Heat

1. **What is Heat Energy?**
   Ans. Heat is a form of Energy possessed by an object due to the vibration of the molecules and which flows from a hot body to a cold body when they are kept in contact.

2. **Why Sun is called universal source of energy?**
   Ans. We on earth receive heat energy mainly from the Sun. The heat energy of sun makes water to become warm and evaporate from the ponds and lakes as water vapor and form cloud. The water vapor from then cloud on condensation turns into rain. Plants use heat from the sun to prepare their food by photosynthesis. This is why the Sun is called Universal source of Energy.

3. **Why Heat Energy is the Internal Energy of the molecule?**
   Ans. Each Body is made up of particles called molecules. The molecules are in motion as well as they have the force of attraction amongst them. Due to the motion the molecule have the kinetic energy and due to force of attraction they have potential energy. When the body is heated or it absorbs heat the motion becomes rapid and kinetic energy increases. Thus, heat energy is the internal energy of the molecules of a body.

4. **What are the units of Heat?**
   Ans. SI unit of Heat: **Joule (J)**
   CGS Unit of Heat: **erg**
   1 J = 10^7erg.
   The other common Unit of Heat is **Calories.**
   - The relation between Joule and Calories is
     1 J = 0.24 Cal
     1 Cal = 4.2 J

5. **What is 1 Calorie?**
   Ans. One calorie is defined as the heat energy required to raise the temperature of 1g of water by 1^0C.

6. **What is Temperature?**
   Ans. Temperature is a quantity which tells the thermal state of a body (i.e., the degree of hotness or coldness of the body). It determines the direction of flow of heat when two bodies at different temperatures are placed in contact.

7. **Which instrument is used to measure temperature?**
   Ans. To measure temperature we use **Thermometer**.

8. **What are the units of Temperature?**
   Ans. CGS Unit of Temperature is Celsius (^{0}C).
   SI Unit of Temperature is Kelvin (K)
   Another unit of temperature is Fahrenheit (F).

9. **What are the different scales are used in Thermometer to measure temperature?**
   Ans. There are three types of Scales are used in Thermometer to measure Temperature. They are
   a. Centigrade Scale
   b. Fahrenheat Scale
   c. Kelvin Scale

10. **Write the boiling Point and Melting Point of Water in Different Scales?**
    Ans.

Different Scales	Melting Point	Boiling Point
Centigrade Scale	0^0C	100^0C
Fahrenheat Scale	32^0C	212^0C
Kelvin Scale	273 K	373 K

11. **What are the intervals of Boiling Point and Melting Point of Water in different scales?**
    Ans.

Different Scales	Intervals of Boiling Point and Melting Point of Water
Celsius	100
Fahrenheat	180
Kelvin	100

12. **What is absolute zero temperature?**
    Ans. The Zero of the Kelvin Scale is called Absolute Zero and it is at a temperature when molecular motion ceases.
    i.e 0 K=-273^0C

13. **What is the relation between Centigrade and Kelvin Scale?**
    Ans. **K=C+273**
    Where K = Kelvin Scale Temperature
    C= Celsius Scale Temperature

14. **What is the relation between Centigrade and Fahrenheat Scale?**
    Ans. $\frac{C}{5}=\frac{F-32}{9}$
    C= Celsius scale temperature
    F= Fahrenheat Scale Temperature

15. **What happen when Heat is supplied to an object.**
    Ans. When heat is supplied to an object, it can have one or more of the following effects:
    a. It changes the temperature of object
    b. It changes the size of the object
    c. It changes the states of object.

16. **What is Melting or Fusion?**
    Ans. The process in which solid substances changes into liquid on heating is called Melting.

17. **What is Melting Point?**
    Ans. The melting point of a substance is the temperature at which it changes state from solid to liquid.
    Ex: The melting point of Water is 0^0 C.

18. **What is Freezing or Solidification?**
    Ans. Freezing means solidification. It is reversal of melting. The process in which liquid substance changes into solid is called Freezing.

19. **What is Freezing Point?**
    Ans. The temperature at which temperature at which a liquid becomes a solid is called Freezing Point.
    Ex: The freezing point of Water is 0^0 C.

20. **What is Vaporization or Boling?**
    Ans. The process in which liquid substance changes into a gas rapidly on heating, is called boiling.

21. **What is Boiling Point?**
    Ans. The temperature at which temperature at which a liquid becomes vapor is called Boiling Point.

22. **What is Condensation or Liquefication?**
    Ans. The process of changing gas to a liquid by cooling, is called Condensation.

