UNIT: 1 - HEAT

CLASS : VI

SUBJECT : SCIENCE

I. Choose the appropriate answer

1. When an object is heated, the molecules that make up the object

a. begin to move faster b. lose energy c. become heavier d. become lighter

2. The unit of heat is

a. Newton **b. joule** c. volt d. celsius

3. One litre of water at 30oC is mixed with one litre of water at 50oC. The temperature of the mixture will be

a. 80 ^{0}C b. More than 50°C but less than 80 ^{0}C c. 20 ^{0}C **d. around 40 ^{0} C**

4. An iron ball at 50°C is dropped in a mug containing water at 50oC. The heat will

a. flow from iron ball to water.

b. not flow from iron ball to water or from water to iron ball.

c. flow from water to iron ball.

d. increase the temperature of both.

II. Fill in the blanks

1. Heat flows from a **higher temperature** body to a **lower temperature** body.
2. The hotness of the object is determined by its **temperature.**
3. The SI unit of temperature is **Kelvin.**
4. Solids **expand** on heating and **contract** on cooling.
5. Two bodies are said to be in the state of thermal **equilibrium** if there is no transfer of heat taking place.

III. True or False. If False, give the correct statement

1. Heat is a kind of energy that flows from a hot body to a cold body. **True**
2. Steam is formed when heat is released from water. **False**
3. Thermal expansion is always a nuisance. **False**
4. Borosilicate glass do not expand much on being heated. **True**
5. The unit of heat and temperature are the same. **False**

IV. Give reasons for the following

1. An ordinary glass bottle cracks when boiling water is poured into it, but a borosilicate glass bottle does not.

The reason is that the borosilicate glass do not expand much on being heated and therefore they do not crack.

2. The electric wire which sag in summer become straight in winter.

In summer the electric wire is expanded by high temperature. So it sags in summer. In winter die electric wire is contracted by low temperature. Hence it becomes straight in winter.

3. Rivet is heated before fixing in hole to join two metal plates.

Rivets are used to join two steel plates together. Hot rivet is driven through the hole in the plates. One end of the rivet is hammered to form a new rivet head. When cooled, the rivet will contract and hold the two plates tightly together.

V. Match the following

1. Heat	-	joule
2. Temperature	-	kelvin
3. Thermal Equilibrium	-	No heat flow
4. Ice cube	-	0 ^{O}C
5. Boiling water	-	100 ^{0}C

VI. Analogy

1. Heat : Joule :: Temperature : **Kelvin**
2. ice cube : 0 ^{0}C :: Boiling water : **100°C**
3. Total Kinetic Energy of molecules: Heat :: Average Kinetic Energy : **Temperature**

VII. Give very short answer

1. Make a list of electrical equipments at home which we get heat from.

- Water heater
- Iron box
- Electric kettle
- Micro oven

2. What is temperature?

- The measurement of warmness or coldness of a substance is known as temperature.

- ❖ SI unit of temperature is Kelvin.
- ❖ Other units : Celsuis, Fahrenheit

3. What is thermal expansion?

The expansion of a substance on heating is called the thermal expansion of the substance.

4. What do you understand by thermal equilibrium?

Thermal equilibrium exists when two objects in thermal contact no longer affect each other's temperature (or) Both the objects are in same temperature they are in thermal equilibrium.

VIII. Give short answer

1. What difference do you think heating the solid will make in their molecules ?

- ❖ When we heat the object this vibrations and movement of molecules increase.
- ❖ The temperature of the object increase.

2. Distinguish between heat and temperature.

S.No	Heat	Temperature
1.	Heat not only depends on the temperature of the substance but also depends on how many molecules are there in the object.	Temperature is related to how fast the atoms or molecules move or vibrate within the substance
2.	Heat measures the total Kinetic Energy of the molecules in the substance.	Temperature measures the average kinetic energy of molecules.
3.	SI Unit: Joule	SI Unit: Kelvin
4.	Unit: Joules, Calories	Unit: Fahrenheit, Celsius, Kelvin
5.	It has the ability to do work	It can be used to measure the degree of heat

IX. Answer in detail

1. Explain thermal expansion with suitable examples.

Thermal expansion:

The expansion of a substance on heating is called the thermal expansion of that substance.

Fitting the iron rim on the wooden wheel:

- The diameter of the iron ring is slightly less than that of the wooden wheel.
- So, it cannot be easily slipped on from the rim of wooden wheel.
- The iron ring is, therefore, first heated to a higher temperature so that it expands in size and the hot ring is then easily slipped over to the rim of the wooden wheel.
- Coldwater is now poured on the iron ring so that it contracts in size and holds the wooden wheel tightly.

Riveting:

- Rivets are used to join two steel plates together.
- Hot rivet is driven through the hole in the plates.
- One end of the rivet is hammered to form a new rivet head.
- When cooled, the rivet will contract and hold the two plates tightly together.

Cracking of a thick glass tumbler:

- Glass is a poor conductor of heat.
- When hot liquid is poured into the tumbler, the inner surface of the tumbler becomes hot and expands while the outer surface remains at the room temperature and does not expand.
- Due to this unequal expansion, the tumbler cracks.

X. Questions based on Higher Order Thinking Skills

1. When a window is accidentally left open on a winter night, will you feel uncomfortable because the cold is getting in, or because the heat is escaping from the room?

- When a window is left open on winter night I will feel uncomfortable because the heat is escaping from the room.
- Heat will transfer from high temperature to low temperature.
- During winter cold air enter into room, so room temperature will decrease.

2. Suppose your normal body temperature were lower than what it is. How would the sensation of hot and cold change?

- If the normal body temperature, **(37°C or 98.6°F)** is lower than what it is, then it is called hypothermia.
- In such a case, the body feels cold sensation. When we are too cold, our blood vessels narrow. This reduces blood flow to our skin to save body heat. We may start to shiver. When the muscles tremble this way, it helps to make more heat.

- Hypothermia can be serious one or even deadly. Low body temperature usually happens from being out in cold weather. But it may also be caused by alcohol or drug use, going into shock, or certain disorders such as diabetes or low thyroid.
- A low body Temperature may occur with an infection. This is most common in new borns, older adults or people who are frail. A very bad infection may also case an abnormal low body temperature.

3. If you heat a circular disk with Am hole, what change do you expect in the diameter of the hole? Remember that the effect of heating increases the separation between any pair of particles.

- If I heat a circular disk with a hole the diameter of the hole will increase.
- Because thermal expansion takes place when we heat the disk.