

PARUL UNIVERSITY
Faculty of Engineering & Technology
B Tech Examination

Subject Name: Electronic Devices

Subject Code: 203107201

Branch/Semester: EC / 3rd Semester

[Date: 03/08/2022]

[Time: 02.30 PM to 04.00 PM]

[Total Marks: 40]

Sr.No.		Marks
Q.1	(A) Multiple Choice / Short Questions (1) Two terminal MOS structure is analogous with (a) Resistor (b) Inductor (c) Capacitor (d) None of above (2) A MOSFET is sometimes called _____ FET (a) Many Gate (b) Open Gate (c) Shorted Gate (d) Insulated Gate (3) Number of electrons for which $n=2$, $m=0$, $s=+1/2$ is _____ (a) 0 (b) 1 (c) 2 (d) 3 (4) Number of electrons in an orbital is _____ (a) 0 (b) 1 (c) 2 (d) 3 (5) The differential equation governing a functional relationship of carrier concentration with time and distance is known as (a) Continuity Equation (b) Poisson Equation (c) Bernouli Equation (d) Binomial Equation (B) Fill in the blanks (1) FETs are known as controllable devices. (2) There are _____ operating regions can be observed in the MOS system under external energy. (3) The type of photoresist which is initially insoluble and becomes soluble after exposure to UV light is called _____ photoresist. (4) To transfer a pattern to a layer on the chip is called _____ (5) _____ fabrication technique is used to prevent unwanted conduction paths between the devices.	05
Q.2	Attempt any four (Short Questions) (1) Define the words: Drift Velocity, Drift Current, Current Density (2) State the law of mass action for intrinsic and extrinsic semiconductor material (3) List the differences between the photodiode and solar cell. (4) Explain two terminal MOS structure with energy band diagrams of the components that make up the MOS system (5) Define the words: Flat-band voltage, Work function, Electron Affinity	12
Q.3	Attempt any two (1) Explain the direct and indirect energy band gap materials. (2) Derive the expression for current density in relation with conductivity and applied external electrical field. (3) Explain the quantum numbers.	08
Q.4	(A) Explain the process steps required for patterning of silicon dioxide in IC fabrication process	05

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(B) What is the importance of device isolation techniques in IC fabrication process? Explain the basic steps of LOCOS process to create isolation around the active areas. 05

OR

(B) List different operating regions observed in MOS structure under externally applied electric voltage. Explain the accumulation region with cross-sectional view of MOS structure and energy band diagram. 05