Total No. of Questions : 8]

SEAT No. :

P3510

[Total No. of Pages : 2

[5560]-160
T.E. (E&TC Engineering)
POWER ELECTRONICS
(2012 Pattern) (Semester - II)

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, Q.7 or Q.8.***
2) ***Neat diagrams and waveforms must be drawn wherever necessary.***
3) ***Use of non-programmable calculator is allowed.***
4) ***Assume suitable data if necessary.***

Q1) a) Draw the steady-state characteristic of SCR and explain all regions. **[6]**

b) Draw the circuit diagram of single phase Full converter with R load. Explain the circuit operation with neat equivalent circuit diagrams. Sketch the neat waveform for output voltage at firing angle 90º. **[7]**

c) Draw the circuit diagram of single phase Full Bridge Inverter with R load. Explain the circuit operation with neat equivalent diagrams. Also, sketch the waveform for output voltage. **[7]**

OR

Q2) a) Draw the circuit diagram of synchronized UJT triggering circuit for SCR. Sketch the waveforms of voltage across zener, capacitor and base voltage. Show firing angle α in waveforms. **[6]**

b) Draw and explain 3ϕ semi-converter with R load. Draw the output voltage waveform. **[7]**

c) Draw the circuit diagram of 3ϕ inverter with balanced star R load with 180º conduction mode. Explain the operation. **[7]**

Q3) a) Draw the circuit diagram of stepdown chopper. Explain the operation with neat waveforms for i/p and o/p voltages. **[6]**

b) A DC chopper is operated with resistive load R = 10Ω, input voltage V_S = 230V, Determine the average and rms output voltage with duty cycle 50%. **[4]**

c) Draw the circuit diagram of two quadrant chopper and explain the operation with neat equivalent diagram. **[8]**

OR

P.T.O.

Q4) a) Draw the circuit diagram of single-phase Full Wave AC voltage controller with R load. Explain its operation with neat waveform of output voltage at $\alpha = 90^{o}$. **[6]**

b) A step up chopper is operated with R load. R = 10Ω, input voltage V_S = 100 V. Determine the average and rms output voltage when duty cycle is 50%. **[4]**

c) Draw and explain DC step-up chopper. Sketch the waveform for output voltage. **[8]**

Q5) a) Draw and explain on-line and off-line UPS system. **[8]**

b) Write a short note on any two : **[8]**

i) Battery charger.

ii) HVDC.

iii) Stepper motor control.

iv) Induction motor speed control.

OR

Q6) a) Draw and explain 1ϕ separately excited DC motor speed control circuits. **[8]**

b) Write a short note on any two : **[8]**

i) HVAC.

ii) Circuit breaker.

iii) UPS system specifications.

Q7) a) Draw and explain ZCS resonant converter with neat waveforms and equivalent diagrams. **[10]**

b) What is EMI? List sources of EMI and explain its reduction techniques. **[6]**

OR

Q8) a) Explain over voltage and over current protection circuits. **[8]**

b) Draw and explain SLR with neat equivalent diagrams and waveforms. **[8]**