## B.E. (Electronics Engineering / Elect. Telecommunication / Elect. Communication Engineering) Fourth Semester (C.B.S.) **Power Devices & Machines**

P. Pages : 2

Time : Three Hours

## \* 0 1 9 5 \*

NRJ/KW/17/4409/4414

Max. Marks: 80

	Notes	s: 1.	All questions carry marks as indicated.	
		2.	Solve Question 1 OR Questions No. 2.	
		3.	Solve Question 3 OR Questions No. 4.	
		4.	Solve Question 5 OR Questions No. 6.	
		5.	Solve Question / OR Questions No. 8.	
		6. 7	Solve Question 9 OR Questions No. 10.	
		/. 0	Solve Question 11 OK Questions No. 12.	
		ð. 0	A sume suitable date whenever pacessery	
		9. 10	Illustrate your answers whenever necessary with the help of neat sketches	
		11.	Use of non programmable calculator is permitted.	
1.	a)	How a contract of the expression of the expressi	onventional SCR can be represented by two transistor model. Derive an on for forward anode current in this modal.	8
	b)	Draw an current i	d Explain turn off characteristics of SCR also define holding current and latching n context with SCR.	5
			OR	
2.	a)	What is a	a TRIAC. Explain four modes of operation.	7
	b)	Write sh	ort notes on application of triac as an ac regulator (phase control circuit)	6
3.	a)	Explain character	IGBT with help of characteristic and symbol also explain its switching ristics.	7
	b)	Draw an	d explain characteristics of N - channel depletion layer MOSFET.	6
			OR	
4.	a)	Explain	GTO with help of characteristics and symbol.	7
	b)	Write co	omparison between SCR, power MOSFET & IGBT.	6
5.	a)	Draw an with R -	d Explain the circuit of single phase full wave fully controlled bridge rectifier L load with the help of neat wave form also derive necessary equations.	10
	b)	Explain	the utility of free wheeling diode in a converter.	4
			OR	
6.	a)	Describe	e the operation of 3 phase half wave controlled rectifier with resistive load.	7
	b)	Explain	the operation of - single phase cyclo-converter with resistive load.	7

7.	a)	Explain operation of step - up chopper with the help of neat circuit diagram and proper waveform. Also derive expression for output voltage in terms of duty cycle.	7				
	b)	Write short notes on Class C Chopper.	7				
		OR					
8.	a)	Explain the operation of single phase bridge inverter. Draw output waveform. Which switching device is preferred in Inverter.					
	b)	Explain in brief working of a three phase bridge inverter in 120° mode. Draw waveform of line and phase voltage.					
9.	a)	rite short note on :					
		1) Parallel operation of Three - Phase Transformer					
		2) Y - Y and $\Delta - Y$ operation of Three Phase Transformer.					
	b)	Explain open - delta (V-V) connection with application of this system.	5				
		OR HIM					
10.	a)	Write short notes on :	8				
		a) Star - Delta starter b) Autotransformer starter					
	b)	What are the different methods of speed control of 3 phase I.M. Explain any one.	5				
11.	a)	Explain with neat labelled diagram construction and working principle of operation of universal motor. State the advantages of universal motor over other motors.	7				
	b)	A 200 V DC series motor runs at 500 rpm when taking a line current of 25 A. The resistance of armature is $0.2\Omega$ and that of series field is $0.6\Omega$ . At what speed will it run when developing the same torque when an armature diverter of $10\Omega$ is used. Assume linear magnetisation curve.	6				
		A <sup>T</sup> OR					
12.	a)	Explain Armature diverter method and field diverter method for speed control of DC series motor.	7				
	b)	Explain Ward - Leonard system of speed control.	6				

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