

Q.6 ⇒ Solar Collector.

Ans ⇒ Solar collectors are used to collect the solar energy and convert this energy into the thermal energy by absorbing them.

- This thermal energy is further used for heating a collector fluid such as water, oil or air.
- Solar collector surface is designed for high absorption and low emission.
- Solar collectors are classified in two types ⇒

a) ⇒ Non-Concentrating ⇒

- It is also known as flat plate solar collector.
- In these collectors, the area of collector to grasp the solar radiation is equal to the absorber plate & has concentration ratio of 1.

b) ⇒ Concentrating Collector ⇒

- It is also known as focusing type solar collector.
- In these collectors, the area of the collector is kept less than the aperture through which the radiation passes, to concentrate the solar flux and has high concentration ratio.

1. Flat plate collector is simplest in design and it is most important part of any solar thermal energy system.

2. In this collector both direct and diffuse radiation are absorbed and converted into useful heat.

(a) Components of Flat Plate collector:

- (i) Absorber plate,
- (ii) Transparent covers,
- (iii) Insulation, and
- (iv) Box.

(i) Absorber Plate * Absorber plate is used to grasp and absorb solar radiation.

2. The plate is usually metallic (Copper, aluminium or steel), sometimes plastics have been used in some low temperature applications.

(ii) Transparent cover \Rightarrow There are one or more sheets made of glass for trapping the heat received by the absorber plate.

2. It helps in reducing the convective and radiative heat losses.

(iii) Insulation \Rightarrow It minimizes the heat losses by conduction.

(iv) Box \Rightarrow It contains the above components and keep them into desired position.

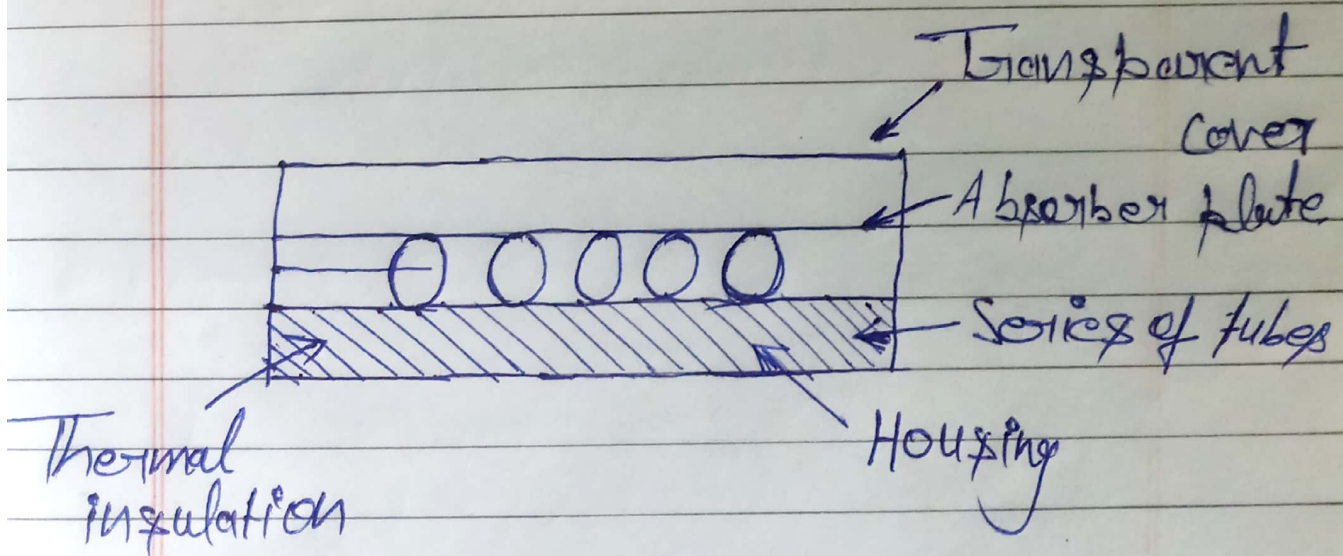


Fig. 2.12.1 Schematic diagram of a flat plate solar collector.