

R16

Code No: 137EV

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech IV Year I Semester Examinations, July/August - 2023

MODERN POWER ELECTRONICS

(Electrical and Electronics Engineering)

Time: 3 Hours

Max. Marks: 75

Note: i) Question paper consists of Part A, Part B.

ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.

iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A

(25 Marks)

- 1.a) What are the different methods to turn on the thyristor? [2]
- b) What is the basis for selection of power semiconductor device for a particular application? [3]
- c) Define Modulation Index. [2]
- d) What is meant by PWM control? [3]
- e) What is a multilevel inverter? [2]
- f) Why higher levels are not possible with diode clamped multilevel inverters? [3]
- g) What is a switching mode regulator? [2]
- h) What are the advantages of Buck converter? [3]
- i) Define Power Quality. [2]
- j) What are Power line disturbances? [3]

PART – B

(50 Marks)

- 2.a) Explain the construction, operation and switching characteristics of IGBT.
- b) Enumerate the main Causes of Voltage Unbalance. [5+5]

OR

3. Explain the working of GTOs with typical GTO turn on and turn-off pulses. Also, state its advantages and disadvantages. [10]

- 4.a) What are space vectors? Explain in brief.
- b) State and describe Even-Order Harmonic Elimination in cascaded H bridge multilevel inverter. [5+5]

OR

5. Explain with relevant mathematical expressions, what is space vector modulation? Also, give its advantages and disadvantages. [10]

6. How would you describe the Relationship between V_{ref} Location and Dwell Times in Diode clamped multilevel inverter? [10]

OR

7. Explain the feedback control of neutral point voltage in diode clamped multilevel inverter. [10]

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8. Discuss the operation of Cuk converter with a circuit diagram, equivalent circuits and waveforms. [10]

OR

9. Discuss dc-dc converters with electrical isolation. [10]

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10. Give the classification of resonant converters. Analyze the basic resonant converter circuit. [10]

OR

11. Explain the working of ZVS resonant converter with equivalent circuits and relevant waveforms and also state advantages and disadvantages. [10]

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