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Seventh Semester B.E. Degree Examination, June/July 2014
Non-Conventional Energy Sources

Time: 3 hrs.

Max. Marks:100

**Note: Answer FIVE full questions, selecting
at least TWO questions from each part.**

PART – A

- 1 a. What are the conventional and non-conventional energy sources? Describe briefly. (10 Marks)
b. What is meant by renewable energy sources? List the advantages and limitations of renewable energy sources. (10 Marks)
- 2 a. Define the following terms:
(i) Altitude angle (ii) Hour angle (iii) Declination angle
(iv) Zenith angle (v) Latitude angle (10 Marks)
b. Write notes on Beam and Diffuse radiation. (05 Marks)
c. Calculate the angle made by beam radiation with the normal to a flat collector on December 1 at 9.00 AM. Solar time for location at 28° 35' N. The collector is tilted at an angle of latitude plus 10°, with the horizontal and is pointing due south. (05 Marks)
- 3 a. Describe the principle of working of a solar pond with neat sketch. (10 Marks)
b. Describe in brief, the different energy storage methods used in the solar system. (10 Marks)
- 4 a. Data for a flat plate collector used for heating the building are given below. Latitude – 22° N on Jan 1 at 11.30 – 12.30 IST; Annual average intensity of solar radiation – 395 W/m²; Collector tilt – 15°; Number of glass covers – 5 ; Heat removal factor for collector – 0.810 ; Transmittance of the glass - 0.88 ; Absorptance of the glass – 0.90 ; Top loss coefficient of collector – 7.88 W/m² °C ; Collector fluid temperature 60°C ; Ambient temperature 15°C. Find useful heat gain and collection efficiency. (15 Marks)
b. Explain the three different thermal losses. (05 Marks)

PART – B

- 5 a. Explain the problems associated with the wind power. (10 Marks)
b. Give the detailed classification of wind machine. Explain any one type of wind machine with neat sketch. (10 Marks)
- 6 a. List the advantages and limitations of geothermal energy. (06 Marks)
b. What are the problems associated with OTEC? (08 Marks)
c. State the merits and demerits of tidal energy. (06 Marks)
- 7 a. What is biomass? (02 Marks)
b. Explain the process of anaerobic fermentation. List the advantages. (08 Marks)
c. Classify biogas plant and explain any one type of biogas plant with neat sketch. (10 Marks)
- 8 a. Discuss briefly the five methods of hydrogen storage. (10 Marks)
b. Explain in detail any two methods of producing hydrogen. (10 Marks)

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