Total No. of Questions : 8] **SEAT No. :**

P3512 **[Total No. of Pages : 2**

[4858]-1048
T.E. (E & TC) (Semester - II)
POWER ELECTRONICS
(2012 Pattern) (End Sem.)

Time : 2½ Hours] ***[Max. Marks : 70***

Instructions to the candidates:

1) ***Neat diagrams must be drawn wherever necessary.***
2) ***Figures to the right indicate full marks.***
3) ***Your answers will be valued as a whole.***
4) ***Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***
5) ***Assume suitable data, if necessary.***

Q1) a) What are phase controlled converter? Explain with circuit diagram working of 1ϕ Half controlled converter with suitable load. Draw suitable waveforms & comment on p.f. **[7]**

b) What is inverter? Explain with diagram 3ϕ voltage controlled inverter with star load (R). Comment on waveforms & Duty cycle. **[7]**

c) What is IGBT? Explain with characteristics. **[6]**

OR

Q2) a) What is the need of dual converters in the industries? Explain with diagram & waveforms, working of 1ϕ dual converter with highly inductive load.**[7]**

b) Explain with circuit diagram & waveforms working of 1ϕ Full controlled converter with RL load? Justify what is Inversion & Rectification mode with waveforms. **[7]**

c) What is bridge Inverter? Explain with circuit diagram & waveforms. **[6]**

Q3) a) What are DC-to-DC converters? Explain with circuit diagram & waveforms working of 4 Quadrant chopper? State its applications. **[9]**

b) What is AC to AC controller? Explain with circuit diagram working of 1ϕ AC full wave AC to AC controller with balanced star Load (R) **[9]**

OR

P.T.O.

Q4) a) i) What is chopper? Explain in brief.

ii) A DC chopper has a resistance of 10Ω & input voltage is 220V. When the chopper switch remains ON its voltage drops to 2V. & chopping frequency is 1KHz. If the Duty cycle is 50% Determine,

1) Average o/p volt
2) Rms o/p voltage
3) Chopper freq
4) Input resistance of chopper **[10]**

b) Explain with circuit diagram & waveforms working of triac based AC power controller ckt. Comment on p.f. Justify why SCR based controllers are prefered over triac based controllers. **[8]**

Q5) a) Explain with block schematic working of off-line UPS. State its specifications & applications. **[8]**

b) What are speed control techniques of DC Motors? Explain with circuit diagram working of 1ϕ seperately Excited DC Motor with Inductive Load. Comment on p.f. **[8]**

OR

Q6) a) Compare ON-Line UPS with Off-Line UPS. Justify why ON-Line is better than Off-Line with technical reasons. **[8]**

b) Write short notes on : **[8]**

i) Battery charger
ii) Electronic Ballast

Q7) a) What are resonant converters? Explain with circuit diagram & waveform working of ZVS? **[8]**

b) A Snubber circuit is used in SCR circuit for protection of di/dt, dv/dt. The value of RLC being 4Ω, 6μH, & 6μF respectively & Supply being 400V. Find the maximum permissible value of dv/dt. Assume the load resistance to be 10Ω. **[8]**

OR

Q8) a) Compare Linear, switched mode & Resonant converter based power supplies. **[6]**

b) Write short notes on : **[10]**

i) HVDC
ii) Induction Heating
iii) Protection circuits