

THE KAVERY ENGINEERING COLLEGE
(An Autonomous Institution)

M.E DEGREE END SEMESTER THEORY EXAMINATIONS, NOV/DEC 2025

Third Semester

Construction Engineering and Management

PEV02414 - Renewable Energy Technology

(Common to Environmental Engineering & Product Design and Development)

Regulations - 2024

Duration : 3 Hrs

Maximum : 100 Marks

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

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
1.	List the primary classifications of energy sources.	L1	1	2
2.	How does renewable energy generation positively impact the environment?	L2	1	2
3.	Mention the basic characteristics of solar radiation.	L1	2	2
4.	Draw a simplified equivalent circuit of a photovoltaic (PV) cell.	L2	2	2
5.	Define grid-interactive inverter.	L1	3	2
6.	Differentiate between a boost converter and a buck-boost converter.	L2	3	2
7.	State Betz's limit.	L1	4	2
8.	Define tip speed ratio (TSR).	L1	4	2
9.	How is hydrogen produced for use in energy systems?	L2	5	2
10.	State the principle behind wave energy conversion.	L1	5	2

*PART - B (ANSWER ALL QUESTIONS) (Marks 5*16 = 80)*

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
11.	a Discuss the classification of energy sources with a focus on CO ₂ emissions. Compare and contrast the features of renewable and non-renewable energy sources, emphasizing their environmental impact.	L2	1	16
	Or			
	b Demonstrate the importance of renewable sources of energy with suitable data on CO ₂ emission, global warming and depletion of fossil fuel reserves.	L2	1	16
12.	a Elucidate the working principle of a solar cell from the basic principle. Also develop the single diode equivalent circuit for solar PV panel.	L2	2	16
	Or			
	b Discuss the importance of blocking diodes in solar energy systems. Enlighten their function in preventing reverse current flow and protecting the system components.	L2	2	16

13.	a	With suitable diagrams describe the working of grid tied and grid interactive inverters.	L2	3	16
		Or			
	b	Explicate the process of sizing a PV array and battery bank for a standalone PV system. Discuss the factors to be considered and the calculations involved in determining the optimal size of these components.	L2	3	16
14.	a	Describe the origins of global and local winds, providing specific examples of each. Discuss the factors that influence wind speed and direction in different geographical locations.	L2	4	16
		Or			
	b	Study the aerodynamics of an aero foil using blade element theory and develop equations for the various forces acting on the blade.	L2	4	16
15.	a i	Clarify in detail the principle of operation of open and closed cycles of OTEC.	L2	5	8
	ii	Describe the construction and principle of operation of a turbine used for tidal power.	L2	5	8
		Or			
	b	Delve into the mechanics of fuel cells, exploring their diverse types and real-world applications in transportation and power generation. Evaluate the merits and demerits of this technology.	L2	5	16