

Registration no:

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M.TECH
PEPC 201

Second Semester Examination – 2014

POWER CONVERTER-II

Time: 3 Hours

Max marks: 70

Answer Question No.1 which is compulsory and any five from the rest.

The figures in the right hand margin indicate marks.

- Q1 Answer the following questions: (2 x 10)
- a) How is dc side voltage controlled in case of three phase switched mode bridge rectifier?
 - b) What are the advantages of CSI over VSI?
 - c) How is the switching frequency of the inverter switches related to the carrier frequency in case of space vector pwm?
 - d) What is the advantage of fixed switching frequency current control method in case of current regulated PWM voltage source inverter?
 - e) What is the peak voltage rating of switch in a push pull converter, if the dc input voltage is 50V?
 - f) What are the advantages of Space Vector Modulation over SinPWM technique?
 - g) Enumerate two advantages of Push Pull converter topology used in SMPS.
 - h) Give the disadvantages of boost converter?
 - i) Why is a diode connected anti parallel to the switch in ZVS resonant switch converter?
 - j) What are the limitations of load resonant converter?
- Q2 Explain the principle of operation of single phase switched mode rectifier with neat circuit diagram, control diagram and relevant waveforms. What is the function of inner current control loop for the control of such rectifier? (10)
- Q3 Draw and explain the modified series inverter circuit. How can you have output frequency higher than the series resonant frequency? State the limitations of this series inverter. (10)
- Q4 Explain the principle of Space Vector Modulation as applied to three level inverter structure giving relevant diagram and wave forms. (10)
- Q5 How is variable band hysteresis control achieved in case of current regulated PWM voltage source inverters. Explain in details its working principle with suitable circuit diagram and waveforms. (10)
- Q6 a) Explain the operation of buck-boost converter and illustrate the operation with the inductor current and the switch waveforms. (5)
- b) A buck-boost converter switching at 50 kHz is supplied with an input voltage that varies between 5 V and 10 V. The output is required to be regulated at 15 V. A load resistor of 15 Ω is connected across the output. If the maximum allowable inductor current ripple is 10% of the average inductor current, estimate the value of the inductance to be used in the buck-boost converter. (5)
- Q7 With neat circuit diagram and wave forms explain the working principle of resonant dc link inverter with zero voltage switching. (10)
- Q8 Write short notes on any two: (5 x 2)
- a) Single phase capacitor commutated CSI
 - b) Flying capacitor type multi level inverter
 - c) Forward converter
 - d) High frequency link integral half cycle converter