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10ME754

Seventh Semester B.E. Degree Examination, Feb./Mar. 2022
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. Compare Conventional and Non – conventional sources with their merits and demerits. (10 Marks)
b. Explain Tar sands and Oil shale as energy sources with flow diagrams. (10 Marks)
- 2 a. With a neat sketch, explain the working of sunshine recorder. (10 Marks)
b. Define : i) Latitude ii) Hour Angle iii) Sun's declination iv) Altitude angle
v) Zenith angle. (10 Marks)
- 3 a. With a neat diagram, explain Solar Flat – Plate collector. (10 Marks)
b. Explain Latent Heat Storage with diagram and also explain materials used in Latent Heat Storage. (10 Marks)
- 4 a. Describe the Transmissivity of the cover system of a solar flat plate collector based on reflection – refraction and absorption. (10 Marks)
b. Explain the following parameters affecting the performance of a liquid flat plate collector :
i) Selective surfaces ii) Number of covers. (10 Marks)

PART – B

- 5 a. With a neat sketch, describe the working of a typical photo voltaic cell. Also draw current voltage characteristics. (08 Marks)
b. Explain a Typical Horizontal Axis Wind Machine. (06 Marks)
c. Find the electrical output of a Henree blade propeller type wind machine operating at a designed wind speed of 36km/hr at a height of 23m from ground. The diameter of rotor is 15m. Assume power coefficient $C_p = 0.46$ tip speed ratio, $\lambda = 5.7$, Transmission efficiency from rotor to generator = 0.9 and $\zeta = 1.2 \text{ kg/m}^3$, Energy conversion efficiency of the generator = 0.9. (06 Marks)
- 6 a. Explain the Double basin arrangement of Harnessing Tidal Energy. (07 Marks)
b. With a neat diagram, explain the Open cycle (Claude) OTEC system (07 Marks)
c. What are the problems associated with Geo – Thermal Energy Source. (06 Marks)
- 7 a. Explain the steps in photosynthesis reaction and also the conditions. (06 Marks)
b. With a neat sketch, explain Fixed Dome type Biogas plant. (07 Marks)
c. What are the factors affecting Biogas generation? Explain. (07 Marks)
- 8 a. Explain Hydrogen production by Polar electrolyser. (10 Marks)
b. Enumerate the different Hydrogen storage. (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.