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10ME754

Seventh Semester B.E. Degree Examination, Dec.2018/Jan.2019
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. Write short notes on Oil shale and Tar sands. **(06 Marks)**

b. List out the advantages and disadvantages of solar energy conversion. **(06 Marks)**

c. Discuss the India's electricity production from commercial and non – commercial sources of energy with help of recent statistics. **(08 Marks)**

2 a. Explain the working principle of Pyrheliometer with neat sketch. **(10 Marks)**

b. Define the following terms : i) Solar constant ii) Direct radiation iii) Global radiation iv) Declination angle v) Day length. **(10 Marks)**

3 a. Write the expression for flux on tilted surface and mention its components. **(04 Marks)**

b. Write short notes on : i) Latent heat storage ii) Solar pond iii) Paraboloid dish solar collector iv) Solar air heater v) Parabolic Trough collector. **(10 Marks)**

c. List out the operational problems of solar pond any six. **(06 Marks)**

4 a. Calculate the overall loss coefficient for a flat plate collector with two glass covers. Given the following data : **(15 Marks)**

Size of the absorber plate	: 1.90m × 0.90m
Spacing between plate and first glass cover	: 4cm
Spacing between first and second glass cover	: 4 cm
Plate emissivity	: 0.92
Glass cover emissivity	: 0.88
Collector tilt	: 20^0
Mean plate temperature	: 70^0C
Ambient air temperature	: 24^0C
Wind speed	: 2.5 m/s
Back insulation thickness	: 8 cm
Side insulation thickness	: 4 cm
Thermal conductivity of insulation	: 0.05 w/m-K

b. List out any five parameters, effects on performance of liquid flat – plate collector. **(05 Marks)**

PART – B

5 a. Describe with neat sketch a photovoltaic water pumping system. **(10 Marks)**

b. Define the following terms :
i) Power co-efficient ii) Lift co-efficient iii) Drag co-efficient iv) Tip speed v) Solidity. **(10 Marks)**

6 a. Explain the working principle of a closed Rankine cycle OTEC system, with neat sketch and thermodynamic representation. **(10 Marks)**

b. Explain the working principle of oscillating water column wave energy conversion system, with neat sketch. **(08 Marks)**

c. List out any four geothermal power plant in the world. **(02 Marks)**

7 a. Write short notes on Photo Synthesis. (02 Marks)
b. Classify the various routes of Biomass conversion. Explain any one in detail. (08 Marks)
c. Explain the construction and working principle of Biogas plant [KVIC model], with neat sketch. (10 Marks)

8 a. What are the properties of Hydrogen fuel? (04 Marks)
b. List out the various routes of Hydrogen production and explain any one routes in detail. (08 Marks)
c. What are the applications of hydrogen? Explain use of hydrogen in Internal combustion engine. (08 Marks)

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