

परमाणु ऊर्जा शिक्षण संस्था, मुंबई

**Atomic Energy Education Society**

**Session: 2023 – 24**

**CLASS- VII**

**SUBJECT : SCIENCE**

**ANSWER KEY WORKSHEET No. – 3**

Name of the Chapter: **Heat**

---

I. Choose the correct option:- (1 x 10= 10M)

1. a. A form of energy
2. c. Thermometer
3. b. Liquids, gases
4. c. Wood
5. a. Becomes hot due to conduction
6. a. 35 °C to 42 °C
7. c. Good conductors of heat
8. b. Radiation
- 9.a. From hotter body to a colder body
10. b. Air trapped between the layers to newspaper is a bad conductor of heat.

II. Answer in one sentence.( 1 x 10 = 10M)

1. The clinical thermometer has a maximum temperature range of 42°C. So it cannot be used to measure high temperatures.
2. The kink present in the clinical thermometer prevents the mercury level from falling down.
3. The range of laboratory thermometer is -10 °C to 110 °C.
4. Conduction, convection and radiation
5. At sea-shore during the day cold air from the sea moves towards the beach because the land gets more heated than the sea water. Hot air above the land rises up, and cold air from the sea moves towards the land beach. This is called sea breeze.
6. During the night, cold air from the land moves towards the sea because the land cools more quickly than the sea water. So hot air above the sea rises up and cold air from the land moves towards the sea. This is called land breeze.

7. If we hold a thermometer by its bulb, the mercury in the bulb will expand due to our body temperature.
8. The clinical thermometer has a maximum temperature range of  $42^{\circ}\text{C}$  and the temperature of flame is more than that.
9. Water kept in a black pot will cool faster because blackened surface is a good radiator than a silvered surface.
10. In hot season, the outer walls of the houses should be painted white, because white colour reflects back the heat radiation which falls upon it. That is why the rooms remain cool, they do not warm up in summer.

III Answer in two to three sentences. (2 x 10 =20M)

1. The temperature of other object may not be the same as that of the bulb of the thermometer. When bulb is brought in contact with that object, the temperature of the bulb changes. So the level of mercury also changes.
2. Light coloured clothes reflect most of the heat that fall on them and we feel more comfortable wearing them in summer. Dark clothes absorb more heat so we feel comfortable with dark coloured clothes in winter.
3. A thermometer used to measure the maximum and minimum temperature of previous day is called Maximum-Minimum thermometer. It is used by the weather department to report/predict the weather.
4. The process by which heat is transferred from hotter end to colder end of metal is called conduction. In this process, molecules of substance do not move but heat energy is transferred. In solids generally, the heat is transferred by the process of conduction.
5. Handle of a metallic kettle is covered with strips of cane because when kettle is heated, the heat does not pass through strips of cane. The strips of cane are bad conductor of heat and we may hold the handle with our bare hands.
6. Wool is a poor conductor of heat. In the winter, we use woollen clothes. The wool fibres trap the air in between them. This air prevents the flow of heat from our body to the cold surroundings. So, we feel warm.
7. The molecules of solid are held strongly due to intermolecular forces and thus cannot move from one place to another place of the solid. So, convection is not possible in solids
8. A few sharp jerks given to clinical thermometer before using it because the jerk to the thermometer will allow the mercury in or above the kink to flow into the bulb so that the mercury level is below normal temperature.

9. 1. Position 'P' will feel warmer due to the hot air rising up.

2. P  $\rightarrow$  Convection T  $\rightarrow$  Radiation

10.

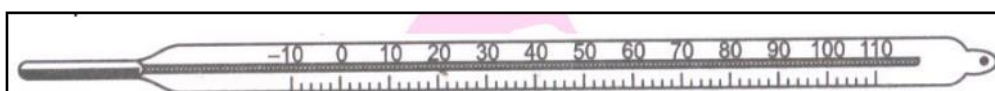
Sr. no	Convection	Conduction
1	A method of heat transfers through fluids, i.e., liquids and gases.	A method of heat transfers through solids
2	In convection, the transfer of heat is by the movement of the fluid itself.	In conduction, the transfer of heat is without movement of matter as a whole.

