TE | IT | ETRX | CBGS | PE-I | 30/05/18

Sub:- Power Electronics-I

Q.P. Code: 24171

[Total Marks: 80]

(3 Hours)

NB: 1) Question No. 1 is compulsory.
2) Attempt any 3 questions out of remaining questions.
3) Figures on the right hand side indicate full marks.
4) Assume Suitable data if necessary

Q1 Answer any **four**

a) Explain different commutation techniques for SCR. Draw current commutation circuit **20**
b) Draw and explain gate characteristics.
c) What is the need of freewheeling diode in rectifiers? Explain with suitable diagrams.
d) Explain Type B DC-DC converter.
e) Explain why harmonic neutralization is necessary in the output of inverter.

Q2 a) Draw and explain single phase fully controlled converter with RL load .Draw load current, Load voltage, input voltage and gating signal for $\alpha = 60^0$ **10**

b) Explain the working of three phase bridge inverter in 120^0 conduction mode with circuit diagram and waveforms. **10**

Q3 a) Draw and Explain dynamic characteristics of thyristor. **10**

b) Explain working principle of 1 Φ cyclo converter with circuit diagram and waveforms. **10**

Q4 a) A single phase fully controlled converter is operated from 230V, 50 Hz ac supply. The load resistance is 10 Ω. The average output voltage is 10% of max possible average output voltage **10**

Calculate- i) Firing angle
ii) RMS and Average output current
iii) Efficiency

b) Draw and explain the working of 3Φ fully controlled rectifier with neat circuit diagram and waveforms. **10**

Q5 a) Draw and explain AC voltage control circuit using DIAC and TRIAC. Draw the waveforms with $\alpha = 60^0$. **10**

b) Draw and explain Buck converter with waveforms. Also derive the expression for output voltage. **10**

[PTO...

Q6 Write short notes on (Any **Four**) 20

a) Compare IGBT, MOSFET.

b) Protection circuits for SCR.

c) Driver circuits for power transistors.

d) Various PWM techniques.

e) Ramp and Pedestal control triggering.
