Nov- Dec - 2012

Total No. of Questions : 12]

SEAT No. :

P772

[Total No. of Pages : 3

[4263] - 254
T.E. (Electrical)
POWER ELECTRONICS
(2008 Pattern) (Sem. - I)

Time :3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answer any three questions from each section.***
2) ***Answers to the two sections should be written in separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Draw gate drive circuit of GTO. Explain switching characteristics of GTO & compair with SCR. **[9]**

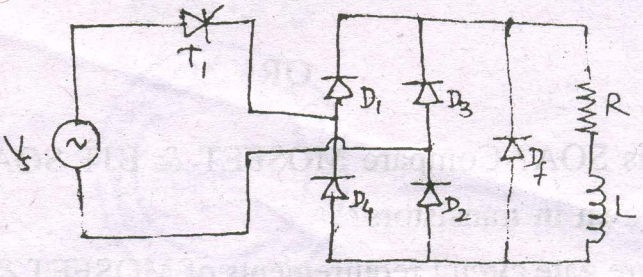
b) Explain various techniques adopted for protection of SCR. **[9]**

OR

Q2) a) Draw & explain gate characteristics of SCR. How the gate voltage & gate current can be determined. **[9]**

b) Draw & explain switching characteristics of SCR. **[9]**

Q3) a) Draw the output voltage waveforms for following circuit. State whether it is full wave or half wave & controlled or uncontrolled. Show the devices conducting on w/f. **[8]**



Que. 3a

P.T.O.

b) Why generally transistor family devices are not used in converter. Explain three phase fully controlled converter with necessary circuit & w/fs. [2 + 6 = 8]

OR

Q4) a) Explain single phase fully controlled converter. [8]

b) Explain single phase dual converter with circulating current mode. State the disadvantages of circulating current & their compensation. Draw w/fs for $\alpha_1 = 60°$. [8]

Q5) a) Explain single phase single step ac voltage regulator feeding RL load with necessary circuit & w/fs. [8]

b) Explain four modes of operation of TR/AC. [8]

OR

Q6) a) Explain with necessary circuit & w/fs single phase three stage ac voltage regulator. [8]

b) Explain three phase two stage ac voltage regulator. [8]

SECTION - II

Q7) a) Explain construction details of IGBT & explain switching characteristics. [8]

b) Explain following with respect to MOSFET [8]

i) Pinch off voltage.

ii) Transconductance.

iii) Threshold voltage.

iv) Turn on & turn off chara.

OR

Q8) a) What is SOA? Compare MOSFET & BJT SOA. What is secondary breakdown in transistors? [8]

b) What are gate circuit requirements of MOSFET & IGBT? Compare. [8]

Q9) a) Explain working of type C chopper with neat diagram & output voltage & current waveforms for motor load. **[8]**

b) A step down chopper is feeding RL load with R = 2Ω & L = 5mH from supply of 220V with switching freq. of 500 Hz at 30% duty. Calculate minimum and maximum load current and % ripple current. **[8]**

OR

Q10) a) Explain type A chopper circuit. Explain if it can be suitable for operating a separately excited dc motor below rated speed? **[8]**

b) What are control strategies used in chopper circuits? Compare. **[8]**

Q11) a) Draw neat circuit dia. & explain working of 1 phase full bridge inverter for generating quasi square wave output. Show output voltage and current waveforms for inductive load. **[10]**

b) Explain why : **[8]**

i) Transistorised inverters are preferred over thyristorised inverters.

ii) Antiparallel diodes are used across switching devices in inverter circuits feeding inductive loads.

OR

*Q12)*a) How output voltage magnitude and frequency can be controlled in a sinusoidal PWM inverter? How harmonics in output are controlled? **[9]**

b) What are controlling modes in case of 3 phase stepped voltage inverters? Explain any one in detail. Draw phase & line voltage waveforms. **[9]**

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