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 $\alpha = 60^{o}$. **[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 contineous 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 = 10Ω 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]**

i) Average o/p voltage

ii) rms o/p voltage

iii) Form factor

iv) Ripple factor

Q5) a) What is meant by electromagnetic interferance? 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]**

i) KVA rating of the inverter

ii) Watlage of Rectifier

iii) A.H. rating of battery for backup time of 30 min.

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