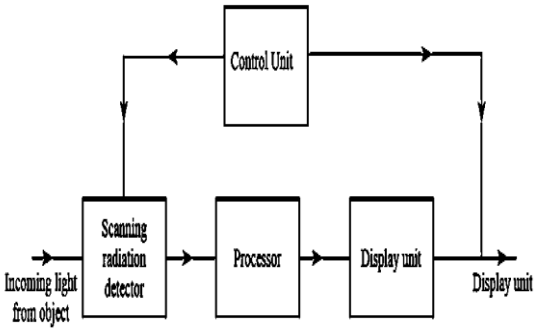
BM-3252 MEDICAL PHYSICS

UNIT-1

1.5 Thermography

- **Infrared thermography** (**IRT**), **thermal video** and/or **thermal imaging**, is a process where a thermal camera captures and creates an image of an object by using infrared radiation emitted from the object
- The amount of radiation emitted by an object increases with temperature; therefore, thermography allows one to see variations in temperature
- All objects at a temperature greater than 0K emit radiation, the spectrum of which depends on the surface temperature TS and the emissivity of the surface.
- The Stefan–Boltzmann law gives the heat transferred from a surface to the environment at temperature T as $u = e\ \sigma\ AT^4$ W m−2 where σ is the Stefan–Boltzmann constant. σ = 5.6705 × 10−8 W m−2 K−4.
- An image of the surface temperature of the body can be formed by a scanning system which measures the emitted radiation.
- Surface temperature is a reflection of the underlying blood flow, so that the images can be used to assess skin blood flow.
- This process may take a considerable length of time (half an hour or more), particularly if the subject has come from a cold environment, and the skin blood flow is therefore reduced.
- Thermography can produce nice images showing body surface temperature but it cannot be regarded as a quantitative method of measuring blood flow.
- Some physiological changes in human beings and other warm-blooded animals can also be monitored with thermal imaging during clinical diagnostics. Thermography is used in allergy detection and veterinary medicine.



Applications of thermography

1. Monitoring flow of product through pipeline.
2. Identifying insulation faults.
3. Recognizing hotspots in furnace linings, electrical machines, bearings etc.
4. Scanning electrical transmission lines for faults.
5. Searching for lost or injured people during disasters.
6. Detecting the pattern of spreading of forest fires.
7. Examining electronic circuit boards and monitoring the process of production by colour-thermography.
8. Medical applications such as body scanning.