Roll No. | | | | | | | | | | | | |

Total No. of Pages : 02

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B.Tech.(EE) (2011 Onwards)/
(Electrical & Electronics) (2011 & 2012 Batch) (Sem.–7,8)

NON-CONVENTIONAL ENERGY SOURCES

Subject Code : BTEE-803
M.Code : 71932

Time : 3 Hrs. **Max. Marks : 60**

INSTRUCTION TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1. Answer briefly :

a. What is the difference between Bio-mass and Bio-gas?

b. List down the four different thermos electric materials.

c. What are the main applications of Geothermal Energy?

d. What is the working principle of MHD system?

e. Enlist two application of fuel cells.

f. Define the following :

i) Angle of inclination

ii) Zenith angle

g. What is the reason of high and low tides?

h. Differentiate the ocean thermal and thermoelectric power generation.

i. Differentiate the mini and micro hydro power plant.

j. Define Gibb's free energy.

SECTION-B

2. With the help of neat sketch, describe the different approaches of thermal electric conversion system (TECS) and wind energy conversion system (WECS) and compare them.

3. How will you differentiate the geothermal, biomass and bio-gas source of energy? Enlist the advantages and disadvantages for these sources of power generation for commercial purposes.

4. How is tidal energy conversion system being different from the wave energy conversion system? Draw their schematic diagram and differentiate them.

5. What is a full cell? Describe the principle of working of a fuel cell with reference to H_2–O_2 cell.

6. A flat plate solar collector having total flat area of $100m^2$ is subjected to an incident beam of sun light having power density 0.7 kW/m^2 in the direction of them. The water of collector is 1000kg at 30°C initially. The angle of incidence is 60° and specific heat of water is 4186 J/kg°C.

   Calculate :

   (a) The power collected by the surface of collector.

   (b) Temperature of water of the collector after 1 hour, assuming constant power collection.

SECTION-C

7. Wind at 1 standard atmospheric pressure and 15°C has velocity of 15 m/s calculate :

   (a) The total power density in the wind stream

   (b) The maximum obtainable power density

   (c) A reasonable obtainable power density

   (d) The Total Power

   (e) The Maximum Torque

   Given that, turbine diameter =120m, and turbine operating speed =40rpm at maximum efficiency. Propeller type wind turbine is considered.

8. Explain the working of MHD generator. With the following specifications for an MHD generator, calculate the open circuit voltage and maximum power output. Plate area = $0.25m^2$, Distance between plates = 0.50m, Flux density = $2Wb/m^2$, Average gas velocity = 10^3m/sec. and gaseous conductivity = 10 Mho/m

9. Write short note on :

   (a) Seebeck Effect

   (b) Peltier Effect

   (c) Thomson Effect

   (d) Multistage thermoelectric generators

   (e) Bio-gas plant

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.