

APJ ABDULKALAM TECHNOLOGICAL UNIVERSITY
08 PALAKKAD CLUSTER

Q. P. Code: PE0825118(A)

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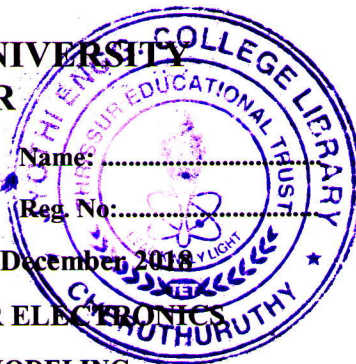
Name:

Reg. No:

FIRST SEMESTER M.TECH. DEGREE EXAMINATION December 2018

Branch: ELECTRICAL AND ELECTRONICS Specialization: POWER ELECTRONICS

08EE6251(A): POWER SEMICONDUCTOR DEVICES & MODELING



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.

(Add any other instruction specific to course here like the use of IS codes/design tables etc.)

Q.no.	Module 1	Marks
1.a	Explain the criterion for selection of a power electronic switch?	3
Answer b or c		
b	Derive the expression for switching power loss?	6
c	Explain how the addition of a n(-) layer increases the reverse voltage blocking of a signal diode?	6
Q.no.	Module 2	Marks
2.a	Explain the construction of power transistor?	3
Answer b or c		
b	Draw the static characteristics of a power transistor and mark V_{cbo} , V_{ceo} ?	6
c	Explain the concept of soft saturation and hard saturation in a power transistor?	6
Q.no.	Module 3	Marks
3.a	Why initially a big magnitude is required for gate current in scr?	3
Answer b or c		
b	Explain the two transistor analogy for scr? Derive anode current?	6
c	Explain in detail the process of increasing alpha when gate current is given?	6

Q.no.	Module 4	Marks
4.a	Explain the construction of MOSFET?	3
Answer b or c		
b	Draw the static characteristics of MOSFET?	6
c	Draw the switching characteristics of MOSFET?	6

Q.no.	Module 5	Marks
5.a	Explain the need for isolation in gate circuit?	4
Answer b or c		
b	Explain gate firing circuits of scr?	8
c	Explain an overvoltage protection scheme for MOSFET?	8

Q.no.	Module 6	Marks
6.a	Explain the factors to be considered in the concept of thermal designing of power semiconductor devices?	4
Answer b or c		
b	Explain in detail the heat loss by conduction and radiation, also develop equations for heat loss?	8
c	Explain the concept of thermal impedance and thermal time constant in the dynamics of heat transfer?	8