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10EE836

Eighth Semester B.E. Degree Examination, June / July 2014
Renewable Energy Sources

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

PART - A

1 a. What is meant by renewable energy sources? Explain in brief these energy sources with special reference to Indian context. **(10 Marks)**

b. Explain the significance of energy consumption as a measure of prosperity. **(05 Marks)**

c. Explain in brief the world energy scenario. **(05 Marks)**

2 a. What are the reasons for variation in solar radiation reaching the earth than received at the outside of the atmosphere? Define the terms : i) Solar constant ii) Declination angle iii) Altitude angle. **(10 Marks)**

b. Determine the local solar time and declination at a location latitude 77^0 30' E at 12.30 IST on June 19. Equation of time correction is given from standard table or chart = -(1' 01"). **(04 Marks)**

c. Describe briefly i) Eppley pyranometer ii) Sunshine recorder. **(06 Marks)**

3 a. Enumerate the different types of concentrating type collectors. **(06 Marks)**

b. What do you mean by a green house? Enumerate the main types of Green house. **(08 Marks)**

c. What are the advantages and limitations of solar furnace? **(06 Marks)**

4 a. What are the main applications of a solar pond? Describe briefly. **(06 Marks)**

b. Describe a central receiver system for a central solar thermal power station. **(06 Marks)**

c. What is the principle of solar photo voltaic power generation? What are the main elements of a PV system? **(08 Marks)**

PART - B

5 a. What is the basic principle of wind energy conversion? **(04 Marks)**

b. Prove that in case of horizontal axis wind turbine maximum power can be obtained when EXIT VELOCITY = 1 / Wind velocity and $P_{max} = \frac{8}{27}\rho AV^3$. **(10 Marks)**

c. Describe the main considerations in selecting a site for wind generators. **(06 Marks)**

6 a. With a neat sketch, explain Janta model digester plant. **(10 Marks)**

b. What are the advantages and disadvantages of floating drum plant. **(10 Marks)**

7 a. Describe the closed cycle OTEC system, with its advantages over open – cycle system. **(10 Marks)**

b. A single basin type tidal power plant has a basin area of $2km^2$. The tide has an average range of 13m. Power is generated only during the ebb cycle. The turbine stops operating when the head on it falls below 3m. Calculate the average power generated by the plant in single emptying process of the basin, if the turbine generator efficiency is 0.7. Estimate the annual energy generating of the plant. **(06 Marks)**

c. What are the advantages and limitations of wave energy conversion? **(04 Marks)**

8 a. With a neat sketch, explain the working of fuel cell. **(08 Marks)**

b. What are the advantages and disadvantages of small hydro resources? **(06 Marks)**

c. What are the advantages and disadvantages of hydrogen energy? **(06 Marks)**

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