

Sixth Semester B.E. Degree Examination, Dec.2024/Jan.2025
Renewable Energy Resources

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Explain what are renewable energy resources. (08 Marks)
- b. Mention some countries with significant use of renewable energy and what is its scope India? (08 Marks)
- c. Compare the energy from the sun with the energy consumption by the human population. (04 Marks)

OR

- 2 a. Explain what is solar constant. What is variation in received solar energy from the sun? (05 Marks)
- b. Define declination. What was declination on June 21st 2021. (07 Marks)
- c. Calculate the solar time at Bangalore on June 10th 2021, at 9:30 a.m. IST, Location of Bangalore is 12.9716° N, 77.5946°E. IST is with respect to 82.5°E. (08 Marks)

Module-2

- 3 a. Explain the working of a stirling engine with a diagram. (07 Marks)
- b. Explain some types of solar collectors. (07 Marks)
- c. Compare concentrating collectors with flat collectors. (06 Marks)

OR

- 4 a. Explain the structure of a silicon solar cell. (06 Marks)
- b. Explain the efficiency and I-V characteristics of a silicon solar cell. (07 Marks)
- c. What is the configuration of a solar panel and deliver 100 watt plate at 120 volte DC, if each cell is rated for 0.1 watt plate at 0.4 volt. (07 Marks)

Module-3

- 5 a. Explain how hydrogen is produced. (07 Marks)
- b. What is the volume of hydrogen generated by complete electrolysis of 1 litre of water at 25°C and 1 atm pressure? (07 Marks)
- c. What is the kinetic energy in a gust of wind of cross section A and velocity V. Assume that density of P.? (06 Marks)

OR

- 6 a. Discuss geothermal energy and its uses. (07 Marks)
- b. Explain the use of incineration and pyrolysis for disposal of water. (07 Marks)
- c. Discuss wind turbine site location. (06 Marks)

Module-4

- 7 a. Explain how biomass is produced. (07 Marks)
- b. Discuss the theory of gasification of biomass. (07 Marks)
- c. Describe a gassifier for biomass. (06 Marks)

OR

- 8 a. Differentiate between biomass gasification and biogas plant. (07 Marks)
- b. Discuss the composition of biogas and how it is produced? (07 Marks)
- c. A tidal basin has area of A, the head of water above the turbines is H. What is the energy started in the water? (06 Marks)

Module-5

- 9 a. List the parameters that characteristics a sea wave. Give an expression for its energy per meter of crest and unit surface. (07 Marks)
- b. Explain the 4 basic technologies for converting sea wave energy to electricity. (06 Marks)
- c. What are the advantages and disadvantages of wave power? (07 Marks)

OR

- 10 a. Explain with a schematic how a closed cycle OTEC plant works. (07 Marks)
- b. What are the benefits of OTEC plant in addition to generation of electricity? (07 Marks)
- c. What are the advantages and disadvantages of OTEC plants? (06 Marks)

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