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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATIONS- 2026

B. Tech.-IV Semester (EE (VLSI Design & Technology))

COURSE CODE (CREDITS): 25B11EC415 (3)

MAX MARKS: 25

COURSE NAME: INTRODUCTION TO MICROFABRICATION TECHNOLOGY


COURSE INSTRUCTOR: Dr. Harsh Sohal

MAX. TIME: 1 Hour 30 Min

Note: (a) All questions are compulsory.

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

(c) Use of calculator is allowed

Q.No	Question	CO	Marks
Q1	For an E MOSFET, when $V_{GS} = 10V$ then the $I_D = 3mA$. The average threshold voltage ($V_{GS(Threshold)} = V_T = 3V$). Determine (a) The resulting value of 'k' for the MOSFET. (b) Draw the appropriate transfer characteristics of the MOSFET. (V_{GS} ranging upto 15V)	1	3+3
Q2	Why do we need to use a resist in lithography? What the two types of photo resists in Lithography? Explain and differentiate the two with the help of required diagrams.	2	4
Q3	What are the reasons to continue to scale semiconductor devices? Discuss the challenges faced by the designers in continued scaling.	1	4
Q4	Explain the term "compensation" with respect to doping profiles in the semiconductor device fabrication. If a pristine semiconductor is doped with Boron atoms ($N_B = 10^{13} cm^{-3}$). Then it is further doped with Phosphorous atoms ($N_P = 10^{16} cm^{-3}$). What will be the resulting semiconductor material? N type or p type? Explain with the help of energy band diagram.	2	5
Q5	Explain various steps (with required diagrams for each step/process and use of masks) to obtain the Active Area definition and well definitions as shown in the figure below: 	2	6