



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

(An Autonomous Institution affiliated to VTU, Belagavi)

**Eighth Semester, B.E. - Mechanical Engineering**

**Semester End Examination; July - 2021**

**Renewable Energy Technology**

*Time: 3 hrs*

*Max. Marks: 100*

*Note: Answer any FIVE full questions.*

- 1 a. What are conventional and non-conventional energy sources? Describe briefly. 10
- b. What is meant by renewable energy sources? Explain in brief three renewable energy sources with special reference to Indian context. 10
- 2 a. With a neat sketch, explain spectral distribution of solar radiation intensity. 10
- b. Write conclusions on alternate energy strategies. Define;
  - i) Solar constant
  - ii) Beam radiation 10
  - iii) Diffuse radiation
  - iv) Insolation
- 3 a. Define the following:
 

i) Altitude angle	ii) Declination angle	iii) Solar Azimuth angle	
iv) Hour angle	v) Zenith angle	vi) Latitude angle	12
- b. With a neat sketch, explain the principle of working of sunshine recorder. 8
- 4 a. Calculate angle made by beam radiation with the normal to a flat plate collector on December 1<sup>st</sup> at 9.00 AM, solar time for location at 28°35'N. The collector is tilted at an angle of latitude +10° with the horizontal and is pointing due south. 8
- b. Distinguish between pyrheliometer and pyranometer. With a neat sketch, explain the principle and working of pyrheliometer. 12
- 5 a. What do you understand solar cells? Discuss the solar photo voltaic cell in regard of its working and application. 10
- b. List type and applications of various types of concentrating solar collectors and explain working principle of any two concentrating solar collectors with neat sketch. 10
- 6 a. Explain with neat sketch, working of solar absorption refrigeration system. 10
- b. With a neat sketch, explain the working of hot dry rock geothermal plant. State the environmental problems associated with geothermal energy conversion. 10
- 7 a. List out major problems associated with wind power generation. Explain coefficient of performance of wind mill motor with graph. 10
- b. Explain the method of harnessing tidal energy by basin system. Mention the advantages and disadvantages of tidal power generation. 10

- 8 a. Explain the principle of working of OTEC. Explain with neat sketch, working of Rankine cycle OTEC. 10
- b. Explain the principle of wind mill. With a neat sketch, explain vertical axis wind mill. 10
- 9 a. Clearly describe the production of oxygen from photosynthesis process. 6
- b. Write a note on energy plantation 4
- c. What are different methods for hydrogen production? Explain any of two in brief. 10
- 10 a. What do you understand by electrolysis? Explain the process of electric production of hydrogen with help of neat sketch. 10
- b. What do you mean by anaerobic digestion? Explain the factors that affect the production of biogas. 10

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