

Set No. 1

III B.Tech I Semester Supplementary Examinations, November - 2015

POWER ELECTRONICS

(Electrical and Electronics Engineering)

Time: 3 hours Max. Mark		ne: 3 hours Max. Marks: 75	
Answer any FIVE Questions All Questions carry equal marks *****			
1	a)	Compare between SCR and IG B T.	[6]
	b)	Draw the V-I characteristics of a thyristor and explain different operating regions. What is the effect of gate current on the V-I characteristics of a thyristor?	[9]
2	a)	What is commutation? What are the types of commutation? Explain any one commutation	[8]
	b)	circuit with a diagram and waveforms. Write short notes on i) UJT triggering circuit (ii) Synchronised UJT triggering circuit.	[7]
3	a)	Describe the operation of 1-phase, two pulse, mid-point converter with relevant voltage and current waveforms.	[9]
	b)	What are line commutated converters? Explain briefly.	[6]
4		A single phase fully controlled bridge converter supplies an inductive load. Assuming that the output-current is virtually constant, and is equal to I_d . Determine the following performance measure, if the supply voltage is 230 V and if the firing angle is maintained at $\pi/3$ radians. i) Average output voltage ii) Supply RMS current iii) Supply fundamental RMS current iv) Fundamental PF and v) Supply PF.	[15]
5	a)	What are the advantages of three – phase bridge controlled rectifier over three – phase midpoint six pulse controlled rectifier?	[8]
	b)	A 3-phase half wave controlled rectifier has a supply of 200 V/phase. Determine the average load voltage for firing angle of 0^0 , 30^0 , 60^0 assuming a thyristor volt drop of 1.5 V and continuous load current.	[7]
6		A single –phase half –wave ac voltage controller is connected with a load of $R=5\Omega$ with an input voltage of 230 V, 50 Hz. If the firing angle of thyristor is 45°, determine (a) the RMS output voltage, (b) power delivered to load (c) input power factor and (d) average value of input current and voltage.	[15]
7	a)	Draw the schematic of step-down chopper and derive the expression for output voltage in	[8]
	b)	terms of duty-cycle for step down chopper. A Chopper circuit is operating on TRC principle at a frequency of 1kHz on 220 V d.c. supply. If the load voltage is 180 V, calculate the conducting and blocking period of thyristor in each cycle.	[7]
8		Draw and explain the simple SCR series inverter circuit. Draw and discuss the important waveforms. State the limitations of this series inverter. ******	[15]