

W 2684

M.E. DEGREE EXAMINATION, JANUARY 2007.

First Semester

Power Electronics and Drives

PE 1604 — ANALYSIS OF INVERTERS

(Regulation 2005)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What type of commutation is used in Mc. Murray Bed Ford inverter?
2. What is the simplest method of eliminating 3rd harmonic in a three phase square wave inverter?
3. Why energy flows from load to source for a fraction of the period in a single phase bridge inverter with an RL load?
4. What are the advantages of transistorised inverter over thyristor inverter?
5. What is meant by auto sequential commutation?
6. What are the applications of load commutated inverters?
7. What is the basic concept of multilevel inverters?
8. What is a diode clamped multilevel inverter?
9. What is the dead zone of a resonant inverter?
10. What is an overlap control of resonant inverters?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain with the help of waveforms the operation of a single phase full bridge inverter. (8)
- (ii) Explain how the commutation of the main thyristor is achieved in Mc Murray bridge inverter. (8)

Or

- (b) (i) Discuss the different techniques adopted to eliminate harmonics generated by inverter circuits. (8)
- (ii) With necessary circuit diagram explain the principle of forced commutation in inverters. (8)

12. (a) (i) Compare 180° and 120° conduction mode of operation of inverters. (5)
- (ii) Discuss the merits of pwm inverter over variable dc link inverter. (5)
- (iii) Compare and contrast the features of square wave and sine wave pwms. (6)

Or

- (b) Explain the voltage control of a three phase VSI is achieved
- (i) by controlling the dc link voltage
- (ii) by using multiple inverters and
- (iii) by using pulse width modulation. (16)
13. (a) (i) Explain the operation of a Six step current source inverter with neat wave forms. (10)
- (ii) List out the merits of an Load commutated inverter over a conventional six step inverter. (6)

Or

- (b) Describe the operation of auto sequentially commutated current source inverter with RL Load. Write appropriate expressions governing its performance. Also mention the sequence of operations. (16)
14. (a) (i) Explain the operation of flying capacitor multilevel inverter. (10)
- (ii) Discuss the advantages and disadvantages of a flying capacitor multilevel inverter. (6)

Or

- (b) (i) Describe the operation of a cascaded multilevel inverter? (10)
- (ii) Compare and contrast the different types of multilevel inverters. (6)
15. (a) (i) Explain the operation of parallel resonant inverter. (8)
- (ii) Describe the operation of class E inverter with neat waveforms. (8)

Or

- (b) (i) Explain the methods for voltage control of series resonant inverters. (8)
- (ii) Explain the operation of resonant Dc link inverters. (8)