USN

Seventh Semester B.E. Degree Examination, Dec.2017/Jan.2018
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.   With neat sketch, explain the production of oil from oil shale and Tar sands.   **(12 Marks)**
    b.   Explain the advantages and limitations of use of non-conventional sources of energy.   **(08 Marks)**

2   a.   With a neat sketch, explain the working principle of an instrument used to measure Global radiation.   **(10 Marks)**
    b.   With the help of appropriate sketch, explain altitude, zenith angle and solar azimuth angle.   **(10 Marks)**

3   a.   With a neat sketch, explain the working principle and applications of solar pond.   **(12 Marks)**
    b.   With a neat sketch, explain thermal storage wall and roof storage with respect to passive solar heating system.   **(08 Marks)**

4   a.   Briefly explain the effect of various parameters on performance of liquid flat plate collectors.   **(10 Marks)**
    b.   Data for a flat plate collector used for heating the building are given below :

Sl No	Factor	Specification
1	Location and latitude	Baroda, 22°N
2	Day and time	January 1, 11:30 to 12:30 (IST)
3	Annual average intensity of solar radiation.	0.5 Langley/min
4	Collector tilt	Latitude + 15°
5	Number of glass covers	02
6	Heat removal factor for collector	0.810
7	Transmittance of the glass	0.88
8	Absorptance of the glass	0.90
9	Top loss coefficient for collector	7.88W/m^2°C [6.80 Kcal/hrm^2°C]
10	Collector fluid temperature	60°C
11	Ambient Temperature	15°C

Calculate:
i) Solar altitude angle
ii) Incident angle
iii) Collector efficiency.   **(10 Marks)**

PART – B

5   a. With a neat sketch, explain the working principle of horizontal axis wind turbine using two aerodynamic blades. **(10 Marks)**

   b. Describe the main considerations in selecting a site for wind generators. **(10 Marks)**

6   a. With a neat sketch, explain single and double basin tidal power plant. **(10 Marks)**

   b. Briefly explain the various factors which affect the operational and environmental problems with respect to Geothermal energy. **(10 Marks)**

7   a. With a neat sketch, explain the Indian bio-gas-plant. **(10 Marks)**

   b. What are the applications of Bio-gas? Explain the modifications needed for C.I. engine using Biogas. **(10 Marks)**

8   a. Discuss briefly the four methods of hydrogen storage. **(10 Marks)**

   b. What are the various routes of hydrogen production? Explain the hydrogen production through electrolysis of water with simple sketch. **(10 Marks)**

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