Reg. No.



## **I SEMESTER M.TECH (POWER ELECTRONICS & DRIVES)**

## **END SEMESTER EXAMINATIONS, NOVEMBER 2017**

## SUBJECT: APPLICATION OF POWER ELECTRONICS IN POWER SYSTEM [ELE 5122]

REVISED CREDIT SYSTEM

Time	e: 3 Hours Date: 18 November 2017 Max	Marks: 50
Instructions to Candidates:   ◆ Answer ALL the questions.   ◆ Missing data may be suitably assumed.		
1A.	Discuss the loading limitations of ac transmission line and suggest any two solution overcome these limitations.	ons to <b>(03)</b>
1B.	Enumerate the advantages and disadvantages of series compensation of transmission Derive the expression for midpoint voltage, current and power when a series capac connected at the midpoint of the line.	n line. itor is <b>(05)</b>
<b>1C.</b>	Draw VI characteristics and discuss the advantages of TSC-TCR over FC-TCR.	(02)
2A.	Consider a 3 phase, 400kV, 50Hz, 800 km symmetrical line which is operating with voltage. Take $Zn=300\Omega$ and $\beta=0.06^{\circ}$ /km. Compute the susceptance offered by SVC to interpret the midpoint voltage to 0.97pu taking the slope of control characteristics as 5% corresponding power flow through the line.	rated crease % and <i>(04)</i>
2B.	With the help of diagram, explain the working of 12 pulse STATCOM.	(03)
<b>2C.</b>	With neat diagrams and waveforms, discuss the capacitor vernier mode of operation of	TCSC. <b>(03)</b>
3A.	With neat diagram, explain the operation of static phase shifter.	(02)
3B.	What is power quality? Discuss any two PQ problems.	(03)
3C.	A harmonic voltage source is represented by $v = 340 \sin (377t) + 50 \sin (1885t) V$ The voltage source is connected to a load of $Z_L = (5+j0.2\omega) \Omega$ through a cable whose ind reactance = $j0.01\omega \Omega$ . The load is compensated by a $200\mu$ F capacitor bank connec parallel to the load. Compute the voltage across the load, voltage across the cable and con- through the capacitor.	uctive ted in urrent (05)
4A.	With relevant diagrams, discuss any two methods of generating reference signals for active filter.	shunt <b>(04)</b>
4B.	With a neat schematic diagram, explain the structure of DVR. Consider a distribution sy with feeder impedance 0.01+j0.2 pu and load impedance 0.75+j0.3 pu connected in with a supply voltage 220V, 50Hz. Compute the DVR voltage if the load voltage is to be br to 220V using minimum energy compensation.	vstem series rought (06)
5A.	Discuss hierarchy of controls in HVDC. Explain CC, CEA and CIA control characteris HVDC converter.	tics of <b>(05)</b>
5B.	A 3 phase 48 pulse bridge rectifier is fed from transformer with turns ratio 0.45 and pr voltage 240 kV. Determine (i) the output voltage of rectifier when firing angle is 20 commutation angle 18° (ii) fundamental component of ac line current, power factor, and reactive power at HT bus if the dc current is 1.7 kA.	imary )° and active <b>(05)</b>