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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Eighth Semester, B.E. - Electrical and Electronics Engineering

Semester End Examination; June - 2017

Renewable Energy Sources

Time: 3 hrs *Max. Marks: 100*

Note: *Answer **FIVE** full questions, selecting **ONE** full question from each unit.*

UNIT - I

1. a. Mention the various energy sources available. How are the renewable energy technologies more attractive than most conventional energy technologies? 8

   b. What are the advantages and disadvantages of conventional energy sources? 8

   c. Mention two salient features of non-conventional energy sources. 4

2 a. Explain :

   i) Angle of latitude ii) Angle of incidence

   iii) Surface azimuth angle iv) Zenith angle. 8

   b. Calculate the angle made by the beam radiation with the normal to a flat plate collector, pointing due south located in New Delhi (28º38′ N, 77º12′ E) at 9 AM solar time on December 1, the collector tilted at an angle of 36º with the horizontal. 4

   c. How solar radiation is measured? With a neat sketch, explain how to measure diffuse radiation? 8

UNIT - II

3 a. Enumerate the different types of concentrating type collector. What are the advantages and disadvantages of concentrated collector over flat plate collector? 10

   b. What is solar pond? Explain working of it. 5

   c. With the help of neat diagram, explain working of solar photo voltaic cell. 5

4 a. What are the advantages of green houses? 5

   b. What is the principle of solar photo voltaic power generation? What are main elements of a PV system? 10

   c. Write a note on :

   i) Solar lighting ii) Solar driers. 5

UNIT - III

5 a. Draw the block diagram of a WECS and explain its operation. 8

   b. Discuss the advantages of WECS. 4

   c. What are the most favorable sites for installing of wind turbines? Discuss disadvantages of WECS? 8

Contd…2

6. a	Derive an expression for maximum power extracted from wind theoretically.	8
b.	How are WEC systems classified? Discuss in brief.	8
c.	Define the terms : i) Cut-in speed ii) Cut-out speed.	4

UNIT - IV

7 a.	Discuss the various bio-mass conversion technologies.	8
b.	Explain the constructional detail and working of KVIC digester and Janata model biogas plant.	12
8 a.	What are the factors that affect the process of bio digestion or generation of gas?	12
b.	Explain the techniques suggested for maintaining the biogas production.	8

UNIT - V

9 a.	What is the basic principle of Tidal power?	4
b.	Explain the use of additional pumping feature in a single effect single pool tidal scheme.	8
c.	With the help of a neat diagram, explain closed cycle OTEC plant (Anderson cycle).	8
10 a.	What are the advantages and limitations of tidal power plant?	6
b.	Discuss various limitations of ocean wave energy.	4
c.	A single basic type tidal power plant has a basic area of 2 km^2. The tide has an average range of 13 m. The turbine however stops operating when head on it falls below 3 m. Calculate the energy generated in one filling (or emptying) process in kWh, if the turbine generator efficiency is 0.7.	10

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