

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY-GURUJADA VIZINAGARAM
III B. Tech I Semester Regular Examinations November -2025
SUSTAINABLE ENERGY TECHNOLOGIES
(ME)

Time: 3 hours

Max. Marks: 70

The Question paper consists of Part A & Part B.

Part A is compulsory, Answer all questions. Part B Answers any one question from each unit.

1		PART-A	(20Marks)
	a)	Define solar constant and its significance.	[2]
	b)	What are the main applications of photovoltaic systems?	[2]
	c)	Write the expression for Betz limit and its importance.	[2]
	d)	What are the types of biogas digesters used for biomass conversion?	[2]
	e)	List any two features of energy efficient motors.	[2]
	f)	What is the principle of fuel cells?	[2]
	g)	Define green manufacturing.	[2]
	h)	Mention two advantages of using vegetable-based cutting fluids.	[2]
	i)	What is meant by sustainable site selection in green buildings?	[2]
	j)	List two examples of environment-friendly building materials.	[2]
		PART-B	(50Marks)
		Question from Unit - I	
2	a)	Explain the structure of the sun and the sun–earth relationship.	[5]
	b)	Describe the different types of solar energy collectors and their working principles.	[5]
		(OR)	
3	a)	Discuss the various methods of solar energy storage.	[5]
	b)	Explain the concept and applications of solar ponds and solar chimneys.	[5]
		Question from Unit - II	
4	a)	Describe the working of horizontal and vertical axis wind turbines.	[5]
	b)	Explain the principle of anaerobic digestion and discuss types of biogas plants.	[5]
		(OR)	
5	a)	Discuss the principle and working of Ocean Thermal Energy Conversion (OTEC) systems.	[5]
	b)	Explain tidal and wave energy conversion techniques.	[5]
		Question from Unit - III	
6	a)	Explain the features and benefits of energy efficient lighting systems.	[5]
	b)	Describe the working principle of variable voltage variable frequency (VVVF) drives.	[5]
		(OR)	
7	a)	Explain the operation and applications of fuel cells.	[5]
	b)	Describe the energy efficient compressors and pumps.	[5]
		Question from Unit - IV	

8	a)	Explain the concept of green manufacturing systems with suitable examples.	[5]
	b)	Discuss the benefits of zero-waste manufacturing.	[5]
		(OR)	
9	a)	Explain the use of recyclable and environment-friendly materials in manufacturing.	[5]
	b)	Describe vegetable-based cutting fluids and their advantages.	[5]
		Question from Unit – V	
10	a)	Explain the features and benefits of green buildings.	[5]
	b)	Discuss the importance of sustainable planning and design for green buildings.	[5]
		(OR)	
11	a)	Explain alternate roofing systems and paints used to reduce heat gain in buildings.	[5]
	b)	Write short notes on: (i) Bamboo and lime pozzolana cement as green materials (ii) Energy management in buildings	[5]
