

GUJARAT TECHNOLOGICAL UNIVERSITY
M. E. - SEMESTER – I • EXAMINATION – WINTER • 2014

Subject code: 713907N**Date: 04-12-2014****Subject Name: Renewable Energy System****Time: 10:30 am - 01:00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q1 A] Discuss various methods of using Solar Energy [7]
 B] Explain the mechanism of winds [7]

- Q2 A] Derive an expression for energy available in the wind [7]
 B] Wind at 1.0325 bar and 30°C has a velocity of 14 m/s. calculate: [7]
 a) Total power density in the wind stream
 b) The maximum obtainable power density.
 c) The Obtainable power density at 42% efficiency
 d) The total power
 e) The torque and axial thrust.

Take: turbine diameter = 10 m, operating speed=60 r.p.m at maximum efficiency
 Propeller type wind turbine is considered.

OR

- B] Calculate Sun's altitude and azimuth angle, hour of sunrise and the day length at [7]
 2:00 pm IST on Jun 8th, at latitude 23°2' N, longitude 72°4' E. Take time
 correction as 1'15"

- Q3 A] Sketch the diagram of a HAWT, and explain the functions of its main components. [7]
 B] With the help of a diagram, a) discuss the power versus wind speed characteristic [7]
 of a wind turbine b) discuss C_p versus tip speed ratio diagram.

OR

- Q3 A] Compare pyranometer and pyrliometer with neat sketch [7]
 B] Explain Solar Energy and Solar constant. [7]

- Q4 A] Compare Floating drum and Fixed dome type biogas plants [7]
 B] Explain the mechanism of photoconduction in a PhotoVoltaic cell. [7]

OR

- Q4 A] What is biomass? What is the difference between biogas and biomass? Why biogas [7]
 should be adopted as a source of energy in a country like India?
 B] Explain the Concept of Bio-energy and Bio-fuels [7]

- Q5 A] What do you understand by geothermal energy? What are the geothermal fields? [7]
 What are the major applications of geothermal energy?
 B] Compare the single basin and double basin tidal power plants with figures. [7]

OR

- Q5 A] Explain scope of Renewable Energies in Gujarat [7]
 B] Explain Aerobic and anaerobic bioconversion processes [7]