23. **What is Condensation Point?**
    Ans. Condensation point is a temperature at which gas changes to liquid. Generally, boiling point is same as condensation point. For water boiling point is 100^0C. So, condensation point is also 100^0C.

24. **What is Sublimation?**
    Ans. The process of directly changing from the solid to gaseous state is called Sublimation.
    Ex: Naphthalene, Dry ice etc.

25. **What is Deposition?**
    Ans. Deposition is the reverse of process of sublimation. Here a gas solidifies directly without going through the liquid stage when it undergoes a reduction of temperature.

26. **What is Evaporation?**
    Ans. The change of state from liquid to gas in all is called Evaporation.

27. **What is the difference between Boiling and Evaporation?**
    Ans. Boiling is at a fixed temperature while evaporation takes place at all temperatures.

28. **What is Latent Heat?**
    Ans. During the change of state at a fixed temperature heat is either absorbed or released but this heat does not change the temperature of the substance it is called the Latent Heat.

29. What is called Thermal Expansion?

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

30. What happen when a solid is heated?

Ans. Solid has a definite shape and size. When a solid is heated, it expands in all directions.

The increase in length of solid is called **Linear expansion.**

The increase in area of solid is called **Superficial expansion.**

The increase in Volume of solid is called **Cubical expansion.**

31. Why in a railway track a small gap is left between two successive railway tracks.

Ans. While laying a railway line a small gap is left between the two rails at the joints to allow expansion during summer. If such a gap is not left at the joints of two rails, the track will get deform due to thermal expansion in summer which may cause derailment of trains.

32. Why in steel bridge one end id fixed and, in another end, roller is fixed.

Ans. One end of the girders is fixed into the concrete or brick pillars and its other end is not fixed, but is placed on rollers. The reason is that if there are any rise (or fall) in temperature of the atmosphere, the girder can freely expand (or contract) without affecting the pillars.

33. How Iron Rims are fitted with wooden wheels of bullock cart?

Ans. To fit iron rims with the wooden wheels of a bullock cart we use the principle of thermal expansion.

To ensure a tight fit the rim is made slightly smaller in diameter than the wheel. The iron rim is first heated due to which it expands. The heated rim is then fitted on the wheel. When the rim cools it contracts and makes a tight fit on the wheel.

34. What is Bimetallic Strip?

Ans. A bimetallic Strip consists of two rods of same length but of different materials rivelled together.

It is commonly used in Thermostat.

35. What is Thermostat?

Ans. A thermostat is a device which is used to control temperature in electric gadgets like refrigerator, electric iron etc.

36. In how many ways heat can be transferred?

Ans. Heat can be transferred in three different modes

a. Conduction

b. Convection

c. Radiation

37. What is Conduction?

Ans. Conduction is the process of transfer of heat from a hot part to a cold part of an object without the actual movement of molecules.

This mode of heat transfer takes place mainly in solids and to a lesser extent in liquids and gases.

38. Why heat is transferred by Conduction process?

Ans. Heat is transferred from one object to another by Conduction if

- The two objects are in contact
- They are at different temperature.

39. What are Conductors?

Ans. Materials that conduct heat well are called good conductors or Simply Conductors of heat.
Ex: Silver, Copper Etc.

40. Why the handles of kettles and pan are provided wooden or ebonite handles?

Ans. The wood or the ebonite being insulators of heat, does not pass heat from the utensil to our hand. Thus, we can hold the hot utensils or pan comfortably buy their handles.

41. In summer why ice is wrapped in a gunny bag or it is covered with saw dust?

Ans. In summer ice is wrapped in a gunny bag or it is covered with saw dust because the airt filled in the fine pores of the gunny bag or saw dust, is insulator of heat. The air does not allow heat from outside to pass through it to the ice. Thus, ice is prevented from melting rapidly.

42. What are Insulators?

Ans. Materials that don not conduct heat easily are called poor conductors or insulators of Heat.
Ex: Wood, Plastic Etc.

43. What is Convection?

Ans. Convection is the process of transfer of heat in liquids and gases due to the actual movement of molecules within the substances.

44. What is Convection Current?

Ans. Liquids and gases expand in volume when heated. Hence, when a liquid or gas is heated, it becomes less dense and rises. Colder liquid or air descends to take the space vacated by the hotter material. This up and down movement is known as Convection Current.

