Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 93432

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

Fifth Semester

Electrical and Electronics Engineering

EE 1301 — POWER ELECTRONICS

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

(Regulation 2004/2007)

(Common to B.E. (Part – Time) Fourth Semester, Electrical and Electronics Engineering - Regulation 2005)

Time : Three hours | Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Why are IGBT becoming popular in their application to controlled converters?

2. What are the factors that influence the turn-off time of a thyristor?

3. Under what conditions a single phase fully controlled converter gets operated as an Inverter.

4. State the principle of phase control in AC-DC converters.

5. What is time ratio control in chopper?

6. What is meant by SMPS?

7. What is a current source inverter?

8. What are the advantages of PWM inverter?

9. Differentiate between shunt controller and series controller in Flexible AC transmission systems.

10. List the types of AC power supplies.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Compare the performance characteristics of MOSFET and BJT. (8)

(ii) Briefly discuss the V-I characteristics of SCR. (8)

Or

(b) Explain the turn-on and turn-off characteristics of IGBT with neat waveforms.

12. (a) (i) Describe the operation of a 1 phase two pulse bridge converter using 4 SCR's with relevant wave forms. (10)

(ii) Discuss the working of above converter in the inverter mode with RLE load. (6)

Or

(b) (i) A single phase two pulse bridge converter feeds power to RLE load with $R=6\Omega, L=6mH, E=60V$, AC source voltage is 230 V, 50 Hz for continuous conduction. Find the average value of load current for a firing angle of 50°. In ease one of the 4 SCR's gets open circuited. Find the new value of average load current assuming the output current as continuous. (10)

(ii) Draw the possible configurations of a single phase AC voltage controller and compare them. (6)

13. (a) Describe the principle of operation of cuk converter and Buck converter with necessary waveforms.

Or

(b) With a neat diagram, explain any two types of resonant converters.

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 a short note on series resonant inverter. (8)

(ii) Explain how inverter can be controlled using multiple and sine PWM techniques. (8)

15. (a) Describe the principle of operation of no break static ups configuration with a neat block diagram and list out its applications.

Or

(b) Explain the principle of operation of unified power controller as compensator with a neat circuit arrangement.