

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 0912

Roll No.

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**B.Tech.**

(SEM. VII) ODD SEMESTER THEORY EXAMINATION  
2010-11

**SOLAR ENERGY**

Time : 3 Hours

Total Marks : 100

Note : (1) Attempt **all** questions. All questions carry equal marks.

(2) Assume suitably, any missing data.

1. Attempt any **four** parts of the following : **(5×4=20)**
- Explain the working of liquid flat plate collector with neat sketch.
  - What do you understand by diffuse radiation ? Discuss the equipment used for measuring diffuse radiation.
  - Define local apparent time and solar constant.
  - Find the temperature of sun's surface if it is assumed to be black and the value of solar constant is  $1367 \text{ W/m}^2$ .
  - Discuss the mechanism of absorption and scattering of solar radiation as it passes through the earth's atmosphere.

(f) State the thermal application of solar energy and explain any one of them with neat sketch.

2. Attempt any **two** parts of the following : **(10×2=20)**

(a) Discuss top loss coefficient and bottom loss coefficient for flat plate collector and also comment on the variation of top loss coefficient as the absorber plate emissivity varies from 0 to 1.

(b) Discuss the effect of number of covers and spacing on the performance of liquid flat plate collectors.

(c) Discuss the working, temperature distribution and collection efficiency of solar ponds.

3. Attempt any **two** parts of the following : **(10×2=20)**

(a) Name different parameters used for the characterization of solar concentrators. Also discuss the thermodynamic limit to concentration.

(b) Discuss matrix air heater and honeycomb porous bed heater with neat sketch.

(c) Write short notes on :

(i) Heliostats

(ii) Tracking requirements.

4. Attempt any **two** parts of the following : **(10×2=20)**

(a) What is the need of thermal energy storage ? Explain the thermo-chemical storage of thermal energy with suitable chemical reactions.

(b) Write short notes on :

(i) Solar stills

(ii) Solar cooker.

(c) How will you do the performance analysis of conventional solar still ?

5. Attempt any **two** parts of the following : **(10×2=20)**

(a) Discuss the criteria for selecting materials for photovoltaic cells.

(b) Describe the construction and principle of working of solar cells with neat sketch.

(c) Write short notes on :

(i) Efficiency of solar cells

(ii) Life cycle saving method of economic analysis of solar systems.