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M.Tech.(Pow. Sys.) (E-III) (Sem.-3)
NON-CONVENTIONAL ENERGY SOURCES

Subject Code : PEE-521

M.Code : 38817

Time : 3 Hrs.

Max. Marks : 100

INSTRUCTION TO CANDIDATES :

1. Attempt any FIVE questions out of EIGHT questions.
2. Each question carries TWENTY marks.

1. a) What is SODIS? What is its importance? Also show the solar radiance on an inclined surface and name the different radiations involved in this. 10
b) Calculate the declination angle for March 31 in a leap year. Also calculate the hour angle at 02:30 PM. 10
2. What are the various types of renewable energy sources existing in nature? Why they are favourable over the conventional sources of energy? Explain the above facts with special reference to Indian scenario. 20
3. a) An aero-generator generates an output of 1200 W at wind speed of 5 m/s at one atmospheric pressure and a temperature of 20°C. What will be the output, if the same aero-generator is installed on the top of a hill where the temperature is 10°C, pressure is 0.85 atmospheric and wind speed is 6 m/s? 15
b) How a solar PV different from solar thermal? Name any five appliances that use solar photovoltaic technology. 05
4. Calculate the volume of the fixed dome type biogas digester for the output of the two cows. Also calculate the thermal power available from biogas. Use following data :

Retention time: 40 days; Dry matter produced: 2 kg/day/cow; Biogas yield: 0.22 m³/kg of dry matter; Percentage of dry matter in cow dung: 18%; Density of slurry: 1090 kg/m³; Burner efficiency: 60%; Heating value of biogas: 23 MJ/m³ 20
5. What are the basic components of a WECS? Classify different types of WEC systems. 20

6. a) What are the important factors to be considered while selecting materials for an MHD generator? 10
- b) Derive the equations for the voltage and power output of an MHD generator. 10
7. a) What is the basic principle of thermo-electric power generation? Also, describe the various materials used in this process. 10
- b) Explain the principle of operation of a thermo-ionic generator. 10
8. a) Classify various types of fuel cells along with their advantages. 10
- b) What are the various methods to store solar energy? 10

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NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.