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21EE652

Sixth Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
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. Discuss causes of energy scarcity and solution to energy scarcity. (08 Marks)
b. Briefly explain energy resources and its classification. (06 Marks)
c. Explain renewable energy availability in India. (06 Marks)

OR

- 2 a. Define the following terms :
i. Zenith angle
ii. Declination angle
iii. Azimuth angle
iv. Hour angle. (08 Marks)
b. With necessary diagram, explain layers of the sun. (06 Marks)
c. Find the solar altitude angle (α) at 2 hours after local solar noon on 1st June 2012 for a city, which is located at 26.75° N latitude. (06 Marks)

Module-2

- 3 a. With a schematic diagram, explain working of a Stirling engine/Brayton engine. (08 Marks)
b. With the help of diagram, explain the working of solar cooker. Also write advantages and disadvantages of it. (08 Marks)
c. Discuss the various material aspects of solar collectors. (04 Marks)

OR

- 4 a. Draw and explain I-V characteristics of solar cell and the factors limiting the efficiency of the cell. (08 Marks)
b. With a neat sketch explain key elements of photo voltaic cell. (08 Marks)
c. What are the advantages and disadvantages of concentrating collectors over flate plate collectors? (04 Marks)

Module-3

- 5 a. State and explain methods of hydrogen production technologies. (08 Marks)
b. Discuss the applications, advantages and disadvantages of hydrogen energy. (06 Marks)
c. Describe the main considerations in selecting a site for wind generators. (06 Marks)

OR

- 6 a. With a neat sketch explain dry steam geo-thermal electric power plant. (08 Marks)
b. Write short notes on Recycling of wastes and its benefits. (06 Marks)
c. With necessary diagram, explain waste recovery management scheme. (06 Marks)

Module-4

- 7 a. Explain biological and chemical stages of anaerobic digestion. (06 Marks)
b. Draw the sketch of updraft, downdraft gasifier and discuss its working and applications. (08 Marks)
c. Discuss the factors affecting the selection of a biogas plant. (06 Marks)

OR

- 8 a. With a neat diagram, explain single basin and two basin tidal power plants. (06 Marks)
b. With a neat sketch, explain fixed dome type biogas plant. List and advantages. (08 Marks)
c. Discuss the problems faced in exploiting tidal energy. (06 Marks)

Module-5

- 9 a. With a neat sketch explain two types of ocean thermal energy conversion plants. (10 Marks)
b. Explain oscillating water column devices to harness sea wave energy. (10 Marks)

OR

- 10 a. Explain the principle of (OTEC) Ocean Thermal Energy Conversion. Explain the basic Rankine cycle and its working. (10 Marks)
b. With a neat sketch, explain closed cycle and hybrid cycle in OTEC cycle. (10 Marks)

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