1 course. Unit 2. Laws of Thermodynamics. Surname Name Group

Task 1. Match the terms with their definitions.

Term	Definition
1.Thermodynamics	a. A measure of the disorder or randomness in a system, often related to the amount of energy unavailable for work.
2. Internal Energy	b. A state in which opposing forces or influences are balanced, resulting in no net change.
3. Heat	c. The transfer of energy that occurs when a force is applied to an object and the object moves.
4. Work	d. The energy contained within a system, arising from the kinetic and potential energies of its molecules.
5. System	e. The branch of physics that deals with the relationships between heat and other forms of energy.
6. Entropy	f. A form of energy associated with the movement of atoms and molecules in a substance, transferred from one body to another due to a temperature difference.
7. Equilibrium	g. A group of interacting or interrelated elements that form a unified whole, often studied separately from its surroundings.

Task 2. Fill in the gaps with the correct word from the drop-down list.

- ***Entropy*** - ***Colder*** - ***Zero*** - ***Hotter***
- ***Isolated*** - ***Work*** - ***Equilibrium*** - ***Conserved***

- **First Law**: Energy is always **(1)** _____ in a system, but it can change from one form to another, such as from heat to **(2)** _____. The total amount of energy in an **(3)** _____ system is constant.

- **Second Law**: Heat naturally moves from a **(4)** _____ object to a **(5)** _____ object. Over time, the **(6)** _____ of the system increases.

- **Third Law**: As the temperature of a system gets closer to absolute **(7)** _____, the motion of particles slows down, and the system reaches a state of **(8)** _____.

Task 3. Read each sentence carefully and identify the thermodynamic concept that applies to each situation.

1. _____No matter how hard scientists try, they cannot make something reach the coldest possible temperature, as it gets harder to remove heat the closer they get.
2. _____In a pressure cooker, the fast-moving particles of steam increase the pressure inside the pot.
3. _____A car engine burns fuel to make the car move, but some of the energy turns into heat and escapes into the air.
4. _____When you leave a hot drink on the table, it slowly cools down while the room gets slightly warmer, spreading out the energy.
5. _____If you put a hot piece of metal into cold water, both will eventually become the same temperature, balancing the heat between them.
6. _____When a metal spoon is placed in hot soup, the spoon gets hot because heat moves from the soup to the spoon.
7. _____Water stored at the top of a dam has a lot of potential energy that turns into moving energy as it flows down, which can be used to produce electricity.
8. _____When you leave an ice cube on a counter, it melts, and the ice becomes more disordered as it turns into liquid.

Task 4. Fill in the gaps with the appropriate collocation.

1. The _____ between the hot object and the cold surface increased the temperature of the metal.
2. The _____ principle states that energy can neither be created nor destroyed, only transformed.
3. The _____ from the stove to the pot caused the water inside to boil.
4. The _____ in the system was due to the absorption of heat during the chemical reaction.
5. As the gas expands, the _____ decreases if no heat is added.
6. The _____ in the closed system occurred as the molecules spread out and became more disordered.
7. In an _____, no heat or matter can enter or leave, so energy remains constant.
8. The system reached an _____ when the temperature was uniform throughout.
9. At _____, the motion of particles theoretically stops, and the system reaches its lowest possible energy state.

Task 5. Read the sentences and decide if they are TRUE or FALSE

1. _____ The temperature of a system can never reach absolute zero according to the Third Law of Thermodynamics.
2. _____ In an isolated system, energy is not conserved, meaning it can be lost to the surroundings.
3. _____ Heat will naturally flow from a hotter object to a colder object, increasing the entropy of the system.
4. _____ As the temperature of a system approaches absolute zero, the motion of particles slows down, and the system moves towards a state of equilibrium.
5. _____ The First Law of Thermodynamics states that energy can be converted from one form to another, but the total amount of work in a system is always conserved.
6. _____ The entropy of a system always decreases over time as energy spreads out.
7. _____ The Kelvin scale measures temperature starting from absolute zero, where particle motion ceases.
8. _____ A system in equilibrium has maximum entropy and no changes in its energy or temperature.
9. _____ The Second Law of Thermodynamics states that energy moves from colder to hotter objects.
10. _____ As the temperature approaches absolute zero, a system's entropy increases, and its order decreases.

Task 6. Read the text and answer the questions.

First Law of Thermodynamics Simply Explained

The first law of thermodynamics is a basic principle of physics that describes the relationship between energy and heat. It states that energy cannot be created or destroyed, only transferred or converted from one form to another. In other words, the total amount of energy in a system remains constant, even as that energy is transferred or converted.

A simple way to understand the first law of thermodynamics is to think about a closed system, such as a sealed container with a gas inside. If heat is added to the gas, the temperature of the gas will increase. The increased temperature causes the gas to expand, doing work on the surroundings. This increase in the gas's temperature and pressure is due to the transfer of heat from the surroundings to the gas. The first law of

thermodynamics tells us that the total amount of energy in the system (the gas and its surroundings) remains constant, even as the heat is transferred from the surroundings to the gas.

In other words, the first law of thermodynamics can be thought of as a statement of the conservation of energy. It tells us that energy is always conserved, even as it is transferred or converted from one form to another. This principle has many important applications in various fields, including thermodynamics, engineering, and chemistry.

1. **What does the first law of thermodynamics state?**

A) Energy can be created and destroyed, but it cannot be converted.
B) Energy cannot be created or destroyed, only transferred or converted.
C) Energy is always constant and cannot change form.

2. In a closed system, if heat is added to a gas, what happens to the gas?

A) The temperature of the gas decreases.
B) The gas stays at the same temperature and pressure.
C) The gas expands and does work on the surroundings.

3. What does the first law of thermodynamics tell us about the total amount of energy in the system?

A) The total amount of energy increases as heat is added.
B) The total amount of energy remains constant, even as heat is transferred.
C) The total amount of energy decreases over time.

4. _____ In the example of a sealed container with gas, what causes the temperature and pressure of the gas to increase?

A) Heat is transferred from the surroundings to the gas.
B) The gas compresses itself.
C) The gas absorbs more work from the surroundings.

5. _____Which of the following best explains the first law of thermodynamics in relation to the gas and its surroundings?

A) The energy in the system remains constant, even with heat transfer.
B) The energy in the system increases as heat is added.
C) The energy in the system is destroyed when heat is added.