

Total No. of Questions : 8]

SEAT No. :

P2956

[Total No. of Pages : 2

[5669]-546

T.E. (E & TC)

POWER ELECTRONICS (Semester - II)

(2015 Pattern)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6 and Q.7 or Q.8.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right side indicate full marks.
- 4) Assume Suitable data if necessary.
- 5) Use of Calculator is allowed.

- Q1)** a) Draw the dynamic characteristics of SCR and explain the turn on & turn off process of SCR in detail? [7]
- b) With the help of neat circuit diagram & waveforms explain the operation of 3- ϕ semi converter for R-load with $\alpha = 60^\circ$. [7]
- c) List out the different voltage control techniques used in inverters? Explain any one in detail? [6]

OR

- Q2)** a) Draw & explain steady state characteristics of power MOSFET? [6]
- b) Explain the operation of symmetric 1- ϕ semi converter with continuous load current. Draw the waveforms and state the eqn for average o/p voltage. [7]
- c) Explain 1- ϕ full bridge inverter for RL load using MOSFET Draw necessary ckt dig & waveforms. [7]

- Q3)** a) Draw & explain step down chopper for R-load with circuit dig. & waveforms. Derive expression for avg o/p voltage? [8]
- b) Derive the expression for average o/p voltage of step up chopper. A step up chopper has i/p voltage of 220v & o/p voltage of 660v. if the non conducting time is 100 μ sec. Calculate pulse width of o/p voltage. Also find the new o/p voltage if pulse width is half for constant frequency operation [8]

OR

P.T.O.

- Q4) a)** With the help of circuit dig & waveforms. Explain the operation of 1- ϕ full wave Ac voltage controller with R-load? Derive the expression for rms o/p voltage? [8]
- b) Derive the expression for average o/p voltage of step down chopper. If DC chopper has resistive load of $R = 10\Omega$ and the i/p DC voltage is 300v. When the chopper switch remains on its voltage drop is 2v and the chopping freq is 1kHz. If duty cycle is 40% determine. [8]
- Average o/p voltage
 - rms o/p voltage
 - Form factor
 - Ripple factor

- Q5) a)** What is meant by electromagnetic interference? Explain it's sources and different minimization techniques in detail? [10]
- b) Explain the over voltage protection ckt using selenium diode & Mov to protect the power devices in detail? [8]

OR

- Q6) a)** What is Resonant converters? Explain the concept of ZCS and ZVS using ckt dig. & waveforms [10]
- b) What are the different cooling methods used for protection of power devices? Explain in detail. [8]

- Q7) a)** With the help of block dig explain the operation of electronic ballast in detail? [8]
- b) What is online? Offline ups? Explain block diagram and applications? [8]

OR

- Q8) a)** With the help of neat ckt dig. explain the operation of fan Regulator ckt using TRIAC. [8]
- b) A ups is driving a 600 kl load which has a lagging p.f. of 0.8. The efficiency of the inverter is 80%. The battery voltage is 24v DC. Assume that there is a seperate charger for the battery. Determine [8]
- KVA rating of the inverter
 - Watlage of Rectifier
 - A.H. rating of battery for backup time of 30 min.

