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Question Paper Code: 52513

M.E. DEGREE EXAMINATION, NOV 2016

First Semester

Power Electronics and Drives

15PPE103 - MODERN POWER SEMI CONDUCTOR DEVICES

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. A thyristor can be termed as
 - (a) DC switch
 - (b) AC switch
 - (c) Both
 - (d) Square-wave switch
2. In a SCR circuit, the angle of conduction can be changed by changing
 - (a) anode voltage
 - (b) anode current
 - (c) forward current rating
 - (d) gate current
3. Power MOSFET is a
 - (a) voltage controlled device
 - (b) current controlled device
 - (c) frequency controlled device
 - (d) none of these
4. When a UJT is used for triggering of an SCR, the wave shape of the voltage is a
 - (a) Sine Wave
 - (b) Saw-tooth wave
 - (c) Trapezoidal wave
 - (d) Square wave
5. Snubber circuit is used to limit the rate of
 - (a) rise of current
 - (b) conduction period
 - (c) rise of voltage across SCR
 - (d) none of these

PART - B (5 x 3 = 15 Marks)

6. What are the three categories of power semiconductor devices available?
7. Define holding current and latching current in thyristors.
8. What is the working principle of IGCT.
9. Draw the gate driving circuit for MOSFET.
10. List the various types of mounting of power devices.

PART - C (5 x 16 = 80 Marks)

11. (a) (i) Write short notes on power switching devices. (8)
(ii) Describe the impact of on steps losses in power diode. (8)

Or

- (b) (i) Explain the sources of EMI, methods to reduce EMI, shielding methods and standards of EMI. (8)
(ii) Draw the symbols of four power switching devices and mention few applications of each device. (8)
12. (a) (i) Explain steady state and dynamic model of BJT. (8)
(ii) Explain the construction of power BJT with appropriate schematic diagram. (8)

Or

- (b) Discuss problems associated with series and parallel operation of thyristor. How are they overcome? Explain in detail. (16)
13. (a) Explain the construction, operation, static and switching characteristics of IGBT with appropriate diagrams. (16)

Or

- (b) (i) Explain the construction switching characteristics of MOSFET with appropriate diagrams. (8)
(ii) Write Short notes on MCT and RCT. (8)
14. (a) (i) Explain over voltage and over current protection of SCR. (8)
(ii) Write short notes about Snubber circuits. (8)

Or

- (b) (i) Draw and explain the gate drive circuit of SCR and MOSFET. (8)
- (ii) Draw and explain the gate drive circuit of IGBT. (8)
15. (a) Explain the transient thermal impedance for power semiconductor devices. (16)

Or

- (b) (i) Explain in detail about various heat sinks and its design. (8)
- (ii) Discuss about the electrical analogy of thermal components. (8)
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