

Total No. of Questions : 8]

SEAT No. :

P3512

[4858]-1048

[Total No. of Pages : 2

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 1 ϕ Half controlled converter with suitable load. Draw suitable waveforms & comment on p.f. [7]
- b) What is inverter? Explain with diagram 3 ϕ 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 1 ϕ dual converter with highly inductive load. [7]
- b) Explain with circuit diagram & waveforms working of 1 ϕ 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 1 ϕ 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 preferred 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 separately 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 , $6\mu\text{H}$, & $6\mu\text{F}$ 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

