TE/Insem./APR-29
T.E. (E & TC)
304186 : POWER ELECTRONICS
(2015 Course) (Semester - II)

Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates:

1) *Attempt Q.No. 1 or Q.No. 2 , Q.No. 3 or Q.No. 4, Q.No. 5 or Q.No. 6.*
2) *Neat diagram must be drawn wherever necessary.*
3) *Figures to the right indicate full marks.*

Q1) a) With the help of neat circuit diagram, explain the two transistor analogy of SCR with expression of anode current. **[6]**

b) Compare Power MOSFET with IGBT. **[4]**

OR

Q2) a) Explain different requirements of control circuits for SCR? Discuss in brief types of isolation. **[6]**

b) Define following terms with reference to SCR.

i) Holding Current

ii) dv/dt **[4]**

Q3) a) Describe the working of single phase fully controlled bridge converter with highly inductive load in the following modes.

i) Rectifying mode

ii) Inversion mode, Also sketch the output voltage waveforms for $\alpha=30°$ and $\alpha=150°$. **[6]**

b) Single phase semi-converter is operated from 120V, 50Hz, AC supply. The load resistance is $10'\Omega$. If the average output voltage is 25% of the maximum possible output voltage,

Determine

i) firing angle (α)

ii) Average output current **[4]**

OR

P.T.O.

Q4) a) Explain the operation of 3 phase half-controlled (Semi) bridge converter with resistive load with output voltage waveforms for α=0° α and α=30°. **[6]**

b) For three phase fully controlled converter operated from 3-phase, 415V, 50Hz supply with resistive load, determine the average output voltage for α=0° and α=30°. **[4]**

Q5) a) Draw and explain single phase full bridge inverter for R-L load with output voltage and current waveforms. Also draw the supply current waveforms. **[6]**

b) What is pulse width modulation? List the various PWM techniques. **[4]**

OR

Q6) a) With the help of neat circuit diagram and waveforms explain briefly the operation of IGBT based 3-phase bridge inverter with balanced star resistive load in 180° conduction mode. **[6]**

b) Compare 180° conduction mode and 120° conduction mode of the three phase inverter. **[4]**

■ ■ ■