APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

08 PALAKKAD CLUSTER

08EE6212-2-April18 **(pages: 3)** **Name:**

Reg No:

SECOND SEMESTER M.TECH. DEGREE EXAMINATION MAY 2018

08EE6212 ANALYSIS OF POWER ELECTRONICS CIRCUIT II

Time: 3 hours **Max. marks: 60**

Answer all six questions. Part 'a' of each question is compulsory.

Answer either part 'b' or part 'c' of each question

Q.no.	Module 1	Marks
1.a	What is Delta Modulation?	3
	Answer b or c	
b	Discuss the various PWM strategies used for inverters. Also quote the advantages and disadvantages of PWM	6
c	Define SVM. Explain how the hexagonal pattern is formed and show the need for an intermediate vector. Also calculate the values of T_1, T_2 and T_0.	6

Q.no.	Module 2	Marks
2.a	By PWM control the lower order harmonics are eliminated or reduced. Justify	3
	Answer b or c	
b	The single phase full converter is operated with symmetric angle control. The load current with an average value of Ia, is continuous, where the ripple content is negligible. (i) Express the input current of converter in Fourier series and determine the HF of input current, DF and input PF. (b) If the conduction angle is $\beta = \pi/3$ and the peak input voltage is $V_m = 169.83V$, calculate V_{dc}, V_{rms}, HF, DF and PF.?	6
c	With neat diagram and waveforms show that power factor is improved in symmetrical angle control than extinction angle control for a half controlled converter	6

Q.no.	Module 3	Marks
3.a	Briefly explain the shoot through zero state in a Z- Source Inverter?	3
	Answer b or c	
b	The load current of a series –full converter is continuous and ripple content is negligible (Ia). The turns ratio of a transformer is Np/Ns = 2. The converters operate in rectification mode such that $\alpha 1 = 0$ and $\alpha 2$ varies from 0 to π (a) Express the input supply current in Fourier series determine the input current HF,DF,and input PF (b) If the delay angle is $\alpha 2 = \pi/2$ and the peak input voltage is Vm=162 V, Calculate Vdc, Vn, Vrms, HF, DF, and PF	6
c	Derive the term Modulation Index and Boost Factor from the equivalent circuit of Z- Source Inverter? Explain the modified carrier based PWM inverter with shoot-through zero state?	6

Q.no.	Module 4	Marks
4.a	What does the capacitor voltage unbalancing means in a multi-level Inverter?	3
	Answer b or c	
b	Explain the Features of Diode Clamped Inverter? What are the advantages and disadvantages of Cascaded MLI?	6
c	What is the principle of operation Flying Capacitors multilevel inverter? Explain a 5 level Flying Capacitors multilevel inverter in detail.	6

Q.no.	Module 5	Marks
5.a	Write a short note Variable band Hysteresis Control	4
	Answer b or c	
b	Discuss on the various fixed frequency and variable frequency current control methods.	8

c	A controlled current inverter employs the PWM current control strategy. The frequency of the triangular carrier is 10 kHz? The Inverter AC frequency is 40Hz. The triangular carrier waveform used has a peak to peak amplitude of 12 V. what will be the number of positive and negative voltage pulses for one period of the inverter AC. Determine the width of widest positive pulse width and the value of the control voltage Vc at which it occurs. Determine also the width of the positive and negative pulses for a control voltage of +5 V?	8

Q.no.	Module 6	Marks
6.a	What is Modulation Matrix in a Matrix Converter?	4
	Answer b or c	
b	Explain three phase Matrix Converter? What is its switching control strategy?	8
c	Explain the Venturini Method for the control of output voltage and input current in a Matrix Converter?	8