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Question Paper Code : X 20491

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2020
Fifth/Fourth Semester
Electronics and Instrumentation Engineering
EE 6503 – POWER ELECTRONICS
(Common to Mechatronics Engineering, Electrical and Electronics Engineering, Instrumentation and Control Engineering)
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A **(10×2=20 Marks)**

1. Define Holding current and Latching current in SCR.
2. What are the advantages of GTO over SCR ?
3. What are the effects of source inductance ?
4. What are the functions of freewheeling diode ?
5. Write the applications of DC Chopper.
6. What is meant by resonant converter ?
7. Define modulation index and what is its use ?
8. What are the applications of CSI ?
9. Why is half wave AC voltage regulator not used ?
10. Explain the term sequence control of AC voltage regulators.

PART – B **(5×13=65 Marks)**

11. a) Explain the construction and switching characteristics of SCR.

(OR)

b) Describe about any one Driver and Snubber circuit for MOSFET.

12. a) Explain the operation of three phase 3-pulse converter with R-load. Derive for average output voltage.

(OR)

b) i) Explain the operating principle of single phase dual converter. **(7)**

ii) A single phase full converter is connected with R-Load. The source voltage is 230 V, 50 Hz. The average load current is 10 A for R = 20 Ω. Find the firing angle. **(6)**

13. a) Explain the working of buck converter with neat waveform and also derive the expression of peak to peak voltage across the capacitor. **(13)**

(OR)

b) Explain the steady state analysis of step down chopper. **(13)**

14. a) With the neat sketch and output waveforms, discuss the operation of three phase inverter operating in 180º mode.

(OR)

b) i) Comparison between voltage source inverter and current source inverter. **(7)**

ii) Explain any one method to reduce the harmonic content in the inverter. **(6)**

15. a) Explain the working of three phase to single phase cycloconverter with neat circuit diagram and necessary waveforms.

(OR)

b) Discuss in detail, the operation of single phase full wave A.C. voltage regulator with help of voltage and current waveform for various loads.

PART – C **(1×15=15 Marks)**

16. a) Explain the operation of a Boost Converter with different modes of operation. **(15)**

(OR)

b) Explain the operation of a sinusoidal PWM inverter. Define amplitude modulation index and frequency modulation index. **(15)**

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