

THE KAVERY ENGINEERING COLLEGE*(An Autonomous Institution)***B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, APRIL/MAY 2026***Third Semester***Biomedical Engineering****UBMT24301 / BM3353 - Fundamentals of Electronic Devices and Circuits***Regulations - 2024 & 2021**Duration : 3 Hrs**Maximum : 100 Marks***PART - A (ANSWER ALL QUESTIONS) (Marks 10*2=20)**

<i>Q.No</i>	<i>Questions</i>	<i>BTL</i>	<i>CO</i>	<i>Marks</i>
1.	With a neat diagram draw the energy band structure of Silicon and Germanium at room temperature and indicate their energy gap values (E_g) in eV.	L3	1	2
2.	Define drift and diffusion current.	L1	1	2
3.	What is early effect?	L1	2	2
4.	State the advantage of multi-emitter transistor in digital circuits.	L2	2	2
5.	What is channel length modulation?	L1	3	2
6.	What is meant by threshold voltage?	L2	3	2
7.	Differentiate Schottky barrier diode and conventional PN junction diode.	L2	4	2
8.	State the applications of tunnel diode.	L1	4	2
9.	Draw and label the basic structure of TRIAC.	L2	5	2
10.	A solar cell is a PN junction device with no voltage directly applied across the junction. If it is so, how does a solar cell deliver power to a load?	L4	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 i Derive the PN junction diode current equation.	L2	1	8
	ii With a neat diagram explain the working of a PN junction diode in reverse bias condition.	L2	1	8
	Or			
	b i Explain the switching characteristics of diode with the help of simple diode circuit.	L2	1	8
	ii Explain the concept of transition capacitance of PN junction diode.	L2	1	8
12.	a i With a neat diagram explain the input and output characteristics of a transistor in Common Emitter (CE) configuration.	L2	2	8
	ii Explain the operation of an NPN transistor with suitable diagrams.	L2	2	8
	Or			
	b i Outline the Ebers-Moll model of an NPN transistor with necessary circuit and relevant equations.	L2	2	8
	ii Outline the hybrid parameters for a basic transistor circuit in CE configuration and give its hybrid model.	L2	2	8

13.	a	i	Explain the transfer characteristics of an n-channel depletion type MOSFET.	L2	3	8
		ii	Derive the drain current equation for a MOSFET in saturation and critically discuss the role of pinch-off voltage in determining saturation current.	L4	3	8
	Or					
	b	i	Sketch and explain the construction and operation of n-channel E-MOSFET.	L2	3	8
		ii	Analyze why MOSFETs are preferred in VLSI circuits over BJTs using device characteristics.	L4	3	8
14.	a	i	Describe the working of metal-semiconductor junction.	L2	4	8
		ii	Explain PINFET and FINFET with its Applications.	L2	4	8
	Or					
	b	i	Draw the V-I characteristics of Zener diode and explain its operation.	L2	4	8
		ii	Explain construction and working principle of LASER diode.	L2	4	8
15.	a	i	Analyze how the structure of a UJT causes negative resistance behaviour.	L4	5	8
		ii	Explain the working principle of SCR and its V-I characteristics.	L2	5	8
	Or					
	b	i	Analyze how the structure of a CCD allows it to transfer charge from one stage to another.	L4	5	8
		ii	Explain the construction and working principle of an LED with a neat diagram.	L2	5	8