Radiation.

The process of the transfer of heat from one place to another place without heating the intervening medium is called radiation.

Precisely it is electromagnetic energy transfer in the form of electromagnetic wave through any medium. It is possible even in vacuum.

For example, the heat from the sun reaches the earth through radiation.

Properties of thermal radiation

(1) The wavelength of thermal radiations ranges from $7.8 \times 10^{-7} m$ to $4 \times 10^{-4} m$. They belong to infra-red region of the electromagnetic spectrum. That is why thermal radiations are also called infra-red radiations.

Radiation	Frequency	Wavelength
Cosmic rays	> 1021 Hz	< 10–13 m
Gamma rays	1018 - 1021 Hz	10–13 - 10–10 m
X-rays	1016 - 1019 Hz	10–11 - 10–8 m (0.1 Å - 100 Å)
Ultraviolet rays	7.5 × 1014 - 2 × 106 Hz	1.4 × 10–8 - 4 × 10–7 m (140 Å - 4000 Å)
Visible rays	4 × 1014 - 7.5 × 1014 Hz	4 × 10–7 - 7.8 × 10–7 m (4000 Å - 7800 Å)
Infrared rays (Heat)	3 × 1011 - 4 × 1014 Hz	7.8 × 10–7 - 10–3 (7800 Å - 3 × 105Å)
Microwaves	3 × 108 - 3 × 1011 Hz	10–3 m - 0.1 m
Radio waves	104 - 3 × 109 Hz	0.1 m - 104 m

(2) Medium is not required for the propagation of these radiations.

(3) They produce sensation of warmth in us but we can't see them.

(4) Everybody whose temperature is above zero Kelvin emits thermal radiation.

(5) Their speed is equal to that of light i.e. $(= 3 \times 10^8 m/s)$.

(6) Their intensity is inversely proportional to the square of distance of point of observation from the source (i.e. $I \propto 1/d^2$).

(7) Just as light waves, they follow laws of reflection, refraction, interference, diffraction and polarization.

(8) When these radiations fall on a surface then exert pressure on that surface which is known as radiation pressure.

(9) While travelling these radiations travel just like photons of other electromagnetic waves. They manifest themselves as heat only when they are absorbed by a substance.

(10) Spectrum of these radiations cannot be obtained with the help of glass prism because it absorbs heat radiations. It is obtained by quartz or rock salt prism because these materials do not have free electrons and interatomic vibrational frequency is greater than the radiation frequency, hence they do not absorb heat radiations.