

3.1.2 Tantrums √
Irritability √
Restlessness √
Severe sleep disturbances √ (Any 1 x 1) (1)

3.1.3
- Headaches √
- Anxiety √
- Upset stomach √ (Any 1 x 1) (1)

3.1.4
- Preservatives √
- Artificial sweeteners √
- Caffeine √ (Any 1 x 1) (1)

3.1.5
- Loss of nutrients √
- Higher prices √ (Any 1 x 1) (1)

3.2 3.2.1 E √ (1)

3.2.2 C √ (1)

3.2.3 B √ (1)

3.2.4 A √ (1)

3.2.5 D √ (1)

TOTAL SECTION C: 10

SECTION D: SYSTEMS AND CONTROL (MECHANICAL SYSTEMS)

QUESTION 4

4.1

Name of object	Input	Output
Car jack	Person uses a crank to turn the handle √	The jack lifts the car √
Scissors	A person's hand applies force to the scissors √	The scissors cut the paper √
Whisk	The person's hand applies force to turn the handle √	The mixers of the whisk spin √
Hand-driven pulley winch	A person turns the handle on the winch √	The load is lifted √
Bicycle's gear system	A person pushes on the pedal √	The wheels turn and the bicycle moves √

(10)

4.2 4.2.1 A pulley is a grooved rotating wheel over which a rope, belt or chain can move to change the direction of a pulling force. √ (1)

4.2.2 A person can pull down on a rope to lift a load, instead of trying to lift a load up. Pulleys create a mechanical advantage to make work easier. √ (1)

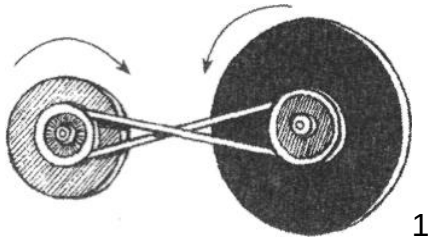
4.3 4.3.1 Mechanical Advantage = $\frac{Load}{Effort}$ √

$= \frac{500\ N}{250\ n}$ √

= 2 √ (3)

4.3.2 By twisting the rope or belt. √ (1)

4.3.3



1 mark for the twisting of the rope √
2 marks for two pulleys √√
1 mark for rotation direction of pulleys √ (4)

4.4 4.4.1 B : C √ (1)

4.4.2 A : E √ (1)

4.4.3 The spring-loaded sockets adjust the tension of the chain. √ (1)

4.5 4.5.1 B √ (1)

4.5.2 D √ (1)

4.5.3 C √ (1)

4.5.4 A √ (1)

4.6 4.6.1 $\sqrt{\frac{C}{D}} = \sqrt{\frac{120}{40}} = 4$ √

90 revolutions (at C) x 4 √ = 360 revolutions per minute at D √ (5)

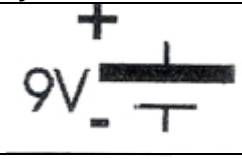
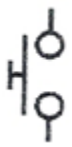
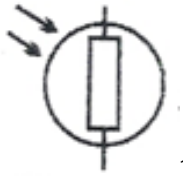
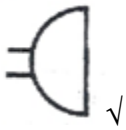
4.6.2 D revolves in a clockwise direction. √ (1)

TOTAL SECTION D: 33

SECTION E: SYSTEMS AND CONTROL (MECHANICAL SYSTEMS)

QUESTION 5

5.1

Component	Symbol	Use
Batteries		Batteries supply the energy to make a circuit work.
1 Push switch √		A push switch turns the flow of current on or off. The current will flow while the switch is being pressed.
Resistors	 **2** √	**3** A resistor reduces the amount of current that flows in a circuit. A 470 W resistor, for example, stops an LED from burning out. √
4 Light emitting diode (LED) √		**5** An LED is a very small light that tells you whether something is on or not. LEDs use very little electricity. √
Light-Dependent Resistor (LDR)	 **6** √	**7** A Light-Dependent Resistor (LDR) is a device whose resistance changes when light shines on it. It can be used in the same way as a thermistor to make a light √
8 Motors √	**9**  √	Motors change electrical energy into movement. The electricity makes the motor turn. We can then use the motor to make other things move.
Buzzer	 **10** √	**11** Buzzers change electricity into sound. A front door bell is an example. √

(11)

(One mark for each missing part.)

5.2 5.2.1 The circuit will switch on and off when the water becomes too hot or too cold. √ (1)

5.2.2 Light- Dependent Resistor (LDR) √ (1)

5.2.3 Thermistor √ (1)
[14]

QUESTION 6

6.1 6.1.1 Transistor √ (1)

6.1.2
- Transistors operate as electronic switches (they allow or do not allow current to flow). √
- They can operate as amplifiers (they enlarge – make bigger – the input signal that they receive). √ (2)

6.1.3
- Emitter √
- Collector √
- Base √ (3)

6.2 6.2.1 Resistor 1

Grey in the 1st band = 8 √
Yellow in the 2nd band = 4 √
Red in the 3rd band = 00 √

= 8 400 Ω (3)

6.2.2 Resistor 2

Violet in the 1st band = 7 √
Blue in the 2nd band = 6 √
Orange in the 3rd band = 000 √

= 76 000 Ω (3)

6.3 6.3.1 1st band 7 = Violet √
2nd band 5 = Green √
3rd band 0000 = Yellow √ (3)

6.3.2 1st band 8 = Grey √
2nd band 0 = Black √
3rd band Nil = Black √ (3)
[18]

TOTAL SECTION E: 32
GRAND TOTAL: 100