Total No. of Questions : 6]

SEAT No. : ____

P531

[Total No. of Pages : 2

TE/Insem/APR-119
T.E. (E & Tc Engineering)
POWER ELECTRONICS
(2015 Pattern) (Semester - II)

Time :1 Hour] ***[Max. Marks : 30***

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6.***
2) ***Figures to the right indicate full marks.***

Q1) a) Explain following rating of SCR, **[6]**

i) Holding current
ii) Latching current
iii) V_{BO}
iv) V_{RRM}

b) Draw the V-I characteristics of IGBT. Mark & explain various operating regions & SOA of the IGBT. **[4]**

OR

Q2) a) Explain how the following devices can be operated as switch with necessary driving conditions. **[6]**

i) SCR
ii) IGBT

b) Draw & Explain switching characteristics of SCR. **[4]**

Q3) a) With the help of neat circuit diagram and waveforms, explain the operation of 1ϕ Full-converter for α = 30 *deg*. and α = 60 *deg*. with *R* load. **[5]**

b) Draw & Explain the single phase duel converter. Explain the 4 quadrant operation of duel converter. **[5]**

OR

Q4) a) Explain effect of source Inductance on the performance of 1Φ full converter. Derive the expression for average output voltage? **[4]**

b) In a single phase semi converter with highly inductive load is feed from 120*V* RMS ac mains & fired at α = 90 *deg*., Calculate **[6]**

i) Average Load voltage
ii) RMS Load Voltage
iii) Displacement factor

P.T.O.

Q5) a) With the help of neat circuit diagram and waveforms, explain the working of single phase bridge inverter for R load. Derive the expression for RMS output voltage. **[6]**

b) Explain Single pulse PWM & Sinusoidal PWM control technique for 1ϕ inverter. **[4]**

OR

Q6) a) With the help of neat circuit diagram and waveform explain the working of 3ϕ voltage source inverter R load with 120° conduction mode. **[6]**

b) With the Fourier expression, explain what are the harmonics presents in the output of single phase 50 Hz square wave inverter with R-L Load? Calculate RMS value 1^{st}, 3^{rd}, and 5^{th} harmonic if the dc supply is 48 Volts? **[4]**