Reg.No.:												

VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 70059

B.E / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – JAN. / FEB. 2025
Second Semester
Electronics and Communication Engineering
U23EC201– SEMICONDUCTOR DEVICES FOR MODERN ELECTRONICS
(Regulation 2023)

Time: Three Hours | Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Define Fermi level?	2	K1	CO1
2.	What is meant by depletion region?	2	K1	CO1
3.	Differentiate between BJT and FET.	2	K2	CO2
4.	Why BJT is called as current controlled device?	2	K1	CO2
5.	What is pinch off voltage in JFET?	2	K2	CO3
6.	Give the output characteristics parameters of a MOSFET.	2	K1	CO3
7.	List the applications of Light Emitting Diode.	2	K1	CO4
8.	What are laser diodes?	2	K1	CO4
9.	Draw the V-I characteristics of tunnel diode.	2	K1	CO5
10.	What are the advantages of PIN diode?	2	K1	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11. a)	i.	Define effective mass and derive the expression for effective mass of an electron in periodic potential field.	7	K3	CO1
	ii.	Write brief note on Fermi Dirac distribution?	6	K2	CO1
		(OR)			
b)		Explain in brief about the V-I characteristics of PN junction diode in forward and reverse bias conditions and also explain its applications.	13	K4	CO1
12. a)		Explain in details on voltage gain and current gain expression for CE configuration using hybrid model.	13	K3	CO2
		(OR)			
b)		Explain the biasing techniques of JFET under different conditions.	13	K2	CO2
13. a)		With neat sketches construction, operation and characteristics of depletion type MOSFET.	13	K2	CO3
		(OR)			
b)		Explain the construction, Principle of operation and characteristics of P-channel enhancement type MOSFET with neat diagrams.	13	K3	CO3
14. a)	i.	Explain the V-I characteristics of photo diode.	5	K2	CO4
	ii.	Explain the construction and operation of LED.	8	K3	CO4
		(OR)			
b)		Explain in detail about principle of operation and characteristics of UJT.	13	K2	CO4
15. a)		Write the working principle of Schottky diode. Explain the V-I characteristics and mention two applications of Schottky diode.	13	K2	CO5
		(OR)			
b)		Explain the V-I characteristics of tunnel diode by using energy band diagram.	13	K3	CO5

PART – C

(1 x 15 = 15Marks)

Q.No.			Questions	Marks	KL	CO
16.	a)	i.	Illustrate the experimentation procedure of obtaining the Zener diode characteristics. Also mention the evaluation of Zener diode characteristic parameters.	9	K2	CO1
		ii.	Explain the mechanism of avalanche and Zener breakdown.	6		
			(OR)			
	b)	i.	The following data are given for an intrinsic Ge at 300K. Calculate the conductivity and resistivity of the sample? (ni= 2.4 x$10^{19}$$m^{-3}$, μe = 0.39 m^2-V-1S-1, μp = 0.19 m^2-V-1S-1).	5	K3	CO1
		ii.	Illustrate the applications of LEDs, Solar Cell, PIN diode and photo detectors toward society in terms of medical, research and development and information technology?	10	K4	CO4