Course Code: 20EE2112 **R20**

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY: PUTTUR-517 583
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QUESTION BANK (DESCRIPTIVE)

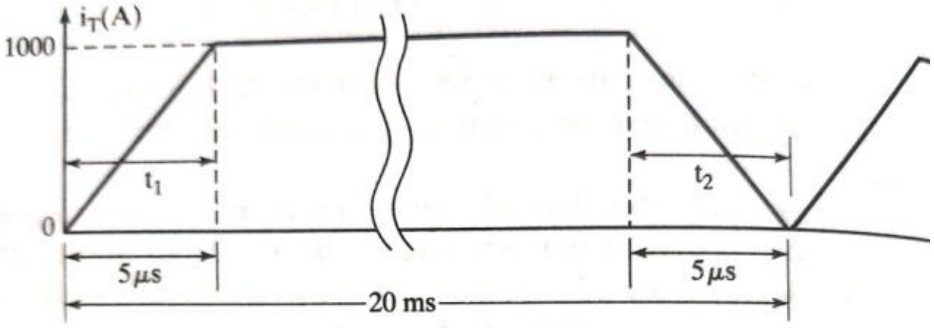
Subject with Code : Power Electronic Converters (20EE2112) **Course & Branch**: M.Tech - PE

Year & Sem: I-M.Tech & II-Sem

UNIT–I

THYRISTOR

1.		Explain briefly about Silicon controlled Rectifiers.	**L1,CO1[12M]**
2.		What are the turn-off and turn-on characteristics of SCR?	**L1, CO1[12M]**
3.		What are the output and transfer characteristics of IGBTs	**L1, CO1[12M]**
4.	**a)**	What is a bipolar transistor and what is the difference between SCR and BJT?	**L1, CO1[6M]**
	b)	Explain about steady state characteristics of BJT with neat sketch.	**L1, CO1[6M]**
5.	**a)**	What is the purpose of shunt snubber and series snubber in transistor?	**L1, CO1[6M]**
	b)	A thyristor carries a current as shown in the figure and the current pulse is repeated at a frequency of f_s=50hz. Determine the average on-state current I_T.	**L3, CO1[6M]**



6.	**a)**	What are the turn-off and turn-on characteristics of MOSFET?	**L1, CO1[6M]**
	b)	What is the switching model of n-channel MOSFET?	**L1, CO1[6M]**
7.		What is meant by commutation? Draw the line commutation and forced commutation circuit for Thyristors.	**L3,CO1[12M]**
8.	**a)**	Draw and explain the turn-off and turn-on characteristics of MOSFET?	**L3,CO1[6M]**

	b)	Two MOSFETs that are connected in parallel ,carry a total current of I_T=20A.The drain to source voltage of MOSFET M_1 is V_{DS1}=2.5V and that of MOSFET M_2 isV_{DS2}=3V.Determine the drain current of each transistor and difference in current sharing if the current sharing series resistances are a)R_{S1}=0.3 ohm and R_{S2}=0.2 ohm ,and b)R_{S1}=R_{S2}=0.5ohm.	**L3,CO1[6M]**
9.		Draw and Explain the dynamic characteristics of SCR?	**L3,CO1[12M]**
10.	**a)**	Derive an expression for two transistor analogy of a thyristor and explain briefly.	**L1,CO1,[12M]**
	b)	Explain the construction of IGBT with neat diagram.	**L3,CO1,[12M]**

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UNIT –II

SINGLE-PHASE &THREE-PHASE AC TO DC CONVERTER

1.		Explain about single phase full converter with RL load.	**L1, CO2 [12M]**
2.		Explain about three-phase dual converter.	**L1, CO2[12M]**
3.	**a)**	What is the pulse-width-modulation control of converters?	**L1, CO2[6M]**
	b)	The single phase full converter has a RL load having L=6.5mh,R=0.5 ohm,and E=10V.the input voltage Vs=120V at (rms) 60hz.Determine a)the load current I_{L0} at wt= $\alpha=60^0$ b)the average thyristor current, c)the rms thyristor current d) rms output current e) the critical delay angle	**L2, CO2[6M]**
4.		Explain the principle of operation of phase-controlled converter.	**L1, CO2[12M]**
5.		Explain the principle of operation of three-phase half-wave converters.	**L1, CO2[12M]**
6.		How does a 12 pulse converter works? and draw the circuit	
7.		State and explain different methods of control of converters.	**L1, CO2[12M]**
8.		Derive an output voltage equation for a three phase semi converter with neat circuit and waveforms.	**L3, CO2 [12M]**
9.	**a)**	The single phase dual converter is operated from a 120v,60hz supply and load resistance is R=10 ohm.The circulating inductance is Lr=40 mH,delay angles are $\alpha_1=60^0$ and $\alpha_2=120^0$.calculate the peak circulating current and the peak current of converter 1.	**L3, CO2,[6M]**
	b)	What are the extinction angle controls of converters?	**L1, CO2[6M]**
10.	**a)**	Derive an expression for average output current for single phase full converter with RL-Load.	**L3, CO2[6M]**
	b)	What are the reactive power considerations of ac-dc converters?	**L1, CO2[6M]**

