

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

EE3011 - Multilevel Power Converters

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.	What is converter?	L1	1	2
2.	Recall about different types of multilevel topologies.	L1	1	2
3.	List the type of PWM.	L1	2	2
4.	Define Modulation.	L1	2	2
5.	What is Voltage balance Control?	L1	3	2
6.	Name behavior of MMC.	L1	3	2
7.	Outline the advantages of flying capacitor multilevel inverter.	L1	4	2
8.	What is flying capacitor multilevel inverter?	L1	4	2
9.	Define total harmonic distortion.	L1	5	2
10.	What is pulse generation?	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 Solve a maintenance plan for a power electronic system with a common DC bus that includes multiple converters. What regular checks and monitoring would you recommend to ensure reliability and performance? Or	L3	1	16
	b Utilize the application of symmetric topology without a common DC link in industrial motor drives. What specific advantages does this topology offer for controlling motor performance and efficiency?	L3	1	16
12.	a Organize a Bipolar Pulse Width Modulation scheme for a single-phase inverter. Describe how you would determine the appropriate duty cycles for the PWM signals to achieve a desired output voltage. Or	L3	2	16
	b Develop a Unipolar Pulse Width Modulation scheme for a single-phase inverter. Describe how you would determine the appropriate duty cycles for the PWM signals to achieve a desired output voltage.	L3	2	16

13.	a	Construct comprehensive testing and validation strategy for a five-level DCMC utilizing a one-inductance scheme.	L3	3	16
	Or				
	b	Build a monitoring and control system that could detect when the voltage balance in a DCMC converter is approaching its effectiveness boundary. What parameters would you track, and how would your system respond to imbalances?	L3	3	16
14.	a	Develop how control strategies for modulation in FCMCs are developed to ensure voltage balancing among flying capacitors. What factors are considered in this process?	L2	4	16
	Or				
	b	Develop the methods commonly used to achieve dynamic voltage balance in FCMCs. What are the advantages and limitations of these methods?	L2	4	16
15.	a	Make use of a three-level multilevel inverter with minimized switches in an industrial application.	L3	5	16
	Or				
	b	Model a scenario where the output voltage of an FCMC is unstable due to rapid load changes. How would you implement a dynamic PWM adjustment strategy to maintain voltage stability, and what parameters would you monitor?	L3	5	16