III Answer in three to four sentences. (3 x 5 = 15M)

1. Clinical thermometer : It is used to measure the body temperature of a human body. The scale on its stem shows temperature from- 35°C to 42°C. It has a slight 'bent' or 'kink' in the capillary tube just above the bulb.

Laboratory thermometer : It is used to measure the temperature of different objects in the laboratory. The scale on its stem shows temperature from-10°C to 110°C. A laboratory thermometer is bigger in size than clinical thermometer and kept upright and not tilted when making measurement.

2. The thermometer which is used to measure the temperature of objects in laboratory is called laboratory thermometer. The range is -10°C to 110°C. It also contains a thread of mercury.



3.i. The thermometer should be kept upright not tilted.

ii. Mercury does not stick to the walls of the thermometer like water.

iii. Mercury can be easily collected when thermometer breaks.

iv. It shines more than water and can be seen easily in thin glass tube of the thermometer.

4. When we come out in the sun, we feel warm. The heat cannot reach us by conduction or convection because there is no any material medium such as air in most part of the space between the earth and sun. Therefore, heat comes to us by the process called radiation from the sun. It can take place whether a medium is present or not.

5. Touching objects with your hands is not a measure of hotness and coldness because if you take your hand from a cold water to normal water, it appears warm. On the other hand, if you take your hand from warm water to normal water, it appears cold. Thus, the same water may give you different feeling thus deceiving you.

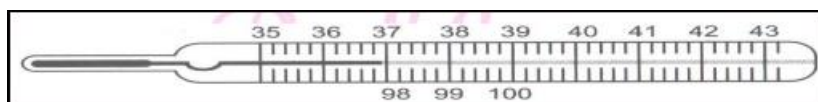
III Answer the following. (5 x 5 = 25M)

1. (a) Mercury is used as thermometric fluid because :

- (i) It expands easily and uniformly on heating.
- (ii) It can be used over a wide range of temperature.
- (iii) It is easily visible, being opaque and shining.
- (iv) It does not stick to the sides of a glass tube.

(b) The handles of most utensils are made of plastic and wood because plastic and wood are poor conductors of heat. We can easily hold the handle with bare hands even if the utensils are hot. This helps us to remove hot utensils from the flame.

2. (a) A clinical thermometer consists of a long narrow, uniform glass tube. It has a bulb at one end which contains shining liquid mercury. Outside the bulb a small thread can be seen in which mercury can flow. It has scale marked from 35°C to 42°C.



(b) We cannot use clinical thermometer for measuring the temperature of any object more than 42°C (more than body temperature). It may break if kept in the sun or near a flame.

3. When water is heated, the water at the bottom gets hot. Hot water rises up from the sides. The cold water from the sides moves down towards the bottom or source of heat. This water also gets hot and rises up and cold water again moves down. This process continues till the whole water gets heated. This mode of transfer of heat is known as convection.



4. The following precautions are to be taken while reading a clinical thermometer :

(a) Thermometer should be washed before or after use, preferably with an antiseptic

solution.

- (b) By giving a jerk, ensure that before use the mercury level is below 35°C.
- (c) Keep the thermometer below the tongue of the person for 30-60 seconds.
- (d) Read the thermometer keeping the of mercury along the line of sight.
- (e) Do not hold the thermometer by the bulb while reading the temperature..

5. At sea-shore during the day cold air from the sea moves towards the beach because the land gets more heated than the sea water. Hot air above the land rises up, and cold air from the sea moves towards the land beach. This is called sea breeze. During the night, cold air from the land moves towards the sea because the land cools more quickly than the sea water. So hot air above the sea rises up and cold air from the land moves towards the sea. This is called land breeze.

