Unit - V

5. a) What is the difference between fuel cells and battery?

   b) What are the various methods for producing hydrogen?

   c) Explain the difference between a geothermal power plant and thermal power plant?

   d) Discuss the various liquid dominated geothermal power plants with suitable sketches.

OR

Explain the working principle of a fuel cell.

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Roll No .....

AU/ME - 702 (A)

B.E. VII Semester

Examination, December 2015

Renewable Energy System

Time : Three Hours

Maximum Marks : 70

Note: i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.

ii) All parts of each question are to be attempted at one place.

iii) All questions carry equal marks, out of which part A and B (Max.50 words) carry 2 marks, part C (Max.100 words) carry 3 marks, part D (Max.400 words) carry 7 marks.

iv) Except numericals, Derivation, Design and Drawing etc.

Unit - I

1. a) Explain :

   i) Latitude

   ii) Declination and

   iii) Surface azimuth angle?

   b) Write short note on Solar Pond.

   c) How a PV cell works? Explain with the help of a suitable diagram.

   d) Derive an expression for the number of daylight (sunshine) hours N?

OR

Calculate the rate of heat flow through the south facing concrete wall with mean incident solar radiation of 260 W/m^2, ambient air temperature 13°C, wall thickness 30cm, Wall conductivity 0.72W/m°C, mean room temperature 20°C, h_c= 8.7 $W/m^{20}C$, h_r=3.8$W/m^{20}C$, α=0.6 and h_{is}=8$W/m^{20}C$?

Unit - II

2. a) Explain the basic principle of wind energy conversion?

   b) Give classification of the wind turbine generators on the basis of axis of rotation?

   c) What do you know about Indian wind power programmes?

   d) A propeller type horizontal shaft wind turbine having following wind characteristics:

   Speed of wind is 8m/s at 1 atm and 25°C.

   The turbine has diameter 150m and operating speed is 60r.p.m at maximum efficiency. Calculate the total power density in wind stream and total power produced in kW? Also, find above values, if the efficiency is 40%.

OR

Derive the expression for maximum efficiency of a propeller type turbine? Explain Betz limit.

Unit - III

3. a) Discuss the availability of biomass.

   b) What are the factors affecting the generation of biogas?

   c) Draw a comparison between fixed dome and movable drum type plant.

   d) Explain the processes which are used for the biomass conversion to biofuels.

OR

Write short notes on the following:

i) Deen bandhu biogas plant

ii) Mudjar biogas plant

iii) Selection of site for biogas plants

Unit - IV

4. a) Discuss the growth of energy sector in India.

   b) Explain critical criteria in design of OTEC plant.

   c) State the present status of tidal power plants in India. Also explain why is the tidal energy not being utilized properly.

   d) Determine the overall efficiency of an OTEC plant if surface warm water temperature is 27°C and deep cool water temperature is 5°C. It can be assumed that the relative efficiency factor of power plant is 55%?

OR

A tidal power plant of single basin type has a basin area of $25 \times 10\text{^}6m^2$. The tide has a range of 10m. The turbine however, stops operating when head on it falls below 2m. Calculate the energy generated in one filling process in kWh if turbine generator efficiency is 75%. Take density of sea water 1025 kg/m^3?