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Question Paper Code : 21506

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2015.

Fifth Semester

Electrical and Electronics Engineering

EE 2301/EE 51/10133 EE 504/10144 EE 504 – POWER ELECTRONICS

(Common to Instrumentation and Control Engineering)

(Regulations 2008/2010)

(Common to PTEE 2301/10144 EE 504 – Power Electronics for B.E.
(Part-Time) Fourth Semester – Electrical and Electronics Engineering –
Regulations 2009/2010)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is meant by switching loss in devices?
2. What is the need for snubber circuit?
3. What is meant by phase control?
4. Why power factor of semi converter is better than full converter?
5. Write the applications of DC chopper.
6. Distinguish between time ratio control and current limit control employed in a DC chopper.
7. What is meant by voltage source inverter?
8. Define harmonic distortion.
9. What is matrix converter?
10. What is integral cycle control in AC voltage controllers?

PART B — (5 × 16 = 80 marks)

11. (a) Analyze the two transistor model of SCR with its V-I characteristics.

Or

- (b) (i) Explain the V-I characteristics of power MOSFET. (8)
(ii) Discuss anyone method of forced commutation of SCR. (8)

12. (a) Explain the operation of a single phase controlled rectifier which can be operated both in rectification and inversion mode.

Or

- (b) A 3-phase 6 pulse full converter is connected resistive and inductive load of 10Ω and $1H$ respectively from 3-phase, 220 V, 50 HZ, Y-connected supply. For firing angle is 30 degree, determine
(i) average output voltage,
(ii) average output current, and
(iii) rms output current.

13. (a) (i) Discuss the various voltage control methods employed in a chopper. (8)
(ii) Distinguish between linear power supply and switched mode power supply. (8)

Or

- (b) Demonstrate the operation of buck and boost converters with necessary voltage equations and waveforms.

14. (a) Explain the operation of three phase voltage source inverter in 120 mode of conduction.

Or

- (b) Discuss various types of PWM schemes available for voltage control in an inverter.

15. (a) Describe the operation of 1 – phase AC voltage controller with R and RL load.

Or

- (b) Explain the operation of 3 phase – 1 phase cycloconverter with circuit diagram and waveforms.