Reg. No. : | | | | | | | | | | |

Question Paper Code: 41254

M.E. DEGREE EXAMINATION, DECEMBER 2014.

First Semester

Power Electronics and Drives

14PPE103 – ANALYSIS OF INVERTERS

(Regulation 2014)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions.

PART A - (5 x 1 = 5 Marks)

1. A single phase full bridge inverter can operate in load commutation mode, in case load consist of
   (a) RL (b) RLC overdamped (c) RLC underdamped (d) RLC critically damped

2. In three phase 180 degree mode bridge inverter, the lowest order harmonic in the line to neutral output voltage(fundamental frequency output=50 Hz) is
   (a) 100 Hz (b) 150 Hz (c) 200 Hz (d) 250 Hz

3. In a CSI, if frequency of output voltage is f Hz, then frequency of the voltage input to CSI is
   (a) f (b) 2f (c) f/2 (d) 3f

4. The number of output phase voltages in cascaded inverter is defined by
   (a) m=2s (b) m=2s-1 (c) m=2s+1 (d) m=s+2

5. In a series resonant inverter
   (a) The load current has square waveform
   (b) Trigger frequency is higher than damped resonant frequency
   (c) Change of frequency does not alter transferred power
   (d) Output voltage depends upon damping factor of the load

PART - B (5 x 3 = 15 Marks)

6. Name the various PWM techniques employed in Single Phase Inverters.
7. Draw the gating signals and voltage waveforms for 120 degree Conduction Mode.
8. List the advantages and disadvantages of ASCI.
9. How selective Harmonic elimination is achieved in Multilevel Inverters?
10. What are resonant Converters? List their merits over Switched Converters.

PART - C (5 x 16 = 80 Marks)

11. (a) Explain the voltage control of single phase inverter using various PWM techniques with necessary diagram and waveforms. (16)

Or

(b) A single phase bridge inverter has a resistive load R=2.4 ohm and the DC input voltage of 48V.Determine (a) RMS output voltage at fundamental frequency (b) Output Power (c) Iav and Im of each transistor (d) Peak reverse blocking voltage of each transistor (e) DF and HF at LOH (16)

12. (a) With neat circuit diagram and waveforms, explain the 180 degree conduction mode operation of three phase inverter with star and delta connection (16)

Or

(b) Write explanatory notes on the following:

(i) Modified sinusoidal PWM (8)

(ii) Comparison of various PWM techniques (8)

13. (a) Describe elaborately the Auto sequential commutated CSI with relevant mode diagram and Waveforms (16)

Or

(b) Derive and explain the six step current source inverter with Inductive Load and Waveforms (16)

14. (a) (i) With neat diagram explain the operation of Diode Clamped Multilevel Inverter. (12)

(ii) List down the merits and demerits of cascaded multilevel inverter. (4)

Or

(b) With neat diagram, describe the operation of DC link capacitor voltage balancing. Also mention its merits and demerits. (16)

15. (a) Explain the methods of voltage control in series resonant inverters? Explain any one method in detail. (16)

Or

(b) Describe the operation of Class E resonant inverter with neat circuit diagram and waveforms. (16)