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Question Paper Code	13336
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M.E. / M.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2024 (JAN – 2025)

First Semester

M.E - Power Electronics and Drives

24PPEPC101 - ADVANCED POWER SEMICONDUCTOR DEVICES

Regulations - 2024

Duration: 3 Hours

Max. Marks: 100

PART - A ($10 \times 2 = 20$ Marks)

Answer ALL Questions

	Marks	<i>K-</i> Level	<i>CO</i>
1. Mention the attributes of ideal switch.	2	K1	CO1
2. Define "Safe Operating Area".	2	K1	CO1
3. Define the concept of latching.	2	K1	CO2
4. Compare GTO with SCR.	2	K2	CO2
5. Distinguish between SCR and GTO.	2	K2	CO3
6. List the applications of IGBT.	2	K2	CO3
7. Draw the gate driving circuit of MOSFET.	2	K1	CO4
8. What is the need of isolation for power semiconductor devices?	2	K1	CO4
9. List out the advantages of oil cooling.	2	K1	CO5
10. Compare conduction, convection and radiation.	2	K2	CO5

PART - B ($5 \times 13 = 65$ Marks)

Answer ALL Questions

11. a) Explain the switching characteristic of the power diode with neat sketch. 13 K2 CO1

OR

b) Discuss briefly the EMI impact due to switching of the power semiconductor devices. 13 K2 CO1

12. a) Explain the operating principle of thyristor and compare its switching characteristics with BJT. 13 K2 CO2

OR

b) Summarize the operation of MCT? Discuss its advantages over other devices. 13 K2 CO2

13. a) Draw and explain the construction, principle of operation and switching characteristics of IGBT. 13 K2 CO3

OR

- b) With suitable illustration and diagrams discuss the steady state and dynamic state model of MOSFET device in detail. 13 K2 CO3
14. a) Build the Power BJT against over voltage and over current protection. 13 K3 CO4
- OR**
- b) Identify the pulse transformer and opto-coupler for power semiconductor device protection. 13 K3 CO4
15. a) Explain the various types of heat sinks, the parameters for heat sink selection and design of heat sinks. 13 K2 CO5
- OR**
- b) A power device has a thermal capacity of 0.2J/C and thermal resistance of 0.7 c/w . show the maximum power dissipation the power devices withstand for 0.1 sec for a temperature not exceeding 40C . 13 K2 CO5

PART - C (1 × 15 = 15 Marks)

16. a) i) Summarize the snubber circuit. 8 K2 CO4
- ii) Explain heat transfer through conduction, convection and radiation. 7 K2 CO5
- OR**
- b) i) Explain the use of pulse transformer and pulse amplifier in a control circuit. 7 K2 CO4
- ii) Discuss the guidelines for the selection of heat sink. 8 K2 CO5