Reg. No.



(A constituent unit of MAHE, Manipal)

II SEMESTER M.TECH

(ENERGY SYSTEMS & MANAGEMENT / POWER ELECTRONICS & DRIVES) END SEMESTER EXAMINATIONS, APRIL/ MAY 2019

SUBJECT: POWER QUALITY ISSUES & MITIGATION [ELE 5238]

REVISED CREDIT SYSTEM

Time	e: 3 Hours	Date:	29 th , April 2019	Max. Marl	ks: 50	
Instructions to Candidates:						
	 Answer ALL the questions. Missing data may be suitable 	a a commo	ad			
		y assume	eu.			
1A.	What are the different types on network based on supply/load	of passiv l system	<i>v</i> e shunt compensators used in the d	istribution	(02)	
1B.	How the passive power filters sketches.	are cla	ssified based on the connection used	l with neat	(02)	
1C.	Explain with a neat block di control algorithm for a three-p DSTATCOM and DVR.	agram o hase fou	of synchronous reference frame the ur-wire VSC based UPQC for the opera	eory based ation of the	(06)	
2A.	What are the effects of power	quality j	problems on users?		(02)	
2B.	Determine percentage voltage unbalance in a 3-phase 3-wire system with three phase unbalanced load voltages $V_a = 0.9 \angle 0^\circ pu$, $V_b = 1.1 \angle -120^\circ pu$, and $V_c = 0.95 \angle 120^\circ pu$.					
2C .	With the relevant phasor dia capacitor supported DVR to pr	gram ex otect th	xplain the operation of three phase ne sensitive loads from voltage sag.	three wire	(05)	
3A.	Derive the expressions for the balancing and p.f. correction unbalanced load.	susepct (UPF)	ances of the passive shunt compensat of a three phase three-wire delta	tor for load connected	(05)	
3B.	A three-phase three-wire DST provide load balancing and rea of 75kVA, 0.8 lagging p.f. loa determine	CATCOM active po d is cor	I is used at 415V, 50Hz distribution ower compensation for UPF. A single- nnected between two lines of the s	system to phase load ystem and		
	a) All the three supply line cur	rents				
	b) DSTATCOM currents					
	c) kVA rating of the DSTATCO	М			(05)	
4A.	Explain with a neat block di mitigating multiple PQ problem	agram ms of vo	of right shunt and left shunt UPQ oltages and currents.	C used for	(03)	

4B.	How series active power filters are classified based on types of converter used and which type is generally preferred and why?	
4C.	A single phase AC mains with source impedance supplies power to a single phase lagging p.f. load. Derive the expression for the susepctance of the shunt compensator to get unity p.f. at the substation.	(05)
5A.	How three phase three-wire DATATCOMs are classified.	(02)
5B.	What are the benefits of power quality monitoring?	(03)
5C.	A single phase 230V, 50Hz supply with feeder impedance of $(0.5+j3)\Omega$ feeds a load having $Z_L = 20 \angle 36.86^\circ \Omega$. If a PWM based DVR is used to regulate the voltage the input voltage (230V) with minimum rating. Calculate a) The voltage across the load terminals b) The voltage and current rating of the DVR	

c) kVA rating of the DVR

(05)