Transfer of heat

1. Conduction
2. Convection
3. Radiation.

Transfer of heat

All mater, at a temperature above the absolute zero, imparts energy to the surrounding space. Three processes viz. conduction, convection and radiation are involved in heat flow or heat transfer.

Conduction

- Heat transfer through matter without the actual movement of the substances or matter.
- Heat flows from the warmer to cooler part of the body so that the temperatures between them are equalized.
- E.g. The energy transmission through an iron rod which is made warmer at one end.

Convection

- Processes of transmission of heat through actual movement of molecules of the medium.
- This is predominant form of energy transmission on the earth as all the weather related processes involve this process.
- E.g. boiling of water in a beaker Transfer through movement of particles (part of mass) in fluids and gasses.

Radiation

- Transfer of energy from one body to another without the aid of the material medium (solid, Liquid or gas).
- Radiation is not heat, only when radiation is absorbed by surface of a body heat is produced.
- E.g. The energy transmission through space from the sun to the earth.

Latent heat

A part of the incident radiation on the surface is absorbed, while a part is reflected and the remaining is transmitted.

Absorptivity

Ratio of the amount of radiant energy absorbed to the total amount incident upon that substance.

Reflectivity

Ratio of the radiant energy reflected to the total incident radiation upon that surface. If it is expressed in percentage it becomes albedo.

Transitivity

ratio of the transmitted radiation to the total incident radiation upon the surface.

Emissivity

Ratio of the radiant energy emitted by a given surface to the total heat energy emitted by a black body.

Blackbody radiation

body, which completely absorbs all the heat radiations falling on it without reflecting and transmitting any of it.

Radiation balance

The difference between all incoming and outgoing radiation at the earth's surface and top of the atmosphere.

Solar constant

- The energy received on a unit area at the outer most boundary of the earth (atmosphere) surface held perpendicular to the sun's direction, at the mean distance between the sun and the earth.
- It fluctuates by as much as ± 3.5 % about its mean value
- Value - 1.94 cal / cm2 / min (133 wm-2) [1 Langley = 1cal]
- 35% of the energy is contributed by U.V. and visible parts and 65% by Infra -Red.

Albedo

1. percentage of reflected radiation to the incident radiation
2. Value is Highest in winter and at sunrise and sunset
    a. Pure water – 5-20%
    b. Vegetation 10-40%

c. Soils 15-50%

d. Earth 34-43%

e. Clouds 55%.

3. High albedo indicates that much of the incident solar radiation is reflected rather than absorbed.