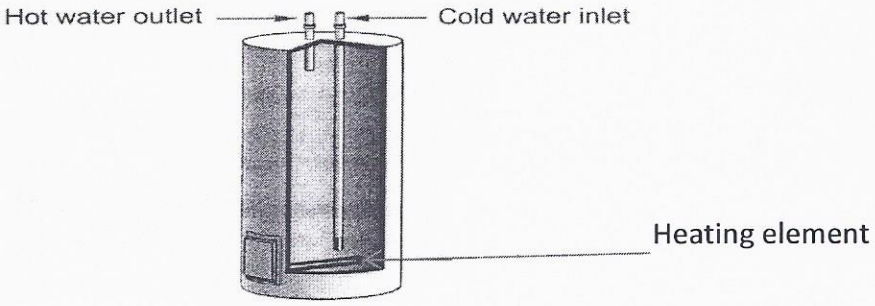
Heat and Energy Transformations Worksheet

Multiple Choice

1. An electric heater has an element that heats the cold water entering the heater.



When the water heater is turned on, why does the water in it heat up?

A) Because the heat given off by the heating element is transferred to the water molecules.
B) Because the heat given off by the heating element is transformed into a temperature.
C) Because the temperature given off by the heating element is transferred to the water molecules.
D) Because the temperature given off by the heating element is transformed into heat.

2. Determine which statements are correct.

1- Cold is the absence of heat.
2- Heat is a measure of temperature.
3- Heat is always transferred from a warmer medium to a colder medium.
4- Temperature is transferred from a warmer medium to a colder medium.

A) 1 and 3 B) 1 and 4 C) 2 and 3 D) 2 and 4

3. In order to work, a gasoline powered lawn mower needs chemical energy to convert into mechanical energy, while producing other forms of energy. Which of the statements below completes the following sentence correctly? The chemical energy consumer is ...

A) ... equal to the mechanical energy produced.
B) ... less than the sum of the other forms of energy produced.
C) ... equal to the sum of the mechanical energy and the other forms of energy produced.
D) D)... greater than the sum of the mechanical energy and the other forms of energy produced.

4. In order to work, a car needs chemical energy that it will convert to mechanical energy, while producing other forms of energy. Which statement is true?

A) The chemical energy consumed is equal to the mechanical energy obtained.
B) The chemical energy consumed is less than the sum of the other forms of energy consumed.

C) The chemical energy consumed is greater than the sum of the mechanical energy and the other forms of energy produced.

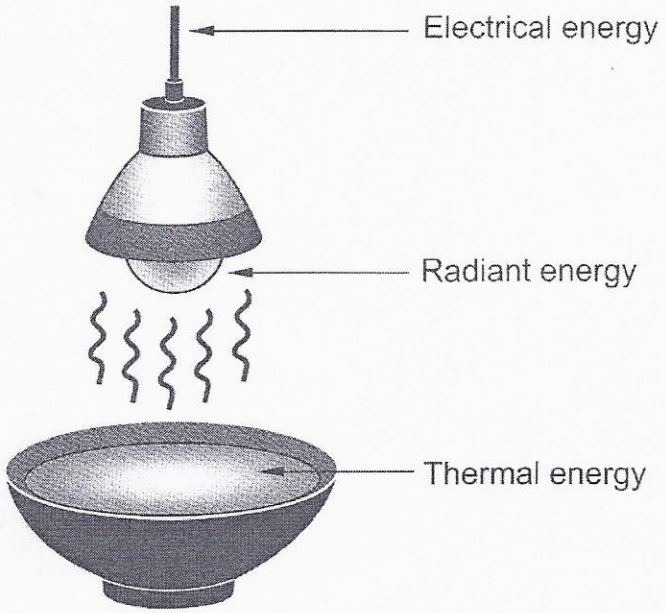
D) The chemical energy consumed is equal to the sum of the mechanical energy and the other forms of energy produced.

5. A miniature electric train with a battery operated motor produces sound and light. The train runs on plastic tracks. Which of the statements below completes the following sentence correctly?

When the train is running, some of the energy is transformed into....

A) .... electrical energy by the indicator light.
B) .... magnetic energy by the indicator batteries.
C) .... chemical energy by the horn.
D) .... mechanical energy by the motor.

6. A heat lamp is used to keep food hot in a cafeteria. The following diagram shows a bowl of soup under a heat lamp.



Which of the following statements about the forms of energy involved is true?

