

JAMIA HAMDARD
Department of Computer Science & Engineering
School of Engineering Sciences & Technology
New Delhi-110062
Odd Semester Examination-2024

Paper Name: Electronic Devices
Time: 2.5 Hours

Paper Code: BTECE 301
Max Marks: 60

Note: Assume missing data, if any.

Attempt (i) Section-A: All questions are compulsory.

(ii) Section-B: Attempt any FOUR QUESTIONS.

Section –A (All questions are compulsory) 4×5=20 Marks

Sr.No.	QUESTIONS	Marks	CO	BL
Q1.	What is the basic concept and need for Quantum Mechanics?	5	CO1	BL5
Q2.	Explain the process of generation and recombination of carriers.	5	CO2	BL6
Q3.	In a common base connection, $I_c = 0.95\text{mA}$ and $I_B = 0.05\text{mA}$. Find the value of α .	5	CO3	BL2
Q4.	Explain working of Photodiode and Solar diode.	5	CO4	BL6

Section –B (Attempt any Four questions) 4×10=40 Marks

Sr.No.	QUESTIONS	Marks	CO	BL
Q1.	The resistivity of a uniformly doped n-type Si sample is 0.5 ohm cm. If the electron mobility is $1250\text{ cm}^2/\text{V-sec}$ and the charge of electron is $1.6 \times 10^{-19}\text{C}$, then calculate the donor impurity concentration (N_D) in the sample.	10	CO1	BL2
Q2.	Assume electron charge $q=1.6 \times 10^{-19}\text{ C}$, thermal voltage $kT/q = 25\text{mV}$ and e^- mobility $\mu_n = 1000\text{ cm}^2/\text{V-s}$. If the concentration gradient of e^- injected into p-type Si sample is $1 \times 10^{21}/\text{cm}^4$, calculate the magnitude of diffusion current density (in A/cm^2).	10	CO2	BL2
Q3.	Explain Common-Emitter configuration with its input and output characteristics. Also explain the base width modulation.	10	CO3	BL6
Q4.	Explain working of a MOSFET with the help of circuit diagram. Draw its VI characteristics.	10	CO4	BL5
Q5.	Explain step-by-step the process of IC fabrication.	10	CO5	BL6
Q6.	Why do we use small signal models of semiconductor devices? Explain direct and indirect bandgap semiconductor with examples of diode.	10	CO2	BL3