Reg. No.



MANIPAL INSTITUTE OF TECHNOLOGY

A Constituent Institution of Manipal University

I SEMESTER M.TECH (POWER ELECTRONICS AND DRIVES) **END SEMESTER EXAMINATIONS, NOV/DEC 2016**

SUBJECT: APPLICATION OF POWER ELECTRONICS IN POWER SYSTEMS [ELE 5122] **REVISED CREDIT SYSTEM**

Time	: 3 Hours	Date:	26 November 2016	MAX. MARKS	S: 50
Instru	ictions to Candidates:				
	 Answer ALL the questions. 	1	,		
	Missing data may be suitab	le assun	ned.		
1A.	State any four benefits of FACT	S contro	llers		02
1B.	With a neat sketch, describe t offered by TCR is a function of f	he worl	king principle of TCR and show that th gle $α$.	e susceptance	05
1C.	Bring out the differences betwee	en shun	t and series compensation.		<i>03</i>
2A.	Show the circuit configuration highlighting the importance o waveform.	n of a 3 f dc linl	phase, 6 pulse STATCOM and explair k capacitor. Also draw the STATCOM	ı its operation output voltage	05
2B.	Derive the expressions for mid at midpoint of the line. Comp capacitor of 100Ω is connect transmission line operating at 8	point vo ute the cted at S=60°. Ta	ltage and current when a series capacitor percentage increase in power transfer midpoint of a 400kV, 50hz, symme ake $Z_n=300 \Omega$ and $\theta=36^\circ$.	or is connected if a series of etrical lossless	05
3A.	With the help of block diagram,	explain	how power scheduling is achieved by us	sing TCSC?	<i>03</i>
3B.	Discuss the impact of power qu	ality on	customers and utility.		04
3C.	Write short notes on i) harmon	ic resona	ance ii) CBEMA curve iii) voltage flicker		03
4A.	A 3 phase, 2 branch shunt p frequency) is employed to redu power factor to unity for a 3 ph current of i(t)= 100sin(wt-30°)	assive s ice the T iase, 440)+20sin(single tuned filter (tuned for 5 th and HD of supply current and to improve the DV, 50Hz fed diode bridge converter whi 5wt)+14sin(7wt). Compute the followin	l 7 th harmonic e displacement ch draws an ac g	
	i) Fundamental active and re	eactive p	oower drawn by the load		
	ii) Values of filter elements if iii) THD of source current if th iv) Bating of passive filter	the qual ne source	lity factor is 50. e reactance at fundamental frequency is	j0.5 Ω.	08
4B.	Compare the performance of pa	assive fil	ter with active filter.		02
5A.	Describe the function of compo	nents us	sed for HVDC system with a neat schema	tic diagram.	03
5B.	A 3 phase, bridge connected p Determine the necessary secon rated at 220kV/110kV, if it is re ratio required.	rectifier ndary vo equired	operates with α =30° and commutation oltage of the converter transformer whi to obtain a dc voltage of 100kV. Also det	n angle μ=15°. ch is normally cermine the tap	04
5C.	Discuss the converter control c	haracter	istics of HVDC system.		<i>03</i>