

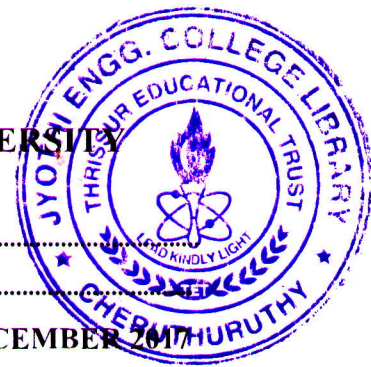
APJ ABDULKALAM TECHNOLOGICAL UNIVERSITY
08 PALAKKAD CLUSTER

6251(A)-17Dec-2

(Pages: 2)

Name

Reg.No:.....



FIRST SEMESTER M.TECH. DEGREE EXAMINATION DECEMBER 2017

Branch: Electrical & Electronics Engineering

Specialization: Power Electronics

08EE6251(A): Power Semiconductor Devices and Modelling

Time: 3 hours

Max.marks: 60

Answer all six questions.

Modules 1 to 6: Part 'a' of each question is compulsory and answer either part 'b' or part 'c' of each question.

| Q.no. | Module 1 | Marks |
|-------|--|-------|
| 1.a | Explain the relevance of high frequency switching in converters | 3 |
| | Answer b or c | |
| b | (i) Explain different losses associated with semiconductor devices. (ii) What is safe operating Area (SOA). How SOA helps in selection of semiconductor switches? | 6 |
| c | Explain the Significance and application of static and dynamic characteristics in semiconductors. | 6 |
| Q.no. | Module 2 | Marks |
| 2.a | Explain the construction of power diode. | 3 |
| | Answer b or c | |
| b | Explain the Static and dynamic characteristics of Bipolar Junction Transistor (BJT). | 6 |
| c | (i) Explain secondary breakdown in Bipolar Junction Transistor (BJT). (ii) Explain the Static characteristics of power diode. | 6 |
| Q.no. | Module 3 | Marks |
| 3.a | Explain Two transistor analogy of SCR. | 3 |

Answer b or c

- b Explain gate and switching characteristics of SCR. 6
- c With help of near diagram, Explain the series and parallel operation of SCR. 6

| Q.no. | Module 4 | Marks |
|--------------|--------------------------|--------------|
| 4.a | Compare MOSFET and IGBT. | 3 |

Answer b or c

- b Describe the switching characteristics of MOSFET. 6
- c (i) What is Voltage controlled device. Explain its working principle. 6
(ii) Briefly explain the construction of Insulated Gate Bipolar Transistor (IGBT).

| Q.no. | Module 5 | Marks |
|--------------|--|--------------|
| 5.a | Explain the necessity of isolation in firing circuits. | 4 |

Answer b or c

- b With near diagram, Explain Optocoupler Isolated Gate Drive Circuit. 8
- c (i) Explain the functions of snubber. 8
(ii) Explain over voltage snubber.

| Q.no. | Marks |
|--------------|---|
| 6.a | Explain the necessity of heat sink in power converters. 4 |

Answer b or c

- b Obtain the equivalent circuit based thermal resistance including heat sink. 8
- c Explain the Heat transfer by conduction, convection and radiation in heat sink. 8