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

Question Paper Code : 71639

M.E. DEGREE EXAMINATION, JUNE/JULY 2013.

Elective

Power Electronics and Drives

PE 9252/PE 9351/10233 PEE 13/PE 952 — ADVANCED POWER SEMICONDUCTOR DEVICES

(Common to M.E. Electrical Drives and Embedded Control)

(Regulation 2009/2010)

Time : Three hours | Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is meant by SOA?
2. What are the various types of power diode?
3. Why vertical structure type construction is preferred for power transistors?
4. What are the problems associated with series connected SCRs?
5. What type of power MOSFET preferred for practical use?
6. How to turn-on and turn-off the IGCT?
7. What is the need for isolation in power electronics circuits?
8. What are the different types of Snubber?
9. What are the heat transfer modes?
10. What are the different types of heat sink?

PART B — (5 × 16 = 80 marks)

11. (a) Explain the characteristics and specifications of an ideal power semiconductor switch. (16)

Or

(b) (i) Write short notes on EMI due to switching. (8)

(ii) Discuss the reverse recovery characteristics of power diode. (8)

12. (a) (i) Explain the construction and operation of Power Darlington with neat sketch. (10)

(ii) List out the problems associated with BJT operation. (6)

Or

(b) (i) Explain the two transistor analogy of thysistor. (8)

(ii) Compare BJT with Thyristor. (8)

13. (a) Explain the switching characteristics of power MOSFET with neat sketch and using its dynamic model. (16)

Or

(b) (i) Write short notes on MCT. (10)

(ii) How GTO differs from SCR? (6)

14. (a) (i) Draw the gate drive circuit for MOSFET and explain. (8)

(ii) Explain how pulse transformer and Opto-Coupler provide isolation. (8)

Or

(b) Explain how snubbers are designed for IGBT protection. (16)

15. (a) Explain the various cooling methods used for power devices and for power converter modules in detail. (16)

Or

(b) (i) Explain the factors to be considered for selection of heat sink. (10)

(ii) Explain the terms thermal resistance and thermal impedance. (6)

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