Total No. of Questions : 8]

SEAT No. :

P3138

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B.E. (Electrical) (Semester - I)

RENEWABLE ENERGY SYSTEMS

(2012 Pattern) (Elective - I)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Attempt Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6 and Q.7 or Q.8.***
2) ***Figures to the right indicate full marks.***
3) ***Neat diagram must be drawn wherever necessary.***
4) ***Assume suitable data, if necessary.***

Q1) a) Explain direct & diffused radiation and effect on power generation. **[5]**

b) The latitude of 30° N & the tilt angle 30° towards the equator, determine the ratio R_b for 10: 30 am on July 25. **[5]**

c) Define following parameters for solar cell **[5]**

i) Efficiency of solar cell

ii) Fill Factor

iii) Short circuit voltage

d) State different types of speed control strategies for wind Turbine. **[5]**

OR

Q2) a) List the different silicon technologies available for solar PV cell. Explain any one in detail. **[5]**

b) Calculate F.F, Maximum power & cell efficiency with following parameters V_{oc} = 0.24V I_{sc} = -10 ma, V_m = 0.14V, I_m = –6.5mA
Intensity = 100 W/m^2 , Area = 4 C m^2 **[5]**

c) Explain any one type of CSP . **[5]**

d) Define following . **[5]**

i) Wind Turbine efficiency

ii) Cut - in - Speed

iii) Cut - out - Speed

iv) Yaw Control

v) Pitch Control

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Q3) a) Explain gasifier in detail with neat diagram? **[8]**

b) Discuss the method of power generation from liquid waste **[8]**

OR

Q4) a) What are the Biomass Resources? Explain with the help of block diagram a biomass based Power generation. **[8]**

b) The following data are given for a family biogas digester suitable for the output of five Cows the retention time is 20 days, temperature30°C, and dry matte Consumed per day = 2 kg, Biogas yield is 0.24 m^3 per kg.The efficiency of burner is 60%, Methane proportion is 0.8. Heat of combustion of methane = 28 MJ/m^3 Calculate i) the volume of biogas digester ii) The power available from the digester. **[8]**

Q5) a) What is SMES? What are its features? Explain any two? **[8]**

b) What are the different losses in electrochemical cell? Give the information about Battery parameters. **[8]**

OR

Q6) a) What is a fuel cell? What are the advantages and disadvantages of a fuel cell? **[8]**

b) A hydrogen oxygen fuel cell operates at 25°C.Calculate the voltage output of the Cell, the efficiency, and the electric work output of cell, the efficiency, and the Electric work output per mole of H_2 consumed and per mole of H_2O produced. Also compute the heat transferred to the surrounding. **[8]**

Given : $\Delta H^0\ 298^0\ K = -285838$ kj/kg mole

$\Delta G^0\ 298^0\ K = -237191$ kj/kg mole

Q7) a) Define& limitation of i) Payback period Method ii) Initial rate of return/ Return on Investment. **[6]**

b) What are different parameters required for synchronization of renewable energy Source with grid. **[4]**

c) Explain with the help of block diagram grid connected PV System. **[8]**

OR

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Q8) a) What is mean by Time Value of money? Why it should be considered? What is Net Present Value (NPV). **[6]**

b) What are different parameters required for synchronization of renewable energy Source with grid. **[4]**

c) Compare simple payback period with life cycle costing. **[8]**

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