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Seventh Semester B.E. Degree Examination, Dec.2015/Jan.2016

Non – Conventional Energy Sources

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions, selecting atleast TWO questions from each part.

PART - A

- 1 a. Explain Tar sands and oil shale as energy sources and also mention their limitations. (10 Marks)
- b. What is the need for alternate energy sources? Explain by considering solar energy. (05 Marks)
- c. Discuss the limitations of non – conventional sources of energy. (05 Marks)
- 2 a. Define the following : i) Latitude ii) Declination angle iii) Surface azimuth angle
iv) Hour angle v) Zenith angle. (10 Marks)
- b. With a neat sketch, explain the working of pyranometer. (05 Marks)
- c. Write short notes on spectral distribution of extra terrestrial radiation. (05 Marks)
- 3 a. Calculate the monthly average hourly radiation falling on a flat plate collector facing south ($\gamma = 0^\circ$) with a slope of 15° , given the following data :
Location : Chennai ($13^\circ 00' N$) ; Month : October ;
Time : 1100 to 1200 (LAT) ; \bar{I}_g : $2408 \text{ kJ/m}^2 - \text{h}$; \bar{I}_d : $1073 \text{ kJ/m}^2 - \text{h}$.
Assume ground reflectivity to be 0.2. (10 Marks)
- b. Describe solar pond for solar energy collection and storage. (06 Marks)
- c. Explain how solar energy can be used for drying, with a neat sketch. (04 Marks)
- 4 a. Explain briefly the parameters affecting the performance of flat plate collectors. (06 Marks)
- b. Derive the expression for transmissivity based on reflection – refraction at the interface of two media. (08 Marks)
- c. Write short notes on collector efficiency factor and collector heat removal factor . (06 Marks)

PART - B

- 5 a. Describe the main considerations in selecting the site for wind generators. (08 Marks)
- b. Explain with a neat sketch, the working of a photo – voltaic cell. Draw I – V characteristics. (06 Marks)
- c. With a neat sketch, explain the horizontal axis wind machine. (06 Marks)
- 6 a. With a neat sketch and T- S diagram, explain the concept of liquid dominated total flow system of generating geothermal energy. (08 Marks)
- b. Explain with a neat sketch, the working principle of closed cycle OTEC plant. (06 Marks)
- c. Sketch and explain single basin type tidal power plant operation. (06 Marks)
- 7 a. Explain the process of photosynthesis. What are the conditions which are necessary for it? (06 Marks)
- b. List the factors affecting bio gas generation. (04 Marks)
- c. Sketch and explain the working of floating gas holder type biogas plant used in India (KVIC plant). (10 Marks)
- 8 a. Explain the process of electrolytic production of hydrogen, with a neat sketch. (08 Marks)
- b. Explain briefly the different methods of hydrogen storage. (06 Marks)
- c. Describe how hydrogen can be used as an alternative fuel for motor vehicles. (06 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.