

Total No. of Questions : 12]

SEAT No. :

P4437

[Total No. of Pages : 2

[4859]-502

B.E. (Mech.)

ALTERNATIVE ENERGY SOURCES

(2003 Pattern) (Semester - I)

Time : 3 Hours]

[Max. Marks : 100

Instructions to the candidates:

- 1) *Answers to the two sections should be written in separate answer books.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*
- 4) *Your answers will be valued as a whole.*
- 5) *Use electronic pocket calculator is allowed.*
- 6) *Assume suitable data, if necessary.*

SECTION - I

- Q1)** a) Explain the trends of utilization of alternative energy sources for power generation in the context of Indian energy demand. **[10]**
- b) Explain the term 'angle of declination'. Sketch its variation during one year. **[8]**

OR

- Q2)** a) Explain the following terms in solar radiation geometry using suitable diagrams. (i) Latitude (ii) Declination. (iii) Hour angle. (iv) Surface azimuth angle (v) Zenith angle. **[10]**
- b) Explain the term solar window. **[8]**

- Q3)** a) Explain the function of main components of a liquid flat plate collector with a neat sketch. Discuss the use of appropriate material for these components. **[10]**
- b) Describe the effect of various parameters on the efficiency of solar flat plate collector. **[6]**

OR

- Q4)** a) Determine the local solar time and declination at a location latitude $23^{\circ}15'N$, longitude $77^{\circ}30'E$ at 12.30. IST on June 19. Equation of time correction as given from standard table = $-(1'01'')$; take standard time longitude = $82^{\circ}30'$. **[8]**

P.T.O.

- b) Describe the standard procedure of testing for liquid flat plate collector. Draw and explain performance curves for it. [8]

- Q5)** a) Explain working of solar pond and effect of various parameters on its performance. [8]
b) Compare solar drying with natural drying, mentioning specific applications. [8]

OR

- Q6)** a) List various types of solar stills, with the help of a neat sketch, explain working of any one type. Showing various energy transfers. [8]
b) Explain construction and working of forced circulation solar dryer with the help of a neat diagram. [8]

SECTION - II

- Q7)** Compare solar PV system with solar thermal system with reference to ratings, applications and future prospects. [16]

OR

- Q8)** Discuss the applications of wind energy mentioning its advantages and limitations. [16]

- Q9)** State the types of geothermal fluids giving their suitable temperature range for power generation. Explain the schematic and thermodynamic cycle of any one type of geothermal power plant. [16]

OR

- Q10)** Explain the development of Fuel Cell Technology. Describe the SOFC with a neat sketch. [16]

- Q11)** Write explanatory notes on : [18]

- a) Dome type bio-gas plant.
b) Environmental protection norms ISO 14000.
c) Bio-gas for diesel engines.

OR

- Q12)** a) What is the basic principle of operation of tidal power plant? [18]
b) What are the different methods of obtaining energy from biomass?
c) Discuss the factors affecting performance of a bio-gas plant.

