

6E6074

Roll No. _____

[Total No. of Pages : 3]

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B.Tech. VI Semester (Main/Back) Examination, April/May - 2017

Electrical & Electronics Engg.
6EX4A Advanced Power Electronics

EE,EX

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 26**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 suitable be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.

Unit - I

1. a) Explain the operation of single phase AC voltage controller with R load. What changes will takeplace in output voltage? (8)
- b) Analyse the output waveform of a single phase a.c. regulator (Converter) into various harmonics with fourier series and find the expression for the magnitude of n^{th} harmonic, E_{nm} and its phase ϕ_n . (8)

OR

1. a) What are the steps involved in determining the output voltage waveforms of three phase bidirectional controllers. (8)
- b) What is the control range of the delay angle for single phase unidirectional controller. (8)

Unit - II

2. a) Draw and explain the control circuit block diagram for a cycloconverter with non circulating current. (8)
- b) What is a load commutated cycloconverter? How does it differ from line commutated cycloconverter? (8)

OR

2. a) Discuss why a 3ϕ to 1ϕ cycloconverter requires positive and negative group phase controlled converters. Under what conditions, the group works as inverter or rectifier. (8)
- b) What are the advantages and disadvantages of a cycloconverter? (8)

Unit - III

3. a) Explain 120° mode of operation of V.S.I. Compare V.S.I. and C.S.I. with respect to their merits and demerits. (8)
- b) Discuss the method of harmonic reduction in inverters by PWM. (8)

OR

3. a) What is the need for controlling the output at the output terminals of an inverter? Also, Discuss briefly and compare the various methods employed for the control of output voltage of inverters. (8)
- b) A 3ϕ bridge inverter is operated in 180° conduction mode. Draw the output line voltage waveform and obtain fourier series for the line voltage. (8)

Unit - IV

4. a) What are the advantages and disadvantages of resonant inverters with bidirectional switches. (8)
- b) What are the methods for voltage control of series resonant inverters. (8)

OR

4. a) What is class E resonant inverter. (8)
- b) What are the advantages and limitations of zcs and zvs converters. (8)

Unit - V

5. a) Discuss the comparative analysis of flyback and forward converter in detail. (8)
- b) What is conditioning of power factor? Discuss multistage converter used for conditioning of power factor. (8)

OR

5. a) What are the elements of SMPS ? Discuss its advantages and disadvantages. (8)
- b) Discuss the operation of bidirectional AC power supplies. (8)

