Registration no: | | | | | | | | | | |

Total Number of Pages: 02 **M.TECH**
PPPE208

2nd Semester Back Examination 2016-17
NON CONVENTIONAL ELECTRICAL ENERGY
Branch: POWER ELECTRO AND POWER SYSTEMS

Time: 3 Hours
Max Marks: 70
Q.CODE:Z1082

Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1 **Answer the following questions:** **(2 x 10)**

a) What is meant by renewable energy sources? Write down the advantages and limitations of renewable energy sources.
b) Write down the difference between a Pyrheliometer and Pyranometer.
c) What are the advantages and disadvantages of concentrating collectors over flat-plate collectors?
d) What are the possible sources of geothermal pollution? How these are avoided?
e) Write down the advantage s of double flash system and limitations of a flashed steam system.
f) What are the difficulties in tidal power developments?
g) The basin area of a tidal power plant is 20×10^6 m^2. The tidal range is 8m, calculate the energy generated in Kwh.
h) What are the factors affecting the bio digestion.
i) What is the basic principle of wind energy conversion?
j) What is the difference between horizontal and vertical axis type aero generators.

Q2 **a)** With sketches of the characteristics and schematic diagram, justify the need for two speed operation of a wind power plant. **(5)**
b) Explain briefly the different approaches of thermal electric conversion system from solar energy. **(5)**

Q3 With the help of a neat sketch describe a solar heating system using water heating solar collectors. What are the advantages and disadvantages of this system? **(10)**

Q4 **a)** Write down the principles of tidal energy conversion and explain how we can regulate and control the tidal power generation. **(5)**

b) In an estuary, which is being developed for tidal power generation during the tide cycle the observed difference between the high and low water of the tide was 5.5m.It is estimated that the estuary's area is 0.5sq km whichcan generate power for 3 hours in each cycle. Assuming the averag available head to be 5m,and the overall efficiency of generation to be 75%,calculate
(i)the power in hp at any instan
(ii)the total energy in the year.
Sea water specific gravity can be taken equal to 1025 kg/m^3. **(5)**

Q5 **a)** Explain with neat sketch the operation of different types of gasifiers. **(5)**

b) Calculate :(i)the volume of a biogas digester suitable for the output of fourCows, and (ii) the power available from the digester. Retention time 20 days, temperature 30^0C,dry matter consumed 2 kg/day, biogas yield 0.24m^3 per Kg.Burner efficiency is 60%, methane proportion is 0.8.Hm. The heat of Combustion of methane may be assumed to be 28MJ/m^3 at STP. **(5)**

Q6 **a)** A wind turbine is being operated in a variable speed mode with an optimum load. If the wind speed doubles, what is the change in
(a) outputpower
(b) torque
(c) rotor speed
explain mathematically. **(5)**

b) Describe the main applications of wind energy, giving neat sketchs. **(5)**

Q7 **a)** Explain briefly the various types of bioreactor **(5)**

b) Explain how the biomass can be used as an energy source. **(5)**

Q8 **Write short notes on any two of the following** **(5 x 2)**

a) Solar pond.
b) Improved cook-stoves .
c) Production of bioethanol.
d) Production of biodiesel.