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B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2008.

Fifth Semester

Electrical and Electronics Engineering

EE 1301 — POWER ELECTRONICS

(Common to Electronics and Instrumentation Engineering and Instrumentation and Control Engineering)

(Common to B.E. (Part –Time) Fourth Semester – Regulation 2005)

(Regulation 2004)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the advantages of MOSFET over BJT?
2. What is latching current of SCR?
3. Why is power factor of semi converter better than full converter?
4. What is the inversion mode of rectifiers?
5. What is two quadrant DC chopper?
6. What is time ratio control in chopper?
7. What is a current source inverter?
8. What are the advantages of PWM inverter?
9. What is off-line UPS?
10. Name any two types of FACT devices.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Compare the performance characteristics of MOSFET and BJT. (10)
(ii) Briefly discuss the R-C triggering of SCR. (6)

Or

- (b) Differentiate natural commutation and forced commutation. Explain the methods used for achieving forced commutation in chopper circuits. (16)
12. (a) Discuss the operation of single phase half controlled rectifier with inductive load. Also derive the average output voltage equation. (16)

Or

- (b) Explain the operation of three phase half controlled rectifier supplying R. load with neat waveforms. Also derive an expression for the average output voltage. (16)
13. (a) Discuss the operation of the resonant switching based SMPS. (16)

Or

- (b) (i) A dc chopper has an input voltage of 200 V and a load of 20 ohm resistance. When chopper is on, its voltage drop is 1.5V and the chopping frequency is 10 KHz. If the duty cycle is 80% , find
- (1) Average output voltage
(2) RMS output voltage
(3) Chopper on time. (8)
- (ii) Explain about Type- E chopper. (8)
14. (a) Discuss the functioning of three phase voltage source inverter supplying a balanced star connected load in 120 degree operating mode.

Or

- (b) (i) Write short note on series resonant inverter. (8)
(ii) Explain how inverter can be controlled using multiple and sine PWM techniques. (8)

15. (a) Explain the operation on- line and off-line UPS in detail. (16)

Or

(b) Write short notes on :

(i) UPFC (8)

(ii) Static VAR compensation. (8)
