

[P.T.] B.E END SEMESTER EXAMINATION APRIL/MAY 2014
ELECTRICAL AND ELECTRONICS ENGINEERING BRANCH
(REG: 2002,2005,2009)
PTEE 9301/PTEE332/PTEE375 POWER ELECTRONICS

TIME:3 HRS

MARKS:100

PART A (10 X 2 = 20 MARKS)

1. Explain the need for circuit turn off time in converter circuits using SCR
2. Explain the operation of inherent free wheeling action in 1 phase semi converter.
3. What is meant by overlap angle in converter circuit?
4. For 1 phase full converter feeding RL load draw the load voltage and load current waveform for $\alpha = \pi/3$
- 5.

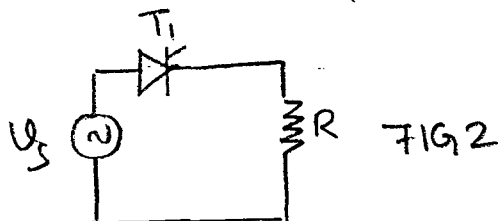


Explain the operation of converter to be used in Fig.1 and calculate the duty cycle

6. What is meant by variable frequency operation of choppers? What are its disadvantages?
7. Draw the circuit diagrams of 1 phase full bridge inverter and 1 phase half bridge inverter.
8. What is the purpose of feedback diodes in inverter circuits.?
9. Explain what is meant by phase angle control in single phase ac voltage controller.
10. What is meant by step up and step down cycloconverters compared to step up and step down choppers?

PART B (5 X 16 = 80 MARKS)

11.



- (i) For converter shown in Fig.2 derive the form factor. (8)
- (ii) Draw the load voltage waveform for 3 phase half wave rectifier feeding RL load for $\alpha = \pi/3$. Derive the expression for average voltage in terms of α . (8)

12.a.(i) Explain the principle of operation of MOSFET with switching characteristics (10)

(ii) Explain the advantages of using MOSFET in chopper circuits than SCR (6)
(OR)

12.b.(i) Prove that 1 phase full converter operates in 2 quadrants and 1 phase
semiconverter operates in 1 quadrant with waveforms. (16)

13.a. Explain the operation of buck converter with waveforms. Derive the
expression for designing the values of L and C in terms of ripple current and ripple
voltage respectively. (16)

(OR)

13.b. Derive the expression for current ripple in step down chopper feeding RLE
load. (16)

14.a. Explain the operation of 120° and 180° mode of conduction for 3 phase inverter
with waveforms. (16)

(OR)

14.b. Explain the different methods of voltage control in inverters. (16)

15.a. A single phase full wave ac voltage controller has a resistive load of $R = 10\Omega$
and input voltage is $V = 120V, 50Hz$. The delay angles of T_1 & T_2 are equal: $\alpha = \pi/3$.
Determine the rms output voltage and input power factor. (16)

(OR)

15.b. For 1 phase step down cycloconverter feeding inductive load draw the load
voltage and load current waveforms for both continuous and discontinuous current
conduction modes. (16)