

Total No. of Questions :6]

SEAT No. :

P76

OCT. -16/BE/Insem. - 130

[Total No. of Pages :2

B.E. (Electrical)

RENEWABLE ENERGY SYSTEMS

(2012 Course) (Elective - I) (Semester - I)

Time : 1 Hour]

[Max. Marks :30

Instructions to the candidates:

- 1) *Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q6.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*
- 4) *Use of electronic pocket calculator is allowed.*
- 5) *Assume suitable data if necessary.*

- Q1) a)** Explain any one instrument used for measuring solar radiation. [6]
- b) What are different solar radiation on tilted surface? State the expression for total flux falling on a tilted surface. [4]

OR

- Q2) a)** List the different types of collectors. Explain any one in detail. [5]
- b) Determine LAT corresponding to 13:30 h (IST) at (28° 35' N, 77° 12' E) on July '. The standard time is based on 82° 30' E. Given: Equation of time correction (minutes)

$$E = 9.87 \sin 2B - 7.53 \cos B - 1.5 \sin B \text{ where } B = (n-81) \left(\frac{360}{364} \right) \quad [5]$$

- Q3) a)** Draw equivalent ckt of pv cell. Hence plot electrical characteristics of silicon pv cell showing maximum power point for various solar irradiation levels. [5]
- b) A solar Pv module is operating at ambient temp of 45°C & 35°C under solar irradiation of 900 W/m² and 800 W/m² respectively. What will be the temperature of the module. Given: Constant k = 0.025 [5]

OR

P.T.O.

- Q4) a)** Define following parameters for solar cell-
- i) Short circuit current
 - ii) Open ckt voltage
 - iii) Fill Factor
 - iv) Efficiency of solar cell
- State the relationship between these factors. [6]
- b)** Show the components of Pv system with energy storage device. Also draw energy flow diagram for this system. Write the broad steps of design for this configuration. [4]

- Q5) a)** State the following terms with expressions.
- i) Power contained in wind
 - ii) Power coefficient
 - iii) Torque acting on turbine
 - iv) Tip -Speed ratio
 - v) Wind turbine efficiency [5]
- b)** Find the diameter of a wind turbine to generate 6 kw at a wind speed of 9 m/s and a rotor speed of 120 rpm.
- Assume power coefficient =0.4, efficiency of mechanical transmission =0.9, efficiency of electrical transmission =0.9 [5]

OR

- Q6) a)** State different types of speed control strategies for wind turbine. [5]
- b)** What are the factors affecting the design of wind turbine? [5]

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