UNIT –III

DC-DC CONVERTERS

1.		Explain the principle of step-down converter with RL-load.	**L1 CO3[12M]**
2.		Explain the principle and operation of the step-up converter with RL-load.	**L1 CO4[6M]**
3.		Classify the converters based on quadrant operation and explain in detail with neat diagrams.	**L3 CO3[12M]**
4.		Analyse the output voltage equation for operation of the step-up converter with neat circuit diagram.	**L3 CO3[12M]**
5.	**a)**	What is a dc-dc converter?	**L1 CO3[6M]**
	b)	Derive an output voltage equation for a step down converter.	**L3 CO3[6M]**
6.		Explain the principle and operation of Buck converter.	**L3 CO4[12M]**
7.		With neat circuit diagram and waveforms explain the principle and operation of the Boost converter.	**L2 CO4[12M]**
8.		Draw the waveforms for operation of the Buck-Boost converter and explain.	**L1 CO4[12M]**
9.		With neat circuit diagram and waveform explain the principle and operation of the cuk converter.	**L1 CO4[12M]**
10.		Explain three phase controlled converters with neat sketch.	**L1 CO4[12M]**

UNIT –IV
SINGLE-PHASE INVERTERS

1.		Explain the principle of the Three-Phase bridge Inverter with neat circuit diagram and waveforms	**L1 CO5**	**[12M]**
2.	**a)**	Classify the inverters based on different aspects.	**L3 CO5**	**[6M]**
	b)	What is the difference between half-bridge and full-bridge inverters?	**L1 CO5**	**[6M]**
3.		Explain the principle and operation of the Voltage source inverters.	**L1 CO5**	**[12M]**
4.		Draw the waveforms for three-phase current source inverter and explain in detail.	**L2 CO5**	**[12M]**
5.		Explain the principle and operation of the current source inverters.	**L1 CO5**	**[12M]**
6.		Draw the waveforms for three-phase inverter when each transistor conducts for120º.	**L2 CO5**	**[12M]**
7.		What are the techniques used for harmonic reductions in inverters?	**L3 CO5**	**[12M]**
8.		Evaluate the voltage control of Three-Phase inverters?	**L3 CO5**	**[12M]**
9.		Explain briefly about difference between space vector modulation and PWM technique.	**L1 CO5**	**[12M]**
10.		Compare the different types of modulation techniques used in inverters.	**L3 CO5**	**[12M]**

UNIT –V
THREE PHASE INVERTERS

1.		Explain the principle of the Three-Phase Inverter.	**L1, CO5**	**[12M]**
2.	**a)**	What are the types of inverters? explain in detail.	**L1, CO5**	**[6M]**
	b)	What is the difference between single-Phase and Three-Phase inverters?	**L1, CO5**	**[6M]**
3.		With neat circuit diagram explain the principle and operation of the series inverters.	**L3, CO5**	**[12M]**
4.		Explain the operation of single-phase inverter and draw the waveforms?	**L3, CO6**	**[12M]**
5.		What is parallel inverter ? and explain the operation with neat waveforms.	**L1, CO6**	**[12M]**
6.		Draw the waveforms for three-phase inverter when each transistor conducts for 180º.	**L2, CO6**	**[12M]**
7.		What are the voltage control techniques of three-phase inverters?	**L1, CO5**	**[12M]**
8.		Draw the waveforms for three-phase inverter when each thyristor conducts for 120º.	**L3, CO6**	**[12M]**
9.		Explain briefly about difference between voltage control and PWM technique.	**L1, CO6**	**[12M]**
10.		Explain the Pulse width modulation techniques used in inverters	**L1, CO6**	**[12M]**

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