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10ME754

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 ($\gamma = 0^0$) with a slope of 15^0, given the following data :
Location : Chennai (13^0 00' N) ; Month : October ;
Time : 1100 to 1200 (LAT) ; $\bar{I}_g$: 2408 kJ/m^2 – h ; $\bar{I}_d$: 1073 kJ/m^2 – 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)**

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