

**N. B.**

1. Attempt any **FOUR** questions.
2. Use illustrative diagrams wherever required.
3. Assume suitable data if necessary.

- Q1) a)** Classify various instruments used to measure the solar radiation. Explain the significant characteristics of Eppley pyranometer. 10
- b)** State the assumptions of isotropic models and anisotropic models for radiation incident on tilted surface. 10
- Q2) a)** Derive an expression of maximum concentration ratio for circular concentrators. 10
- b)** Draw and explain temperature variation on an absorber plate of sheet and tube solar collector. 10
- Q3) a)** Elaborate the recent development and applications of solar pond. 10
- b)** Classify solar dryers. Draw typical solar drying rate curve and explain the process of moisture removal. 10
- Q4) a)** Define 'f' value used in f-chart method for solar heating design. How the total solar fraction of annual load is calculated? List the systems where f-chart method can be applied. 10
- b)** Compare discrete and continuous solar simulation systems considering flexible outputs, accuracy, computation speed and costs. 10
- Q5) a)** Explain the two main stand-alone PV applications as i) battery charging and ii) solar water pumping? 10
- b)** Explain constructional features of peak-power-tracking PV power system showing major components. 10
- Q6) a)** Explain following features peculiar (or specific) to solar energy systems that affect the economic viability. 1) cost of the system 2) depreciation 3) interest on capital 4) cost of energy and the scenario and 5) subsidies or incentives 10
- b)** Explain the  $P_1$ ,  $P_2$  method to calculate the life cycle savings (LCS) in solar systems. 10
-