

THE KAVERY ENGINEERING COLLEGE
(An Autonomous Institution)

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

Fifth Semester

Electrical and Electronics Engineering

EE3014 - Power Electronics for Renewable Energy Systems

Regulations - 2021

Duration : 3 Hrs

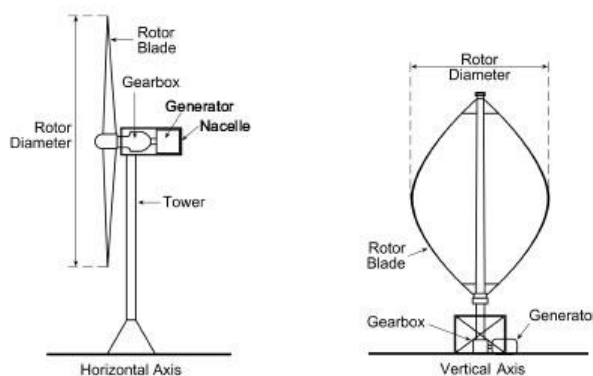
Maximum: 100 Marks

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

Q.No	Questions	BLT	CO	Marks
1.	List the various renewable energy resource.	RE	1	2
2.	Identify the name of the instrument used in wind energy conversion system.	UN	1	2



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|----|--|----|---|---|
| 3. | Induction generators more preferred over DC generators. Justify your answer. | AP | 2 | 2 |
| 4. | Point out the difference between the below shown types of wind energy conversion system. | UN | 2 | 2 |



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|-----|---|----|---|---|
| 5. | Compare stand alone PV system with grid connected PV system. | UN | 3 | 2 |
| 6. | Outline the issues related to grid connected solar PV systems. | AP | 3 | 2 |
| 7. | Sketch the circuit diagram of three phase uncontrolled rectifier. | RE | 4 | 2 |
| 8. | Infer about application of PWM inverter in power converters. | AP | 4 | 2 |
| 9. | Identify the need of hybrid systems. | UN | 5 | 2 |
| 10. | Point out the various MPPT techniques. | RE | 5 | 2 |

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

<i>Q.No</i>		<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
11.	a i	Discuss the advantages and disadvantages of conventional and non-conventional energy sources in detail, focusing on their environmental impacts.	UN	1	7
	ii	Explain the operating principle of any one type of fuel cell.	UN	1	6
		Or			
	b	With neat sketch explain the operating principle of solar PV and biomass renewable energy system. Also state their benefits, challenges, and applications.	UN	1	13
12.	a	Draw the schematic of double fed induction generator and explain its construction and principle of operation in detail.	UN	2	13
		Or			
	b	Draw the equivalent circuit and show the steady state analysis of Permanent Magnet Synchronous Generator (PMSG). Explain the merits and demerits of PMSG for wind energy conversion system.	UN	2	13
13.	a i	Enumerate the control strategy used in grid connected power converter system with neat sketch.	AP	3	7
	ii	Describe the working principle of a boost converter and its application in PV systems.	AP	3	6
		Or			
	b	Draw the schematic diagram of standalone solar photovoltaic system. Point out the main components and explain their functions.	AP	3	13
14.	a i	Explain the three phase AC voltage controllers in detail.	UN	4	7
	ii	Explain the need of AC-DC-AC converters for wind energy conversion system.	UN	4	6
		Or			
	b	Draw and discuss the operation of a matrix converter in detail.	UN	4	13
15.	a	With a neat schematic explain the integration of wind energy system with solar PV system.	AP	5	13
		Or			
	b i	Enumerate the importance of MPPT in the operation of a photovoltaic system.	AP	5	7
	ii	Explain the incremental conductance based Maximum power point tracking algorithm with a suitable illustration.	AP	5	6

*PART – C (Marks 1*15 = 15)*

<i>Q.No</i>		<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
16.	a i	Explain the principle and operation of line commutated converters in inverse mode.	AP	3	8
	ii	Explain the space vector PWM technique to control 3-phase inverter with neat schematic diagrams.	AP	4	7
		Or			
	b i	Explain in detail about the types of PV-Diesel Hybrid System.	AP	5	8
	ii	Enumerate the importance of MPPT in the operation of a wind energy conversion system.	AP	5	7