Kolbe Catholic College

Year 8 Science - 2022

**Task 1 – Energy Topic Test**

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Answer the following questions in the space provided.

Total: /45 %

**MULTIPLE CHOICE 10 Marks**

**Use a pencil and erase incorrect answers completely.**

1. An object that is moving from point A and point has:
   1. Potential energy
   2. Electrical energy
   3. Chemical energy
   4. Kinetic energy
2. Which of the following is not a type of potential energy?
   1. Elastic energy
   2. Gravitational energy
   3. Sound energy
   4. Chemical energy
3. Which of the following statements about energy is CORRECT?
   1. Energy has many different forms, such as can be found in natural gas, sunlight, and water in mountain lakes
   2. If you train hard, you will build up your energy
   3. If something has energy it has to be moving, for example a train speeding along
   4. Pushes, pulls and twists are all forms of energy
4. Which of the following is an example of an object increasing in energy?
5. A car engine: while it is cooling down after a long drive
6. A ball: picking up speed as it rolls down a hill
7. Water: being frozen inside a freezer
8. A sprinter: coming to a stop after the finish line
9. The scientific unit of energy is the:
   1. Joule (J)
   2. Volt (V)
   3. Watt (W)
   4. Degrees Celcius (°C)

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d)

c)

b)

a)

1. Which of the devices pictured above carries out this energy transformation?

Light à electricity

1. Bunsen burner
2. Wind turbine
3. Torch
4. Solar panel
5. A car is 40% efficient. 100 J of energy is supplied to the car. The amount of energy transformed into kinetic energy is:
   1. 40 J
   2. 100 J
   3. 60 J
   4. 140 J
6. The direction that heat flows is always:
   1. From low to high
   2. From both objects – does not matter which object has more or less heat
   3. From an object with a higher temperature to an object with a lower temperature
   4. From the object with less heat energy to the object with more heat energy
7. Craig watches a music video clip on his plasma screen TV.

Choose the best description of the energy transformations that are happening.

1. electrical energy à sound energy + light energy
2. sound energy + light energy + heat energy à electrical energy
3. sound energy + light energy à electrical energy
4. electrical energy à sound energy + light energy + heat energy
5. Particles of matter are needed to transfer heat energy in the case of:
6. radiation but not conduction or convection
7. radiation and conduction but not convection
8. conduction and convection but not radiation
9. conduction but not convection or radiation

**SHORT ANSWER QUESTIONS 36 Marks**

**Write your answers in the space provided.**

1. This diagram shows a solar cell that is used to operate a solar fan.



Draw an energy flow diagram to show the energy changes that take place in this process. (2 marks)

Light energy à electrical energy à kinetic energy + sound energy + heat energy

(0.5). (0.5) (0.5) any one for (0.5)

1. A red Honda travels at 20 km/h around a curved road near the top of a mountain. A blue Honda travels at 50 km/h along a flat road near a beach.
   1. **State** which car has the greatest kinetic energy and **explain** your answer. (2 marks)

The blue car has the greater amount of kinetic energy (1) because it is travelling at a higher speed than the red car (1).

* 1. **State** which car has the greatest gravitational potential energy and **explain** your answer. (2 marks)

The red car has the greater gravitational potential energy (1) because it is moving on an elevated mountain road which is at a greater height than the blue car (1).

1. The Law of Conservation of Energy states:

“Energy can neither be **created ( ½ )** nor **destroyed ( ½ )**, it can only be transformed or transferred from one form to another. “

* 1. Complete the sentence above by filling in the missing words. (1 mark)
  2. Apply your understanding of this Law to **calculate the quantity** of energy produced as light in the system below. **Show working out**. (2 marks)

Diagram

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**Working out = 1 mark**

**Total E = 3600 J**

**Heat E = 3240 J**

**So, Light E = 3600 J – 3240 J**

**= 360 J**

**Light Energy =360 J (1)**

**Deduct ½ if no units**

**Heat Energy: 3240 J**

**Electrical Energy: 3600 J**

**Electrical Energy: 3600J**

As long as they’ve shown some sort of   
 working out, award the mark.

