SIXTH SEMESTER B.TECH DEGREE EXAMINATION

(Model Question)

(2013 Scheme)

13.606.3 Elective II- SOLAR ENERGY ENGINEERING (H)

Time: **3 Hrs** Max. Marks: **100**

Part A

*Answer **all** questions. Each question carries **2** marks.*

1. Discuss two types of solar radiation measurement.
2. Explain about global radiation and pyranometer.
3. Prepare a brief note on air based flat plate collector.
4. Classify different tracking models.
5. Distinguish between winter and summer green house.
6. Write a note about solar chimney and driers.
7. List the main components in power electric circuits of solar panel.
8. Explain about charge regulators.
9. Give example for chemical solar energy storage.
10. State the working and importance of solar ponds.

Part B

*Answer **one full** question from each module. Each question carries **20** marks*

MODULE - I

11. Obtain an expression for collector heat removal factor and flow factor of flat plate collector. (20 Marks)

I2. Calculate the collector efficiency factor for the following specifications:

Overall loss coefficient	8.0 W/m^2C
Tube spacing	150 mm
Tube diameter (inside)	10 mm
Plate thickness	0.5 mm

Plate thermal conductivity (copper)	385 W/m C	
Heat transfer coefficient inside tubes	300 W/m C	
Bond conductance	8 W/m^2C	(20 Marks)

MODULE - II

13. Write a note on different solar concentrator. (20 Marks)

14. Obtain the performance equation for cylindrical parabolic Collector. (20 Marks)

MODULE – III

15. Write a note about

a) Solar A/C System
b) Solar Water pump
c) Solar dehumidifier
d) Solar cooker (20 Marks)

16. Explain the working and principle of solar cell and obtain an expression for maximum power output. (20 Marks)

MODULE – IV

17. A pebble bed has the following characteristics: length in flow direction 1.80 m; cross-sectional area 14.8 m2; air velocity 0.053 m/s, equivalent diameter of pebbles 12.5 mm, void fraction 0.47, density of pebble material 1350kg/m3, specific heat of pebbles 0.90 kJ/kg C, thermal conductivity of pebble material 0.85 W/m C, and surface area of pebbles per unit volume 255 m2/m3. For this pebble bed, calculate the Biot number and *NTU*. Will there be significant temperature gradients in the pebbles? Can the infinite *NTU* model be used to calculate the performance of this storage unit? (20 Marks)

18. Discuss the different materials for phase change energy storage. (20 Marks)