

THE KAVERY ENGINEERING COLLEGE*(An Autonomous Institution)***M.E DEGREE END SEMESTER THEORY EXAMINATIONS, APRIL-MAY 2025***Second Semester**Power Systems Engineering***PS4092/PPSE2405 - Renewable Energy and Grid Integration***Regulations -2021/2024***Duration : 3 Hrs****Maximum : 100 Marks****PART – A (ANSWER ALL QUESTIONS) (Marks 10*2=20)**

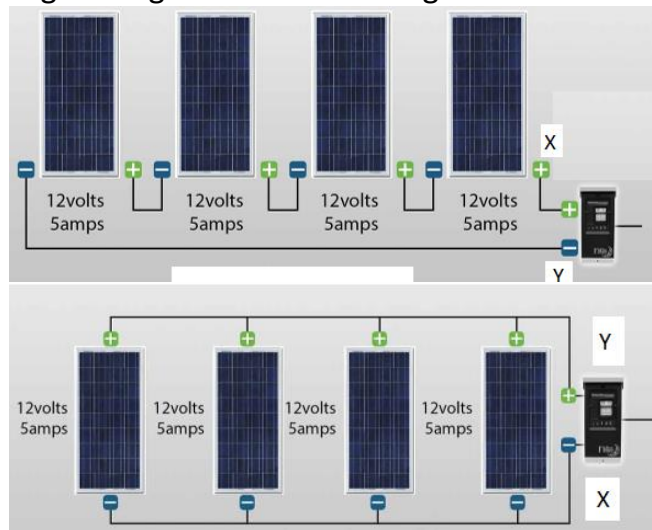
Q.No	Questions	BLT	CO	Marks
1.	Spell out the environmental issues on smart grid.	L1	1	2
2.	Specify the significance of buck boost converter.	L1	1	2
3.	How energy conversion takes place in solar cell? Which type of carriers crosses the PN Junction?	L2	2	2
4.	For Charging 24 V battery, determine the numbers of solar cell required. Mention the connection between the batteries required.	L3	2	2
5.	List the merits of synchronous generator-based wind energy conversion system.	L1	3	2
6.	Draw the Speed-torque curve of induction generator.	L2	3	2
7.	What is the need for MPPT?	L1	4	2
8.	Compare PV System Versus Wind Energy System.	L2	4	2
9.	Identify the need for Hybrid Systems.	L2	5	2
10.	Mention the disadvantage of Wind-Diesel hybrid system.	L1	5	2

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

Q.No	Questions	BLT	CO	Marks
11. a	Discuss renewable and conventional forms of energy. Discuss their importance in India's power requirement context. Highlight their merits and demerits.	L2	1	16
	Or			
b	Illustrate the working and operation of a matrix converter with a neat diagram and explain its limitations.	L2	1	16
12. a	Sketch the PV module equivalent circuit. Estimate the schematic diagram of standalone solar photovoltaic system for 2KVA load capacity.	L4	2	16

Or

- b Evaluate the Battery Voltage and Current rating at XY in the following figures of both cases. Suggest the methods to increase its existing Voltage rating and Current Rating in both the cases. L4 2 16



13. a i Explain the principle involved in wind energy generation. Classify the types of Wind-mills and Highlight their merits and demerits. L2 3 8
- i Determine the range of Voltage developed in Wind Power generation and discuss the way of transferring the voltage from the wind power plant to load end. L3 3 8

Or

- b i Illustrate the working and principle of grid connected PMSG in wind power plant. L2 3 8
- i Is induction Motor act as induction generator? Spell out the identification of wind speed and its direction. Discuss how speed variable obtained in PMSG. L3 3 8

14. a i Evaluate the number of Solar cells required for each solar panel and number of solar panels required to deliver 240W load. Each solar panel supply with rating 60W, 12V, 5A. Also determine the Expected generated unit after 10 years if on a clear sunny day, a PV array received 6 Peak Sun Hours. Total loss in the system is estimated at 70%. L4 4 10

- i Brief any one type of MPPT algorithm used for solar photovoltaic system. L2 4 6

Or

- b i A WEG generates 1500 watts at rated speed of 24 kmph at the atmospheric pressure and temperature of 20°C. Evaluate the change in output if the wind generator is operated at an altitude of 1800 m, temperature 10°C, wind speed 30 kmph, and air pressure 0.88 atmospheres. L4 4 10

	i i	Briefly any one MPPT technique for WECS.	L2	4	6
15.	a	With neat diagram explain the various energy storage elements and mention its merits and demerits.	L1	5	16
		Or			
	b	With a neat sketch, describe the coordinated operation of PV-Diesel System.	L1	5	16