USN

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

- 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 10⁰ 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)
- 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 - R

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- 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 $3.03 \, \text{m}^3 / \text{h}$ 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 , $\rho_w = 996 \, \text{kg/m}^3$, $\rho_a = 1.2 \, \text{kg/m}^3$. (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)