

Total Pages—5

Set-22(I)

B.Tech-5th(EE)
Power Electronics

Full Marks : 50

Time : $2\frac{1}{2}$ hours

Answer all questions

The figures in the right-hand margin indicate marks

Symbols carry usual meaning

Any supplementary materials to be provided

1. Answer all questions :

2 × 5

- (a) Give construction details of a thyristor.**
- (b) What are different control strategies of a DC chopper ?**
- (c) Give classification of choppers.**
- (d) Write difference between SMPS and linear regulator.**

(Turn Over)

(2)

(e) Draw circuit diagram of three phase voltage source bridge types of Inverter .

2. (a) What are different turn on methods of a thyristor ? 4

(b) What do you mean by di/dt protection and dv/dt protection of a thyristor ? 4

Or

(a) What are different thyristor rating ? Give its significance. 4

(b) A thyristor operating from a peak supply voltage of 400 V has the following specifications.

Repetitive current $I_p = 200$ A, $(di/dt)_{max} = 50$ A/microsecond, $(dv/dt)_{max} = 200$ V/microsecond.

Choosing a factor of safety 2 for I_p , $(di/dt)_{max}$ and $(dv/dt)_{max}$, design a suitable snubber circuit. The minimum value of load resistance is 10 ohm. 4

(3)

3. (a) Explain the converter mode of operation of a single phase full rectifier bridge with RLE load. 4

(b) What is the effect of source inductance on a single phase full converter ? 4

Or

(a) Explain the inverter mode of operation of a single phase full rectifier bridge with RLE load. 4

(b) A three phase full converter charges a battery from a 3-phase. 4

4. (a) Explain the operation of a step down chopper with relevant diagram and waveform. 4

(b) A step down ^{step} chopper has input voltage of 220 V and output voltage of 600 V. If the non-conducting time of thyristor chopper is 100 microsecond, compute the pulse width of output voltage. In case of pulse width is

(4)

halved for constant frequency operation,
find the new output voltage.

4

6.

Or

(a) Explain the operation of a step up chopper
with relevant diagram and waveform.

4

(b) Explain four quadrant operation of chopper.

4

5. (a) Explain the basic scheme of switch mode
power supplies.

4

(b) Enlist major advantage of SMPS over linear
supplies.

4

Or

(a) Give circuit of series dc-dc regulation.
Describe how it works .

4

(b) Give 4 IC regulator of positive voltage
regulator & 4 IC regulator negative voltage
regulator.

4

ALL MARKS: 20

BRANCH NAME: ELECT
SUBJECT NAME: Power

(5)

6. (a) Explain the operation of half bridge inverter. 4

(b) Explain the operation of three phase voltage source bridge type of inverter with 120° conduction mode. 4

Or

(a) Write short notes Uninterrupted Power Supply (UPS). 4

(b) Write short notes on Induction Heating. 4