

THE KAVERY ENGINEERING COLLEGE*(An Autonomous Institution)***B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, APRIL/MAY 2026***Sixth Semester**Electrical and Electronics Engineering***EE3033 – Hybrid Energy Technology***Regulations - 2021**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.	Indicate the principle of power generation using tides.	L2	1	2
2.	What are the limitations of Renewable Energy source?	L1	1	2
3.	Define Clarke transformation.	L1	2	2
4.	Compare between induction generator and synchronous generator.	L2	2	2
5.	Define term fill factor of solar cell.	L1	3	2
6.	Define inversion mode of operation in line commutated inverter.	L1	3	2
7.	List out the issues to be addressed while integrating the solar PV systems with grid.	L1	4	2
8.	Indicate the applications of AC voltage controller or AC chopper.	L2	4	2
9.	Classify the types of PV-diesel hybrid systems.	L2	5	2
10.	Indicate the major components of Biogas Solar thermal Hybrid System.	L2	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 Outline the following renewable energy systems with neat schematics. i. Geothermal Energy sources ii. Hydrogen energy system	L4	1	16
	Or			
	b i Compare the power extraction aspects of solar PV system with wind energy system.	L4	1	8
	ii Analyze the design and principle of operation of general Fuel cell and Fossil Fuel cell.	L4	1	8
12.	a Examine the schematic of Permanent Magnet Synchronous generator and explain the construction and principle of operation in detail.	L4	2	16
	Or			
	b i Analyze the circuit model of self-excited induction generator and explain the methods used for steady state analysis.	L4	2	8
	ii Distinguish between Doubly fed Induction Generator (DFIG) over Squirrel Cage Induction Generator (SCIG) for wind energy conversion.	L4	2	8

13.	a	Apply the principle of working of buck-boost converter with time ratio and current limit control and draw the circuit and necessary waveforms.	L3	3	16
	Or				
	b	Construct block diagram of the solar PV system and explain the principle of operation in detail.	L3	3	16
14.	a	Explain the three-phase uncontrolled rectifier in detail for hybrid energy system.	L2	4	16
	Or				
	b	Explain the working and operation of Matrix Converter. Also indicate its merits and demerits.	L2	4	16
15.	a	Draw the block diagram of Hybrid renewable energy system with integration wind energy system and solar PV system with neat sketch and explain the operation.	L2	5	16
	Or				
	b i	Explain the case study of Biomass Diesel-Fuel-cell hybrid system.	L2	5	8
	ii	Explain the case study of Micro Hydel PV hybrid system.	L2	5	8