



End Term (Odd) Semester Examination November 2025

Roll no.....

Name of the Course and semester: B.TECH/5th (MSE)

Name of the Paper: Renewable Energy

Paper Code: TME 509

Time: 3 hour

Maximum Marks: 100

Note:

- (i) All the questions are compulsory.
- (ii) Answer any two sub questions from a, b and c in each main question.
- (iii) Total marks for each question is 20 (twenty).
- (iv) Each sub-question carries 10 marks.

Q1.

(2X10=20 Marks)

- a. Explain the current global energy scenario and the need for renewable energy transition and Discuss environmental impacts of conventional energy use. CO1
- b. Explain solar radiation components and their measurement methods. CO2
- c. Explain the construction and operation of solar ponds. CO6

Q2.

(2X10=20 Marks)

- a. Describe the design and working of a solar thermal power generation system. CO5
- b. Explain the principle and working of a horizontal axis wind turbine and describe components of a wind turbine generator system. CO3
- c. Explain biochemical pathways involved in biogas formation and describe utilization of biogas for domestic and industrial applications. CO4

Q3.

(2X10=20 Marks)

- a. Describe geothermal energy exploration methods and compare geothermal and solar energy in terms of sustainability. CO5
- b. Explain dry steam, flash steam, and binary cycle geothermal plants. CO5
- c. Explain the principle and working of a tidal barrage system and discuss future scope of marine renewable energy in India. CO6

Q4.

(2X10=20 Marks)

- a. Explain sustainable energy development and its pillars and discuss the role of government policies in promoting renewable energy. CO1
- b. Explain how wind and solar hybrid systems work and discuss control strategies for hybrid renewable systems. CO2/ CO3
- c. Explain biomass gasification process and its products. CO4

Q5.

(2X10=20 Marks)

- a. Explain the working and applications of Ocean Thermal Energy Conversion (OTEC) and discuss economic and environmental challenges of OTEC deployment. CO5
- b. Describe bioenergy conversion technologies and their classification and explain how bioenergy contributes to carbon neutrality. CO1/ CO4
- c. Explain the potential of mini-hydel power plants in India and discuss technical challenges in hydel power development. CO5/ CO6