

THE KAVERY ENGINEERING COLLEGE
(An Autonomous Institution)

B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, NOV /DEC 2024

Fifth Semester

Agriculture Engineering

CAI335 - Solar and Wind Energy System

Regulations - 2021

Duration : 3 Hrs

Maximum: 100 Marks

PART - A (ANSWER ALL QUESTIONS) (Marks 10*2=20)

Q.No	Questions	BLT	CO	Marks
1.	How do selective surfaces improve collector performance?	RE	1	2
2.	What is an absorber plate, and why is it important?	UN	1	2
3.	Differentiate between passive and active solar stills.	UN	2	2
4.	How does solar technology contribute to green building design?	UN	2	2
5.	Why is the wind power law important for calculating wind energy potential?	UN	3	2
6.	How does the shape of an aerofoil impact lift and drag forces?	UN	3	2
7.	How does wheeling and banking relate to wind energy management?	UN	4	2
8.	What is the purpose of energy storage in wind energy systems?	UN	4	2
9.	What is a fuel cell?	RE	5	2
10.	What are the primary differences between onshore and offshore ocean energy technologies?	UN	5	2

PART - B (ANSWER ALL QUESTIONS) (Marks 5*13 = 65)

Q.No	Questions	BLT	CO	Marks
11.	a i Explain the concept of solar radiation availability and discuss the various techniques used for measuring solar radiation.	UN	1	7
	ii Describe how transmittance and absorptance affect solar energy collection, with examples of their impact on solar collector performance.	UN	1	6
	Or			
	b i Discuss the various types of solar dryers and analyze the factors that influence heat transfer performance in these dryers.	UN	1	7
	ii Explain the significance of solar dryers in agro-industrial applications, providing examples to illustrate their practical benefits.	UN	1	6
12.	a Describe the basic principles of solar thermal power stations, and discuss their main applications in electricity generation and industrial processes.	UN	2	13
	Or			
	b Explain the different types of photovoltaic (PV) cells, and describe their key characteristics and efficiencies for various applications.	UN	2	13
13.	a Describe the nature and structure of wind in the Earth's atmosphere. Analyze the factors that influence wind patterns and explain how these affect wind energy potential at different locations.	AP	3	13
	Or			

	b	Describe the purpose of wind velocity and power duration curves. Explain how these curves are used to analyze wind resource data and assess the suitability of a site for wind energy generation.	AP	3	13
14.	a	Explain the working principles of upwind and downwind wind turbine systems. Analyze how the orientation of these systems affects their performance and efficiency in varying wind conditions.	AN	4	13
		Or			
	b	Compare standalone wind energy systems with grid-connected systems. Analyze the advantages and disadvantages of each in terms of reliability, energy storage, and cost.	AN	4	13
15.	a	Explain the principles of Ocean Thermal Energy Conversion (OTEC). Compare and contrast open and closed cycle systems, focusing on their operational mechanisms, efficiency, and suitability for different ocean conditions.	AP	5	13
		Or			
	b	Describe the different types of geothermal resources available for energy production. Analyze how the classification of these resources impacts the choice of geothermal power plant design.	AP	5	13

*PART – C (ANSWER ALL QUESTIONS) (Marks 1*15 = 15)*

<i>Q.No</i>			<i>BLT</i>	<i>CO</i>	<i>Marks</i>
16.	a	Evaluate the various tidal energy conversion technologies available today. Discuss their operational principles, site requirements, and potential environmental impacts.	EV	5	15
		Or			
	b	Evaluate the concept of hybrid reactors that combine fission and fusion processes. Discuss the potential benefits of hybrid reactors for future energy systems, including efficiency and waste reduction.	EV	5	15