

Total No. of Questions : 8]

P5104

SEAT No. :

[Total No. of Pages : 2

[4958]-1048A
T.E. (E & TC)
POWER ELECTRONICS
(2012 Pattern)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:-

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*

- Q1)** a) What are power devices? Explain with characteristics any one power device used for power control applications. [4]
- b) What are phase controlled converters? Explain with circuit diagram & waveforms working of 1ϕ full controlled converter with suitable load. Comment on rectification, inversion mode & power factor. [10]
- c) What is the need of triggering circuits? Explain in brief UJT triggering circuit for SCR. [6]

OR

- Q2)** a) What are DC to AC converters? Explain with circuit diagram & waveforms working 3ϕ voltage source Inverter operating in 180° mode. Comment on duty cycle & power factor. [8]
- b) Explain in brief difference between converter grade SCRS & inverter grade SCRS. [4]
- c) A single phase full controlled converter is fed from 230v, 50Hz supply. The load is highly inductive find the average load voltage & current if the load resistance is 10Ω & firing angle $\alpha = 45^\circ$. [8]

- Q3)** a) What are DC to DC converters explain with diagram working of 4 Quadrant chopper comment on power factor. [8]
- b) Explain with circuit diagram & waveforms working of SCR based 1ϕ AC full wave power controller circuit. [8]

OR

- Q4)** a) What is Triac? Explain with circuit diagram & waveform & how AC. power is controlled with triac Justify why some times SCR's are preferred over triacs for low power applications. [8]
- b) A DC chopper operates on 230v DC & frequency of 400Hz; feeds an RL load. Determine the on - time of chopper for o/p of 150V. [8]

P.T.O.

- Q5) a)** What is the need of uninterruptable power supplies in industries? Explain with block diagram working of On-line UPS state its specifications. [8]
- b)** What are DC drives? Explain with circuit diagram. Working of 1 ϕ seperately excited DC Motor with inductive load. Suggest power factor improvement techniques. [8]

OR

- Q6) a)** What are AC drives? Explain with block diagram, speed control technique of 3 ϕ Inductor motor by using $\frac{V}{F}$ method. [8]
- b)** Write short notes on any two
- i) HVDC
 - ii) Battery charger
 - iii) PWM techniques
 - iv) Stepper Motors. [8]

- Q7) a)** What are resonant converters? Explain with circuit diagram & waveforms working of ZVS resonant converters. [10]
- b)** Compare linear, switched Mode & Resonant based power supplies. [8]

OR

- Q8) a)** What is SLR? Explain with circuit diagram & waveforms above resonant converter comment on Pf. [9]
- b)** Explain dv/dt ; di/dt with details & snubber circuit. [9]

