



End Semester Examination – Nov/Dec – 2016

Code : 14EE3003
Sub. Name : POWER CONVERTER ANALYSIS II

Semester : 2016-17 ODD
Duration : 3hrs
Max. marks : 100

ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)

Q. No.	Sub Div.	Questions	Course Outcome	Marks
1.	a.	With the help of waveform and necessary equations, explain the principle of operation of single phase HALF bridge inverter which is used to drive the single phase Induction Motor.	CO1	15
	b.	Demonstrate the various performance parameters used to justify the quality of an inverter.	CO1	5
(OR)				
2.	a.	With neat circuit diagrams and waveforms explain the operation of 180° mode operation of three phase inverter in detail.	CO1	15
	b.	The Single Phase FULL Bridge Inverter has a resistive load of 2.4Ω , and the dc input voltage is $V_s = 48V$, Determine the Total Harmonic Distortion.	CO2	5
3.	a.	Explain the single and multiple pulse width modulation techniques used for Power Electronic system to control the output voltage.	CO2	15
	b.	Describe that how the power devices are underutilized in 120° mode of operation	CO1	5
(OR)				
4.	a.	Analyze the various modes of operation of a single phase auto – sequential Commutated inverter with neat diagrams and waveforms which is suitable for industrial applications.	CO2	20
5.	a.	Explain about single phase capacitor – commutated current source inverter which is used for the speed control of an Induction motor.	CO1	15
	b.	Distinguish between voltage source inverter and current source inverter.	CO1	5
(OR)				
6.	a.	Construct the flying capacitor type Multilevel Inverters for the Permanent Magnet Brushless DC motor.	CO2	15
	b.	Compare the component requirements per leg of Multilevel Inverters	CO2	5
7.	a.	Construct a series resonant inverter with $L = 50\mu H$, $C = 6\mu F$ and $R = 2\Omega$. The DC input voltage $V_s = 220V$ and frequency of the output voltage $f_o = 7kHz$. The turn-off time is $t_q = 10\mu s$. (i) Determine a resonant frequency ω_r and the time at which it produces the maximum load current (ii) Explain it with the help of circuit diagram and waveforms	CO3	20
(OR)				
8.	a.	Describe that how the structure of separate dc source Cascaded H-Bridge Multilevel Inverter is well suited for various renewable energy sources.	CO2	8
	b.	The parallel resonant inverter delivers a load power of $P_L = 1kW$ at a peak sinusoidal load voltage of $V_p = 170V$ and at resonance. The load resistance is $R = 10\Omega$. The resonant frequency is $f_o = 20kHz$. Determine (i) The dc input current.	CO3	12

		(ii) The quality factor for the load power of 200 W when $u = 1.25$ (iii) The Inductor Value (iv) The Capacitor Value.		
		<u>Compulsory:</u>		
9.	a.	Explain the modes of Operation in Class E Resonant Inverter which is used for Low Power Applications.	CO1	10
	b.	Design the optimum values of L , C , C_e , and L_e for the Class E inverter to operate at resonance and has $V_s = 15 \text{ V}$ and $R = 15 \Omega$. The switching frequency is $f_s = 50 \text{ kHz}$. Assume $Q = 8$.	CO3	10

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