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.

ALLOCATE OF MARKS

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</table>
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 ✓  

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 √ |

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. √

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. √

4.3 4.3.1 Mechanical Advantage = \( \frac{\text{Load}}{\text{Effort}} \) √

\[
= \frac{500 \text{ N}}{250 \text{ N}} √
\]

= 2 √

4.3.2 By twisting the rope or belt. √

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 4.4.1 B : C √

4.4.2 A : E √

4.4.3 The spring-loaded sockets adjust the tension of the chain. √
4.5 4.5.1 B √  
4.5.2 D √  
4.5.3 C √  
4.5.4 A √  

4.6 4.6.1 \[ \sqrt{\frac{C}{D}} = \sqrt{\frac{120}{40}} = 4 \]  
90 revolutions (at C) \[ \times \] 4 \[ \sqrt{ } \] = 360 revolutions per minute at D √  
4.6.2 D revolves in a clockwise direction. √  

TOTAL SECTION D: 33
<table>
<thead>
<tr>
<th>Component</th>
<th>Symbol</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Batteries</td>
<td><img src="image" alt="Symbol" /></td>
<td>Batteries supply the energy to make a circuit work.</td>
</tr>
<tr>
<td>Push switch</td>
<td><img src="image" alt="Symbol" /></td>
<td>A push switch turns the flow of current on or off. The current will flow while the switch is being pressed.</td>
</tr>
<tr>
<td>Resistors</td>
<td><img src="image" alt="Symbol" /></td>
<td>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.</td>
</tr>
<tr>
<td>Light emitting diode (LED)</td>
<td><img src="image" alt="Symbol" /></td>
<td>5 An LED is a very small light that tells you whether something is on or not. LEDs use very little electricity.</td>
</tr>
<tr>
<td>Light-Dependent Resistor (LDR)</td>
<td><img src="image" alt="Symbol" /></td>
<td>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.</td>
</tr>
<tr>
<td>Motors</td>
<td><img src="image" alt="Symbol" /></td>
<td>9 Motors change electrical energy into movement. The electricity makes the motor turn. We can then use the motor to make other things move.</td>
</tr>
<tr>
<td>Buzzer</td>
<td><img src="image" alt="Symbol" /></td>
<td>11 Buzzers change electricity into sound. A front door bell is an example.</td>
</tr>
</tbody>
</table>

(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. √

5.2.2 Light- Dependent Resistor (LDR) √

5.2.3 Thermistor √

QUESTION 6

6.1 6.1.1 Transistor √

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). √

6.1.3 • Emitter √
• Collector √
• Base √

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 400Ω

6.2.2 Resistor 2

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

= 76 000Ω

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

6.3.2 1st band 8 = Grey √
2nd band 0 = Black √
3rd band Nil = Black √

TOTAL SECTION E: 32
GRAND TOTAL: 100