Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

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M.Tech. (ME) (2017 Batch) (Sem.–2,3)

SOLAR ENERGY UTILIZATION

Subject Code : MTME-228

M.Code : 75004

Time : 3 Hrs. Max. Marks : 100

INSTRUCTIONS TO CANDIDATES :

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.