Model Question Paper **2018 (CBCS Scheme)**

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18EE53

Fifth Semester(CBCS) B.E. Degree Examination
POWER ELECTRONICS

TIME: 03 Hours **Max. Marks: 100**

Note: Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**.

		Module 1	Bloom's Taxonomy Level	Marks
Q. 01	**a**	**With the help of neat block diagram explain the power electronic converters.**	**L2**	**(10)**
	b	**Explain the peripheral effects caused by power electronic converters and remedies for them.**	**L2**	**(05)**
	c	**List the various types of power diodes indicating the differences.**	**L1**	**(05)**
		OR		
Q. 02	**a**	**Describe reverse recovery characteristics of diode.**	**L2**	**(06)**
	b	**The reverse recovery time of a diode is t_{rr} = 3μs and the rate of fall of the diode current is di/dt = 30 A/ μs. Determine the (i) storage charge Q_{RR} (ii) peak reverse current I_{RR}.**	**L4**	**(06)**
	c	**With circuit diagram and waveforms explain the working of single phase full wave rectifier with R load**	**L2**	**(08)**
		Module 2		
Q. 03	**a**	**With the aid of steady state characteristics discuss the different operating regions of a power BJT.**	**L3**	**(08)**
	b	**Draw the switching model of MOSFET and explain its switching characteristics.**	**L2**	**(06)**
	c	**Give a comparison between BJT, MOSFET and IGBT**	**L4**	**(06)**
		OR		
Q. 04	**a**	**Discuss the need of base drive control in a power transistor.**	**L2**	**(05)**
	b	**Explain how anti saturation base control improves the switching performance of a BJT**	**L2**	**(07)**
	c	**With circuit diagrams discuss the methods of providing isolation of gate/base circuits from power circuit.**	**L2**	**(08)**

		Module 3	Bloom's Taxonomy Level	Marks
Q. 05	a	Mention the different turn on methods employed to switch on SCR.	L2	(08)
	b	Derive an expression for anode current using two transistor model of thyristor.	L3	(06)
	c	Derive an equation for components of dynamic equalization circuit of SCRs connected in series.	L3	(06)
		OR		
Q. 06	a	Describe how thyristors are protected from di/dt.	L2	(06)
	b	Calculate the required parameters for snubber circuit to provide dv/dt protection to a SCR used in single phase bridge converter. The SCR has a maximum dv/dt capability of 60 v/ μs. The input line to line voltsage has a peak value of 425 V and source inductance 0.2 mH. Take damping factor as 0.65.	L4	(06)
	c	Explain UJT triggering circuit for full control of SCR with waveforms.	L2	(08)
		Module 4		
Q.07	a	With neat circuit and waveforms derive an expression for the rms value of output voltage of single phase half wave controlled rectifier with RL load.	L3	(10)
	b	Explain the working of single phase dual converter circuit with the help of waveforms for RL load.	L2	(10)
		OR		
Q.08	a	Derive an expression for rms value of the output voltage for single phase full wave AC voltage controller with resistive load.	L3	(07)
	b	An on-off controller with an input of 230 V, 50 Hz is connected to a resistive load of 20Ω. The circuit is operating with the switch ON for 30 cycles and OFF for 30 cycles. Determine (i) R.M.S output current (ii0 Input power factor.	L3	(07)
	c	Explain the operation of 1-Φ phase control type of voltage controller with RL load.	L2	(06)
		Module 5		
Q.09	a	Obtain an expression for the output voltage for a step-up chopper.	L3	(06)
	b	Classify choppers and their circuits	L2	(04)
	c	With the help of circuit and quadrant diagrams, describe the working of a class E chopper.	L3	(10)
		OR		
Q.10	a	Explain the working of single phase half bridge inverter with necessary waveforms.	L2	(06)
	b	Write a note on voltage control of single phase inverters by sinusoidal pulse width modulation technique.	L2	(06)
	c	Analyze the working of 1-Φ transistorized current source inverter with neat circuit diagram and waveforms.	L3	(08)