6E6074

B.Tech. VI Semester (Main/Back) Examination, May-June 2015
Electrical & Electronics Engineering
6EE4A Advanced power Electronics
Common for EE,EX

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 24

Instructions to Candidates:

*Attempt any **five** questions, selecting **one** question from **each unit**. All questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) Explain on - off control and phase angle control of $1-\phi$ Ac voltage controller. with R-Load. (8)

   b) A single phase Ac voltage controller has resistive load of 10Ω input voltage

   $V_s = 120v$, 60Hz the delay angle of thyrister T_1 is $\alpha = \frac{\pi}{2}$ determine.

   i) RMS value of output voltage.

   ii) Input power factor. (4+4)

OR

1. Explain the three phase full wave controller with star connected resistive load also draw wave forms. (16)

Unit - II

2. a) Describe 3 - phase to three phase cycloconverter with relevant circuit using 18 SCRs and 36 SCRs. (10)

b) What are the advantage of $3-\phi$ bridge circuit cycloconverter over 18 - thyrister device. **(6)**

OR

2. a) Describe the basic working principle of single phase to single phase step down cycloconverter continuous conduction for bridge type cycloconverter. **(8)**

b) Show that the fundamental RMS value of per phase output voltage of low frequency for an M - pulse converter is given by . $V_{or} = V_{pn}\left(\dfrac{M}{\pi}\right)\sin\left(\dfrac{\pi}{M}\right)$. **(8)**

Unit - III

3. a) A single phase full bridge inverter inconnected to a dc source of V_s. resolve the o/p voltage wave shape into fourier series. **(8)**

b) Explain working principle of three phase bridge inverter with 180^0 degree of conduction. **(8)**

OR

3. a) What is pulse width modulation? List the various PWM techniques, How do these differ from each other. **(8)**

b) For a single pulse modulation used in inverters show that output voltage can be expressed as $V_o = \displaystyle\sum_{n=1,3,5} \dfrac{4Vs}{n\pi}\sin\left(\dfrac{n\pi}{2}\right)\sin nd \sin(nwt)$, where 2d is pulse width. **(8)**

Unit - IV

4. a) Explain working of L - type ZCS resonant converter. **(8)**

b) The 2cs resonant converter deliner maximum power of w/P_L = 400mw at V_0 = 4v the supply voltage V_s = 12v. The maximum operating frequency 50Hz. Determine the value of L and C assume t_1 and t_3 are very small and x = 1.5. **(8)**

OR

4. a) Write down short note on ZVS resonant converter. **(10)**

b) Write down the advantages and Limitations of ZVS. **(6)**

Unit - V

5. a) Explain the control circuit of current mode control and voltage mode control. (8)

   b) write down short note on multistage conversion. (8)

OR

5. a) What is the switched mode Dc power supplies. Explain working principle of flyback converter. (8)

   b) Explain the operation of full bridge converter. (8)