Eighth Semester B.E. Degree Examination, Jan./Feb. 2021
Renewable Energy Sources

Time: 3 hrs.   Max. Marks:100

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

PART – A

1   a.   What are primary and Secondary energy sources?   **(05 Marks)**
    b.   Explain the significance of Energy Consumption as a measure of prosperity.   **(05 Marks)**
    c.   What are the Conventional and non-Conventional Energy Sources? Describe briefly mention the advantages of Renewable energy.   **(10 Marks)**

2   a.   Define the following terms:
         i)Solar Azimuth angle   ii) Surface Azimuth angle   iii) Solar Altitude   **(05 Marks)**
         iv) Zenith angle (θ_z)   v) Declination angle
    b.   Determine the Local Solar time and declination at a location latitude $23^0 15'$N. Longitude $77^0 30'$E at 12-30 IST on June 19. Equation of time Correction is given from standard chart= -(1'01''). **(05 Marks)**
    c.   What is the difference between a Pyrheliometer and a Pyronometer. Describe the Principle of Angstrom type Pyrheliometer.   **(10 Marks)**

3   a.   What are the main Components of a blot-plate Solar Collector. Explain with a neat big working principle and function of each components.   **(10 Marks)**
    b.   With a neat Sketch Explain the following:
         i)Solar Cooker   ii) Solar Green Houses   **(10 Marks)**

4   a.   Explain with a neat diagram Solar Pond electric power plant with cooling tower.   **(10 Marks)**
    b.   Write Short Notes on:
         i)Solar water pumping system
         ii)Methods of energy storage (Block diagram representation)   **(10 Marks)**

PART – B

5   a.   Prove that in case of horizontal axis wind turbine maximum power can be obtained when:
         Exit Velocity$=\dfrac{1}{3}$ Wind Velocity and $P_{max} = \dfrac{8}{27g.c}\rho AV_i^3$ **(10 Marks)**
    b.   Describe with a neat sketch the working of a Wind Energy Conversion System (WECS) with main Components.   **(10 Marks)**

6   a.   What is Pyrolysis? Explain with a neat figure Small Scale Pyrolysis Unit.   **(10 Marks)**
    b.   Explain the Constructional detail and working of KVIC digester.   **(10 Marks)**

7   a.   Explain with a block diagram Anderson cycle Ocean Thermal Electric Conversion (OTEC)   **(08 Marks)**
    b.   Explain briefly, Tidal power plant Double Basin operation.   **(06 Marks)**

c. The observed difference between the high and low water tide is 8.5m, for a proposed tidal site. The basin area is about 0.5sq km which can generate power for 3 hours in each cycle. The average available head is assumed to be 8m, and the overall efficiency of the generation to be 70%. Calculate the power in h.p at any instant and the yearly output. Average Specific Weight of sea water is assumed to be $1025 kg/mt^3$. **(06 Marks)**

8 a. Explain with the help of Block diagram the main components of Fuel Cell System.
   (10 Marks)

   b. What are the advantages and limitations of Small Scale Hydro electric power generation?
   (10 Marks)

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