1. Read the following descriptions below, and determine whether an **energy transfer** or **energy transformation** best describes the effect that has taken place. (2 marks)
2. The wind moving clothes hanging on a washing line. **transfer**
3. An iPad screen lighting up after being turned on. **transformation**
4. A muscle cell contracting when a bicep is flexed. **transformation**
5. A foot kicking a stationary ball. **transfer**.
6. The diagram below shows a skateboard rider performing a trick on a ramp.

|  |  |
| --- | --- |
| C:\Users\dmur\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Outlook\XRDRPMZV\Skateboarder air-123path.png | - - - - - - Path of the rider |

**Choose the graph** in the table below that best represents the potential and kinetic energy of the rider at each of the positions 1, 2 and 3.

*NOTE: There are two graphs that will not be used when answering this question.*

Position 1 = Graph # \_\_**4**\_\_ Position 2 = Graph # \_\_**3**\_\_\_

Position 3 = Graph # \_\_**5**\_\_\_

(3 marks)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Graph 1** | **Graph 2** | **Graph 3** | **Graph 4** | **Graph 5** |
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Key:

Potential Energy:

Kinetic Energy:

* 1. Name the method of heat transfer from the Sun to the Earth. (1 mark)

**Radiation**

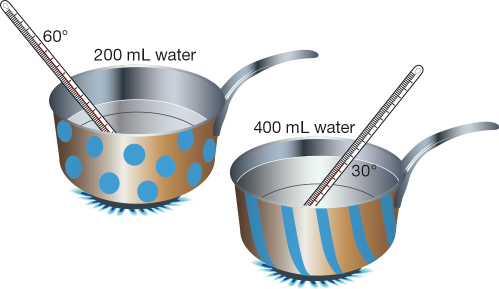
* 1. Identify the following examples of heat transfer as either **radiation**, **conduction** or **convection**. (2 marks)

|  |  |
| --- | --- |
| **Example** | **Radiation, Conduction or Convection** |
| Your throat warming from drinking hot chocolate. | **Conduction** |
| Boiling water in a saucepan on the stove. | **Convection** |
| An air-conditioner in a room causing the hot air to rise. | **Convection** |
| Your hands feeling cold holding a can of soft drink straight from the fridge. | **Conduction** |

1. For each of the following systems, identify the input energy, useful output energy and one form of wasted energy. One answer has already been completed for you. (3 marks)

|  |  |  |  |
| --- | --- | --- | --- |
| **System** | **Input** | **Useful** | **Wasted** |
| Torch | Chemical | Light | Heat |
| Electric Beater | Electrical | Kinetic | Sound / Heat |

1. 200 mL of cold water is heated in a spotted saucepan, and 400 mL of cold water is heated in an identical striped saucepan.



* 1. Propose why the base of each saucepan is metal, but the handles are made from a tough plastic. (2 marks)

|  |
| --- |
| * Metal base – conducts heat energy to heat contents of pan |
| * Plastic handle – insulates which allows user to pick up sauce pan and not get burnt |
|  |
|  |

* 1. Explain why the water in the spotty saucepan heats up faster. (3 marks)

|  |
| --- |
| * Fewer particles in the spotty saucepan |
| * Each particle absorbs more energy/heat travels quicker through water |
| * Over the same period of time, resulting in a higher temperature |
|  |

* 1. Explain how convection currents cause a hot air balloon to rise. (3 marks)

|  |
| --- |
| * The heat source heats air inside the balloon. |
| * The air inside the balloon is hotter than air outside balloon * The denser cold air pushes down/hot air rises lifting balloon (1) |
|  |

1. a) A netball is dropped onto a flat surface from a height of 2 m and rebounds to 1.3 m.

Calculate the netball’s efficiency. *Show your working* *out* (1 mark)

Deduct 0.5 if no working out

1. Explain why the ball doesn’t rebound to the height it was dropped from. (6 marks)

*Hint: include the following words in your answer – transfer, transformation, gravitational potential energy, elastic potential energy, kinetic energy, wasted energy*

* The ball has gravitational potential energy when it is above the ground (1)
* When it is dropped the GPE is transformed into Kinetic energy (1)
* Kinetic energy is transformed to elastic potential energy
* then transforms elastic potential energy into kinetic energy (1) moving upwards
* When it hits the ground not all of the energy is transformed into kinetic energy/EPE.(1)
* Some of the energy is transformed into sound and heat energy and is wasted (1)
* The ball doesn’t have the same amount of kinetic energy to move upwards as it did to fall downwards. (1)