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Question Paper Code : 91443

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2014.

Fifth Semester

Electrical and Electronics Engineering

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

(Common to Instrumentation and Control Engineering)

(Regulation 2008/2010)

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

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is meant by current commutation of SCR?
2. Distinguish between SCR and TRIAC.
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. Write the advantages of resonant converters.
9. What is cycloconverter?
10. What is integral cycle control in AC voltage controllers?

PART B — (5 × 16 = 80 marks)

11. (a) Discuss different turn-on methods of SCR with its turn on characteristics.

Or

- (b) Discuss the static and switching characteristics of IGBT and MOSFET.

12. (a) Explain the operation of dual converter with complete circuit diagram and waveforms.

Or

- (b) A 230 V, 50 HZ supply is connected to load resistance of 12Ω through half wave controlled rectifier. If the firing angle is 60 degree, determine
- (i) Average output voltage. (4)
 - (ii) rms output voltage, (4)
 - (iii) Ratio of rectification and (4)
 - (iv) Transformer utilization factor. (4)

13. (a) (i) Discuss the operation of step-up DC chopper. Also derive the expression for its output voltage. (10)
- (ii) Write short note on switch mode power supply. (6)

Or

- (b) A dc chopper has an input voltage of 200V and a load of 8 ohm resistance. The voltage drop across thyristor is 2V and the chopping frequency is 800 Hz. The duty cycle is 0.5. Find
- (i) Average output voltage (4)
 - (ii) RMS output voltage (4)
 - (iii) Chopper efficiency (4)
 - (iv) Input resistance seen by the source. (4)

14. (a) Briefly discuss the different types of PWM schemes available for voltage control in an inverter.

Or

- (b) Explain the operation of three phase voltage source inverter in 180 mode of conduction.

15. (a) Write short note on the followings.

- (i) 3-phase to 1-phase Cycloconverter (8)
- (ii) Matrix converter (8)

Or

- (b) A single-phase full wave AC voltage controller has an input voltage of 230V, 50HZ and it is feeding a resistive load of 10 ohms. If firing angle of thyristors is 110 degree, find the output RMS voltage, input power factor and average current of thyristor.