45. What is Land Breeze?

Ans. At night, the land cools much faster than the sea, therefore the sea water is warmer than the land. The air near the sea being warm less dense so it rises up and cold current of air blows from the cold land to the warm sea to take its place. This is called Land Breeze.

46. Why ventilators are used in room?

Ans. When we breath out in a room the air in the room becomes warm and impure. The warm air is less dense so it rises up and moves out through ventilators and the cold air comes through window to room.

47. How Chimney helps to remove undesired fumes, smoke etc?

Ans. Chimney are provided over the furnace in factories. This is because the hot gases coming out of the furnace are less dense than air. They rise up through the chimney. The smoke, fumes etc. around the furnace rush in so as to take their place and they are sucked out. Thus, the chimney helps to remove undesired fumes, smokes etc.

48. What is Sea Breeze?

Ans. During the day, the land becomes warmer than the sea, so the air above the land being warm becomes less dense. It rises up the cold air from the sea blows towards the land to take its place. This is called Sea Breeze.

49. How Land and Sea Breezes are formed near the sea?

Ans. Due to convection of heat Land and Sea breezes are formed near the sea. During summer in places near the sea, it is noticed that a breeze blows from the land towards the sea during the night which is called Sea Breezes.

50. What is Radiation?

Ans. Radiation is a process by which heat is transmitted from a hot object in straight lines, in all direction and at a very high speed without the need for a material medium.

51. What is the speed of Heat through Air or Vacuum?

Ans. 3×10^8 m/s

52. Why do we wear light clothes in summer and dark clothes in winter

Ans. We wear light clothes in summers because white and light clothes are bad conductors of heat and they reflect most of the heat energy fallen on them.
We wear dark or black colour of clothes in winter because they are good conductors of heat.

53. What is Solar Cooker?

Ans. A solar cooker is a device which uses the energy of direct sunlight to heat, cook or pasteurize drink and other food materials.

54. What are the uses of Room Heater?

Ans. Room Heaters keep rooms warm by radiating the heat produced by heating coils. They have a reflector with a shiny surface placed behind the coil to reflect heat to the front.

55. Why the bottom part of cooking utensil or pan is painted black?

Ans. The bottom part of cooking utensil or pan is painted black because the black surface absorbs more heat and so the contents of the utensil or pan get cooked rapidly if the bottom part is printed black.

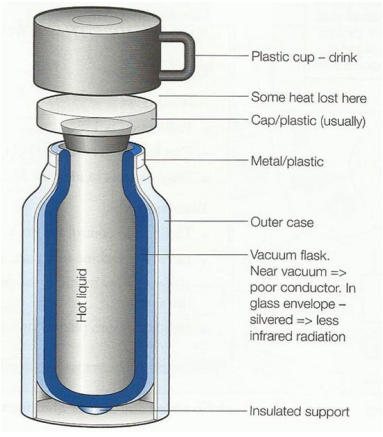
56. Write the differences between Conduction, Convection and Radiation?

BASIS FOR COMPARISON	CONDUCTION	CONVECTION	RADIATION
Meaning	Conduction is a process in which transfer of heat takes place between objects by direct contact.	Convection refers to the form of heat transfer in which energy transition occurs within the fluid.	Radiation alludes to the mechanism in which heat is transmitted without any physical contact between objects.
Represent	How heat travels between objects in direct contact.	How heat passes through fluids.	How heat flows through empty spaces.
Cause	Due to temperature difference.	Due to density difference.	Occurs from all objects, at temperature greater than 0 K.
Occurrence	Occurs in solids, through molecular collisions.	Occurs in fluids, by actual flow of matter.	Occurs at a distance and does not heats the intervening substance.
Transfer of heat	Uses heated solid substance.	Uses intermediate substance.	Uses electromagnetic waves.
Speed	Slow	Slow	Fast
Law of reflection and refraction	Does not follow	Does not follow	Follow

57. What is Thermos Flask?

Ans. Thermos Flask is a container which is designed to reduce heat transfer into and out of it to a minimum.

58. How Thermos flask works?



Ans. A thermos flask maintains the temperature of the substance kept in it, that is, it keeps a hot substance hot and cold substance cold for long a long time.

The outer casing of a thermos flask is made up of plastic or metal. Plastic, being a poor conductor of heat, acts as an insulator preventing the heat loss through conduction. Inside it, is a double-walled container made of glass or stainless steel. Both the walls are polished so they are shiny. The space between the two walls is a vacuum; this prevent prevents heat loss through convection since there are no air particles to carry out the transfer of heat. the shiny surface of the walls also prevents heat loss through radiation.