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INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

M.Tech II Semester End Examinations (Supplementary) - January, 2018

Regulation: IARE-R16

DC TO AC CONVERTERS

(Power Electronics and Electrical Drives)

Time: 3 Hours

Max Marks: 70

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the question must be answered in one place only

UNIT – I

- What are the commonly used modulation techniques for controlling the voltage of single phase inverter? Explain principle of operation of any one of them. [7M]
 - Discuss the effect of over-modulation on the performance of sinusoidal PWM controlled three phase inverters. [7M]
- How is staircase modulation different from stepped modulation? Explain briefly. [7M]
 - With relevant diagrams, discuss the operation of a boost inverter. [7M]

UNIT – II

- Briefly explain the different types of zero current switching resonant converters. [7M]
 - Discuss the operation of quasi-resonant inverters. [7M]
- Write short notes on resonance dc link inverters. [7M]
 - A series resonance inverter with series load delivers a load power of 1kW at resonance. The load resistance is 10ohm. The resonant frequency is 20kHz. Determine [7M]
 - the dc input voltage,
 - the quality factor, if it is required to reduce the load power to 250W by frequency control so that $u=0.8$,
 - the inductance value, and
 - the capacitance value.

UNIT – III

- Explain how a multilevel converter can be used for reactive power compensation. [7M]
 - List the general features of multilevel converters. [7M]
- Explain how multilevel converters connected back-to-back can be used to connect two asynchronous systems. [7M]
 - Compare the different configurations of different multilevel converters. [7M]

UNIT – IV

7. (a) Discuss the operation of forward converters. Also mention the use of reset winding in forward converters. [7M]
- (b) Write short notes on bidirectional power supplies. [7M]
8. (a) The average output voltage of the push-pull converter with a resistive load of 0.8Ω is 24V. The on-state voltage drop of the transistors and diodes in the circuit is 1.2V and 0.7V respectively. The turns ratio of the push-pull transformer is 0.25 (i.e. N_s/N_p). Find, the average input current, average transistor current, peak transistor current and rms transistor current. [7M]
- (b) Explain the operation of a flyback converter with neat diagrams. [7M]

UNIT – V

9. (a) With relevance to ac power supply control circuits, write short notes on voltage mode control and current mode control. [7M]
- (b) What are the different types of power line disturbances? Briefly explain about them. [7M]
10. (a) Write short notes on the effect of power line disturbances on sensitive equipment. [7M]
- (b) Draw the generalized block diagram of an uninterruptible power supply and explain the function of each block. [7M]

