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 $180^o$ 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 $\alpha = 45^o$. **[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 prefered 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$\phi$ 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$\phi$ 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]**