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CBCS SCHEME

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21ME652

Sixth Semester B.E./B.Tech. Degree Examination, June/July 2026
Renewable Energy Power Plants

Time: 3 hrs. Max. Marks: 100

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

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-1

1 a. Explain different types of energy sources. **(10 Marks)**

b. With a neat sketch explain the working principle of Actinometer and Bolometer. **(10 Marks)**

OR

2 a. What are different energy alternatives? **(04 Marks)**

b. Explain the need for non-conventional energy sources. **(06 Marks)**

c. Describe Extraterrestrial and Terrestrial radiation and types of radiation from the sun. **(10 Marks)**

Module-2

3 a. Define the following :
i) Declination Angle
ii) Surface Azimuth angle
iii) Hour Angle
iv) Zenith Angle
v) Solar Altitude Angle. **(10 Marks)**

b. Explain the principle of working of solar pond and solar cooker with a neat sketch. **(10 Marks)**

OR

4 a. Explain the characteristics of solar photovoltaic systems. **(06 Marks)**

b. With a neat sketch explain the construction and working of Evacuated Tubular Collector. **(10 Marks)**

c. Write a note on apparent motion of the sun in terms of solar radiation geometry. **(04 Marks)**

Module-3

5 a. A 10 m/s wind is at 1 standard atmospheric pressure at 15°C temperature, calculate:

i) The total power density in the wind stream

ii) Maximum obtainable power density

iii) A possible power absorption in w/m^2

iv) Total power (in KW) if the turbine diameter is 120 m. Assume conversion efficiency as 40%. **(10 Marks)**

b. Explain the construction and working of floating drum type biogas plant with a neat sketch. **(10 Marks)**

OR

6 a. Explain problems associated with bio-gas production. **(10 Marks)**

b. Explain the working principle of vertical axis wind turbine with a neat sketch and mention advantages and disadvantages. **(10 Marks)**

Module-4

7 a. Explain the basic components of hydro electric power plant with a neat sketch. **(10 Marks)**

b. What are the fundamental characteristics of tidal power? **(06 Marks)**

c. What are the advantages and disadvantages of ocean wave energy harnessing? **(04 Marks)**

OR

8 a. Elucidate the concept of harnessing tidal energy. **(10 Marks)**

b. What are the important factors considered during the selection of Hydel plants? **(04 Marks)**

c. At a particular site, the mean monthly discharges (in millions of m^3) of a river in 12 months from January to December are 30, 25, 20, 0, 10, 50, 80, 100, 110, 65, 45 and 30 respectively. Estimate the power developed in MW if the available head is 90 m and the overall efficiency of generation is 85% [Assume each month of 30 days]. **(06 Marks)**

Module-5

9 a. Explain the problems associated with OTEC. **(10 Marks)**

b. Explain the advantages and disadvantages of geothermal energy over other energy forms. **(10 Marks)**

OR

10 a. Explain Rankine cycle with a neat sketch. **(10 Marks)**

b. With a neat sketch explain the principle of working of geothermal energy power plant. **(06 Marks)**

c. List and explain different types of geothermal stations. **(04 Marks)**

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