2007 COCHIN UNIVERSITY OF SCIENCE & TECHNOLOGY

B.TECH ELECTRONICS & AND COMMUNICATIONS ENGINEERING

INDUSTRIAL AND POWER ELECTRONICS

NOVEMBER 2007

TIME: 3 HOUR
MARK: 90

ANSWER ANY SIX QUESTION
ALL QUESTIONS CARRY EQUAL MARKS

MARK [6*15]

1 a. Draw and explain the V-I characteristics of an SCR. Also define Latching current and Holding current

b. What are the various methods to turn on an SCR. Also explain the turn off characteristics of an SCR

2 a. Draw the V_I characteristics of a TRIAC and explain its working in each of the four modes using appropriate structures

b. Explain various voltage ratings of Thyristors

3 a. Draw the circuit, waveforms and explain operation of a single phase full converter with RL with voltage source as load

b. Explain the function of a free-wheeling diode, showing how it is connected in a circuit

4 a. Draw the circuit of a 3 phase full wave rectifier with R load and explain its working with suitable waveforms

b. The speed of a seperately excited d.c. motor is to be controlled in either direction. Discuss a suitable thyristor control scheme

5 a. Explain with circuit diagrams and waveforms auxiliary commutation scheme for SCRs

b. Explain the working of a single phase parallel inverter. Bring out its salient features and limitations

6 a. With circuit diagram, describe the working of Jone's Chopper

b. Briefly explain the concept of slip-power recovery scheme in the speed control of induction motors

7 a. Explain the working of a buck-boost converter

b. A boost regulator has an input voltage of Vin=15V. The average output voltage is Vav=25V and average load current Iav=0.5A. If L=150 microH and C=200 microF Detemine i) duty cycle ii) ripple current in inductor iii) ripple voltage in capacitor. Assume switching frequency as 25 KHz.

8 a. Explain online and offline UPS with the help of block diagrams

b. Explain dv/dt and di/dt protection in thyristors

9 a. Give the principle and characteristics of induction heating

b. Explain with diagrams the various types of resistance welding

10 a.Explainthe principle and theory of dielectric heating

b. In non-destructive testing, discuss the use of ultrasonics