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

Question Paper Code : 51440

B.E/B.Tech.DEGREE EXAMINATION, MAY/JUNE 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 Power Electronics for B.E (Part-Time) Fourth Semester – Electrical and Electronics Engineering – Regulation 2009)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define Latching current and Holding current.

2. Compare power MOSFET and BJT.

3. Compare half controlled rectifier and full controlled rectifier.

4. What is Dual converter? Mention its functional mode of operation.

5. What are the advantages and disadvantages of Cuk converter?

6. What are the circuit configurations used for SMPS?

7. What are the advantages of PWM control in inverters?

8. Compare VSI and CSI.

9. What is the control range of firing angle in AC voltage controller with R – L load?

10. What is Matrix converter?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain the operation of SCR using two transistor analogy. (10)

(ii) Briefly discuss the V – I characteristics of SCR. (6)

Or

(b) (i) Explain the switching characteristics of power MOSFET. (8)

(ii) Briefly explain about the power MOSFET protection circuits. (8)

12. (a) Discuss the effect of source inductance on the performance of single phase full converter. (16)

Or

(b) Explain the two functional modes of Dual converter with necessary diagrams. (16)

13. (a) Explain the operation of class-C and class-D types of two quadrant choppers. (16)

Or

(b) Draw the power circuit diagram of Cuk regulator and explain its operation with equivalent circuit for different modes with necessary waveforms. (16)

14. (a) Discuss the functioning of three phase voltage source inverter in 120 degree operating mode. (16)

Or

(b) (i) Explain the working of series inverter with the aid of circuit diagram. (8)

(ii) Explain different PWM techniques in detail. (8)

15. (a) With the aid of circuit diagram and waveform explain the operation of

(i) Power factor control in AC voltage regulation. (8)

(ii) Single phase full wave AC voltage controller. (8)

Or

(b) Draw the circuit diagram of three phase to single phase cycloconverter and explain its operation with necessary waveforms. (16)