

Roll No.....

## MEEM-103

M.E./M.Tech. I Semester Examination, June 2020

### Solar Power Generation

Time : Three Hours

Maximum Marks : 70

- Note :** i) Attempt any five questions.  
ii) All questions carry equal marks.

1. a) What do you mean by solar photovoltaic system? Write the advantage and disadvantage of photovoltaic system.  
b) Discuss the role of MNRE to promote SPV program in India.
2. a) Explain with neat sketch the basic principle of power generation in a PV cell.  
b) Discuss different regions in a solar cell with adequate reasoning.
3. a) Illustrates an equivalent circuit diagram of solar cell. Why does the power of a PV cell decrease with increasing temperature?  
b) What do you mean by monocrystalline, polycrystalline and multicrystalline? Write its properties.
4. a) Discuss various performance parameters of CSP plant.  
b) Explain with neat sketch the working principle of CSP plant.
5. a) Compare three different types of solar hot water systems.  
b) Explain with neat sketch the operations of solar ponds.
6. a) Compare the monthly variation of global solar radiation on a horizontal surface at a location in India and in Germany.  
b) Explain how the latitude affects the optimum orientation angle of a flat-plate collector.
7. Estimate the rate of thermal energy collected by the receiver of a concentrating collector field, by the incident solar radiation of  $700\text{W/m}^2$ , the concentration ratio of 500, the reflectivity of mirror 0.9, the absorptivity of the receiver 0.9, the heat loss coefficient of the observer  $100\text{W/m}^2\text{K}$  and  $T_p = 600^\circ\text{C}$  when the ambient is  $30^\circ\text{C}$ . There are 10 concentrating collectors, each with an area of  $100\text{m}^2$ .
8. Write short note on following (any four)
  - i) Photovoltaic materials
  - ii) Maintenance of PV system
  - iii) Band gap
  - iv) Passive solar design
  - v) Linear Fresnel technology
  - vi) Insolation

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