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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

SECOND SEMESTER M.TECH DEGREE EXAMINATION, MAY 2016

Electrical & Electronics Engineering

(Control Systems, Guidance and Navigational Control, Power Systems, Electrical Machines, Power Control & Drives, Power System and Control)

01EE6412 New and Renewable Sources of Energy

Max. Marks: 60 Duration: 3 Hours

(Answer any two full questions from each part)

Part A

1. a) Describe the principle of operation of a solar pond. (5)

   b) What are the main applications of a solar pond? Describe them. (4)

2. Explain the working principle of a solar photovoltaic cell. Describe a basic photovoltaic system for power generation. (9)

3. Describe the layout & working of a solar water heating system. (9)

Part B

4. Wind at 1 atmospheric pressure and 15°C has a velocity of 15m/s. Calculate: (9)
   i. Total power density of the wind stream
   ii. Maximum obtainable power density
   iii. Reasonably obtainable power density
   iv. Total power and
   v. Torque and axial thrust

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

5. Describe the main considerations in selecting a site for wind power plants. (9)

6. a. Explain the basic principle of Tidal power generation. (6)

   b. Explain the advantages of Tidal power generation (3)

Part C

7. Describe the basic civil work design considerations for small scale hydroelectric plants with neat diagram (12)

8. Briefly explain (12)
   i) Fuel cells
   ii) Alcohol energy

9. Explain different types of turbines and generators used for small hydroelectric plants (12)
