

**Total No. of Questions : 08**

## SOLAR ENERGY UTILIZATION

**Subject Code : MTME-228**

**M.Code : 75004**

**Time : 3 Hrs.**

**Max. Marks : 100**

1. Attempt any FIVE questions out of EIGHT question.
2. Each question carry TWENTY marks.

1.
  - a) Discuss the different renewable sources of energy with special reference to Indian context.
  - b) What is solar energy? What is the total amount of solar irradiation received by earth on a daily basis? How much of that can be harvested economically.
2.
  - a) Explain the techniques to measure various components of solar radiation.
  - b) Explain briefly the interaction of sunlight with atmosphere.
3.
  - a) Explain briefly the interaction of radiation with matter with reference to following aspects :
    - i) Absorptivity, Reflectivity, and Transmittivity;
    - ii) Emissivity and Kirchhoff's Law
    - iii) Bouguer-Lambert-Beer's Law
  - b) What is the difference between a solar collector and a solar panel? Give general description and design characteristics of flat plate collector giving a neat sketch.
4.
  - a) Explain the working principle, construction of All-Glass Vacuum-Tube Collector giving a neat sketch. Also, discuss the performance comparison of flat-panel and evacuated-tube collectors.
  - b) Explain the working principle, construction of Solar receiver tubes giving a neat sketch.

5.
  - a) Explain the need for energy storage solar systems? Describe mechanisms of sensible heat energy storage.
  - b) How does a solar pond work? Why are salt ponds red? What material does a solar pond contain?
6.
  - a) What is a passive solar heating system? Where is passive solar heating used? What are the 5 elements of passive solar design?
  - b) Explain the working principle, construction and elements of solar cooling system for domestic use giving a neat sketch.
7.
  - a) Explain the working principle, construction and elements of combined solar heating and cooling systems by giving their applications.
  - b) What is the efficiency of a typical reflector for the solar spectrum?
8.
  - a) Write short note on 'solar process modelling, components'.
  - b) Explain the working mechanism of a solar cell giving a neat sketch.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**