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10ME754

Seventh Semester B.E. Degree Examination, Dec.2017/Jan.2018

Non Conventional Energy Sources

Time: 3 hrs.

Max. Marks:100

Note: Answer FIVE full questions, selecting at least TWO questions from each part.

PART - A

- 1 a. With neat sketch, explain the production of oil from oil shale and Tar sands. (12 Marks)
b. Explain the advantages and limitations of use of non-conventional sources of energy. (08 Marks)
- 2 a. With a neat sketch, explain the working principle of an instrument used to measure Global radiation. (10 Marks)
b. With the help of appropriate sketch, explain altitude, zenith angle and solar azimuth angle. (10 Marks)
- 3 a. With a neat sketch, explain the working principle and applications of solar pond. (12 Marks)
b. With a neat sketch, explain thermal storage wall and roof storage with respect to passive solar heating system. (08 Marks)

- 4 a. Briefly explain the effect of various parameters on performance of liquid flat plate collectors. (10 Marks)
b. Data for a flat plate collector used for heating the building are given below :

Sl No	Factor	Specification
1	Location and latitude	- Baroda, 22°N
2	Day and time	- January 1, 11:30 to 12:30 (IST)
3	Annual average intensity of solar radiation.	- 0.5 Langley/min
4	Collector tilt	- Latitude + 15°
5	Number of glass covers	- 02
6	Heat removal factor for collector	- 0.810
7	Transmittance of the glass	- 0.88
8	Absorptance of the glass	- 0.90
9	Top loss coefficient for collector	- 7.88W/m ² °C [6.80 Kcal/hrm ² °C]
10	Collector fluid temperature	- 60°C
11	Ambient Temperature	- 15°C

Calculate:

- i) Solar altitude angle
- ii) Incident angle
- iii) Collector efficiency.

(10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

PART – B

- 5 a. With a neat sketch, explain the working principle of horizontal axis wind turbine using two aerodynamic blades. (10 Marks)
- b. Describe the main considerations in selecting a site for wind generators. (10 Marks)
- 6 a. With a neat sketch, explain single and double basin tidal power plant. (10 Marks)
- b. Briefly explain the various factors which affect the operational and environmental problems with respect to Geothermal energy. (10 Marks)
- 7 a. With a neat sketch, explain the Indian bio-gas-plant. (10 Marks)
- b. What are the applications of Bio-gas? Explain the modifications needed for C.I. engine using Biogas. (10 Marks)
- 8 a. Discuss briefly the four methods of hydrogen storage. (10 Marks)
- b. What are the various routes of hydrogen production? Explain the hydrogen production through electrolysis of water with simple sketch. (10 Marks)

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