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10ME754

Seventh Semester B.E. Degree Examination, Aug./Sept.2020
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. What are the various Commercial Energy Resources available? What are their present states in the World? **(10 Marks)**

b. Explain Tar sand and Oil shale as energy sources and also mention the limitations. **(10 Marks)**

2 a. List different instruments used for the measurement of solar radiation and explain Pyrheliometer. **(10 Marks)**

b. Calculate the average value of solar radiation on a horizontal surface for June 19, at the latitude of 10^0 N. The constants a and b are as 0.30 and 0.51 respectively. The average sunshine hours per day are 9.1 and day of the year is 170. **(10 Marks)**

3 a. Discuss the following with neat sketch :
i) Parabolic concentrating collectors ii) Solar still. **(10 Marks)**

b. With neat sketch, explain Solar Refrigeration Plant and Solar Pond. **(10 Marks)**

4 a. What do you mean by a Solar Thermal Collector? With a labeled schematic diagram, discuss in brief the functioning of each components of a liquid flat plate collector. **(10 Marks)**

b. For a glass cover system, estimate T_ρ, T_α and τ for the following data :
Angle of incidence = 45^0, Number of covers = 2, Thickness of each cover = 4mm
Refractive index of glass relative to air = 1.52, Extinction coefficient of glass = $15m^{-1}$. **(10 Marks)**

PART - B

5 a. List the important application of Solar Photovoltaic System. What are the advantages and disadvantages of Photovoltaic Solar Energy Conversion? **(10 Marks)**

b. A wind mill with multi blade rotors lifts $3.03m^3/h$ of water through a heat of 28 meters when the wind speed is 3.3 m/s. Calculate the power coefficient for a rotor diameter of 4.5 meters. Assume i) Transmission efficiency = 0.95, Pump efficiency = 0.70, $\rho_w = 996\ kg/m^3$, $\rho_a = 1.2kg/m^3$. **(10 Marks)**

6 a. Describe the "Closed Cycle OTEC" system, with its advantages over open cycle system. **(10 Marks)**

b. Classify Geothermal Sources. With a neat sketch, explain Vapour dominated system. **(10 Marks)**

7 a. Explain the process of "Photosynthesis", what are the conditions which are necessary for it? **(10 Marks)**

b. With a neat sketch, explain the construction and working of KVIC digester. **(10 Marks)**

8 a. What is an Electrolysis? Describe the More Popular method of hydrogen production. **(10 Marks)**

b. Discuss the following with respect to hydrogen energy :
i) Properties of Hydrogen ii) Application of Hydrogen. **(10 Marks)**

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