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# Question Paper Code: 11187

# M.E./M.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Second Semester

Power Electronics and Drives

### PX 5201 — ANALYSIS AND DESIGN OF INVERTERS

(Regulation 2017)

Time: Three hours

Maximum: 100 marks

## Answer ALL questions.

## PART A — $(10 \times 2 = 20 \text{ marks})$

- 1. Write the different methods of voltage control of a single phase inverter?
- 2. Define harmonic factor.
- 3. What are the methods of voltage control of a three phase inverter with improved performance?
- 4. Define triangular factor.
- 5. Why diodes should be connected in anti-parallel with the thyristor in an inverter circuits?
- 6. Compare CSI and VSI.
- 7. State the significance of static VAR generator.
- 8. Which constitute the energy tank for the inverter and why?
- 9. Define class E resonant inverter,
- 10. What is overlapping mode?

PART B 
$$\rightarrow$$
 (5 × 13 = 65 marks)

11. (a) Explain various harmonics elimination methods in single phase inverter.

Or

(b) Explain the carrier based PWM technique used to control the output voltage in a single phase inverters.

12. (a) Discuss the principle of working of a three phase voltage source inverter.

Draw a phase and line voltage waveform on the assumptions that each thyristor conducts for 180 degree.

Or

- (b) Derive the multi pulse voltage control of three phase inverter.
- 13. (a) A single phase ASCI feed a resistive load. Describe its working with the appropriate circuit and waveforms, Find also the circuit turns off time for the thyristor.

Or

- (b) With neat sketch of voltage and current waveform, explain the working principle of CSI.
- 14. (a) Draw and explain the operation of flying capacitor multilevel inverter.

Or

- (b) Draw and explain the operation of single phase Z-source inverter with relevant waveforms.
- 15. (a) Explain the single phase parallel inverter with a neat diagram and its waveform.

Or

(b) Draw the block diagram for online and off line UPS and explain the operation of UPS.

#### PART C - $(1 \times 15 = 15 \text{ marks})$

16. (a) A single phase full bridge inverter is fed from a dc source such that fundamental component of output voltage is 230V. Find the rms value of thyristor and Diode current for the following loads (i)  $R=4\Omega$ , (ii)  $R=3\Omega$ ,  $X_1=10\Omega$ ,  $X_c=6\Omega$ .

Or

- (b) A 3 phase inverter delivers power to a resistive load from a 450 V DC source. For a star connected load of 100 ohm/phase. Determine for both 180 degree and 120 degree mode of operation.
  - (i) RMS value of load current
  - (ii) RMS value of thyristor current
  - (iii) Load power.