CLASS: M.TECH/PRE-PHD   SEMESTER : II/NA
BRANCH: EEE   SESSION : SP/19

SUBJECT : EE557 POWER ELECTRONICS APPLICATION

TIME: 3.00 Hrs.   FULL MARKS: 50

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

Q.1(a)	Highlight application s of power electronics in modern world. What is fly back action of power diodes? Give Circuit and appropriate waveforms.	[5]
Q.1(b)	Elucidate: Hybrid Vehicle, MCT, THD, FACTS and Ultracapacitor.	[5]
Q.2(a)	Why bipolar HVDC transmissions more popular?	[5]
Q.2(b)	Analyze effect of source inductance on the performance single phase full converter with power circuit and phase voltage waveforms. Indicate the sequence of conduction of each SCR. Sketch load current of both positive and negative group of SCRs.	[5]
Q.3(a)	Develop a suitable converter in power electronics lab in order to interface solar power to grid.	[5]
Q.3(b)	Design traction motor for a light HEV car in acceleration and deceleration mode. The mass of vehicle is 1000kg., f_r =0.01, C_d=0.3 and A_f=2.0m^2. The vehicle is running on ECE driving cycle. It accelerates from 0 to 100kmph in20secs and decelerates from 100 to 0 kmph in 10 secs.	[5]
Q.4(a)	How power factor is enhanced by symmetrical angle control? Draw power circuit, voltage and current waveforms.	[5]
Q.4(b)	Why PWM converter are popular in modern industry? Describe sinusoidal PWM inverter with power circuit, appropriate voltage and current waveforms. Discuss the hardware implementation of firing circuit of PWM inverter. Develop an expression for load voltage using Fourier Series 7th and 9th harmonics.	[5]
Q.5(a)	Which FACT controller provides maximum power flow. Validate with power-angle characteristics. Discuss its operation of with neat circuit arrangement.	[5]
Q.5(b)	A three-phase load of 20kW+j36kVARis fed from 400√2sin314t volts. TCR in SVC has an inductance of 0.8H. For firing angle delay of 120^{0,} it is found that the system operates at UPF. Estimate the value of capacitance for fixed cacitor and kVAR delivered by it. Draw circuit and phasor diagram.	[5]