A) The amount of electrical energy consumed by the lamp is equal to the amount of thermal energy absorbed by the soup bowl.
B) The amount of radiant energy provided by the lamp is equal to the amount of thermal energy absorbed by the soup bowl.
C) The amount of electrical energy consumed by the lamp is greater than the amount of thermal energy absorbed by the soup bowl.
D) The amount of thermal energy absorbed by the soup bowl is greater than the amount of radiant energy provided by the lamp.

Short Answer

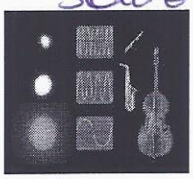
7. For each of the following statements, write the form of energy that will result from the energy transformation described.

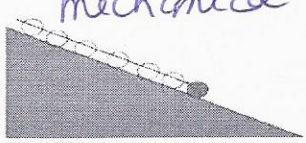
a- You turn on an electric radiator. electric
b- Gas powers your car. chemical
c- The nuclear power plant operates. nuclear
d- The microwave. radiation
e- A lamp lights up the room. radiation
f- An apple gives me energy chemical
g- The ball my thrown broke the window mechanical
h- The sun melts the snow in the spring. radiation

8. Name the form or forms of energy in each of the following energy sources.


chemical


chemical


sound


mechanical


electrical


elastic


elastic potential


radiation


potential

9. Does each of the following situations describe a transfer or a transformation of energy, or both?

a) Solar energy makes photosynthesis in plants possible. Transfer
b) Energy from a heating system warms the air in a home. "
c) Power plants generate electricity that is then delivered to our homes. transformation
d) The snow you are holding in your hand begins to melt. transfer
e) Your hands are being warmed by the campfire. "
f) Your radio which is plugged into an outlet is playing very loud rock music. transformation

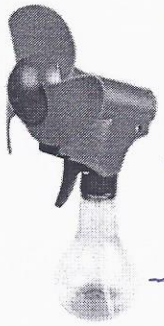
10. Match the type of energy with its appropriate definition.

a- Chemical energy
b- Elastic energy
c- Electric energy
d- Kinetic energy
e- Radiation energy
f- Sound energy

F Vibrations or disturbances of matter
A Stored energy where the bonds can be broken
B Results in the deformation of an object
C Produced when electrons flow through a conductor
E Energy transported by electromagnetic waves
D Energy of movement

11. Below is a picture of a water misting fan. In the back portion of the fan there are two AA batteries connected to a series circuit which allows a small motor to work. As you press on the nozzle two things occur:
    1- Water comes out of the center of the fan.
    2- The series circuit is closed because of the contact made and the blades will spin as a result.

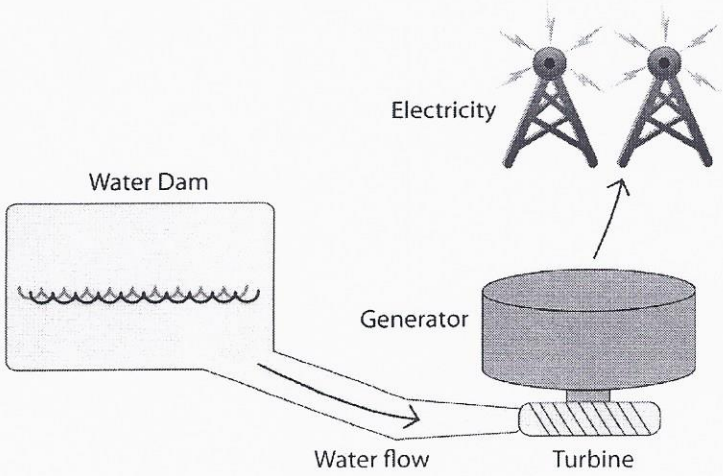
    Several energy transformations are needed to make the misting fan work. Explain two energy transformations that occur when the water misting fan is in operation.



- Chemical to electric: energy stored in battery creates electrical energy
- electric to kinetic: ē cause movement of fan
- Kinetic to sound: turning blades cause sound

Kinetic to sound: blades turning creates sound - there are more

12. A simple diagram of a Hydro-Electric System is shown below.



Describe why all the energy from the water flowing into the turbine is not transformed into electrical energy.

Energy is also being transfered to other forms of energy within the process. Heat energy, sound energy, mechanical energy...