

THE KAVERY ENGINEERING COLLEGE*(An Autonomous Institution)***M.E DEGREE END SEMESTER THEORY EXAMINATIONS, NOV/DEC 2025***First Semester**Applied Electronics***PAPT2403 - Semiconductor Devices and Modeling***Regulations - 2024**Duration : 3 Hrs**Maximum : 100 Marks***PART - A (ANSWER ALL QUESTIONS) (Marks 10*2=20)**

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
1.	Recall the term Electrostatic Potential.	L1	1	2
2.	What is meant by High-Field Effects?	L1	1	2
3.	List the role of MOSFET Channel Mobility.	L1	2	2
4.	Define Short-Channel Effect.	L1	2	2
5.	State CMOS Scaling.	L2	3	2
6.	State the applications of Threshold Voltage.	L1	3	2
7.	Define Base Current.	L2	4	2
8.	What is Basic dc Mode?	L1	4	2
9.	State the continuity equation.	L2	5	2
10.	Interpret about trap rate.	L2	5	2

PART - B (ANSWER ALL QUESTIONS) (Marks 5*16 = 80)

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
11.	a Illustrate the concept of MOS under Nonequilibrium and Gated Diodes.	L3	1	16
	Or			
	b Elucidate in detail about the Injection of Hot Carriers from Silicon into Silicon Dioxide with neat diagram.	L3	1	16
12.	a i Categorize the structure of MOSFET I-V Characteristics.	L4	2	8
	ii Discuss the operation of Drain-Current Model.	L2	2	8
	Or			
	b i Analyze the function and operation of High-Field Transport Channel Length Modulation in MOSFET devices.	L4	2	8
	ii Interpret about MOSFET Degradation at High Field.	L2	2	8
13.	a i Implement the operation of following Scaling: i) Constant-Field Scaling ii) Generalized Scaling	L3	3	8
	ii State the principles and working of Channel Profile Design.	L2	3	8
	Or			

	b	i	Organize the concepts of Discrete Dopant Effects on Threshold Voltage.	L3	3	8
		ii	Discuss in detail about the MOSFET Channel Length.	L2	3	8
14.	a	i	Construct in detail about the Ideal IC-VCE Characteristics.	L3	4	10
		ii	Outline the effect of Emitter and Base Series Resistances.	L4	4	6
			Or			
	b	i	Draw and explain the function and working principles of Time-Dependent Analyses Basic dc Model.	L3	4	10
		ii	State the applications of Small-Signal Equivalent Circuit Model.	L4	4	6
15.	a	i	Derive the hydro dynamic equations and also explain its functions.	L4	5	8
		ii	Derive the drift-diffusion equation based on the principle of working.	L4	5	8
			Or			
	b		Compare the finite difference solutions to these equations in 1D and 2D space.	L4	5	16