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2112E135

Post Graduate Diploma
Aerospace Technical Publication
Subject: Microelectronics Devices to Circuit
(MOOC/Online Course-II)
Subject Code: OET-802
Semester: Second
December 2021
Theory (External): 70 Marks
Time: 03 Hours

Instructions to the Students

1. This Question paper consists of two Sections. All sections are compulsory.
2. Section A comprises 10 questions of objective type in nature. All questions are compulsory. Each question carries 2 mark.
3. Section B comprises 8 essay type questions out of which students need to do any 5. Each question carries 10 marks.
4. Read the questions carefully and write the answers in the answer sheets provided.
5. Do not write anything on the question paper.
6. Wherever necessary, the diagram drawn should be neat and properly labelled

Roll Number									

SECTION -A (SHORT/OBJECTIVE TYPE QUESTIONS)
(10x2=20 Marks)

- A. What is the effect of impurities on the oxidation rate?
- B. What is the difference between thick film and thin film technology?
- C. Explain with example the difference between short channel effects and narrow channel effects
- D. What is meant by impurity profile? How is the profile controlled during fabrication?
- E. What are the different fabrication processes available to CMOS technology?
- F. How Thermal Runaway can be stopped in IC's?
- G. What is channel stop implantation?
- H. Explain Lapping process used in wafer preparation
- I. Why masking is done in fabrication of CMOS transistor?
- J. What is DC sputtering? Explain.

SECTION -B (ESSAY TYPE QUESTIONS)
(5x10=50 Marks)

1. What is the difference between enhancement type and depletion type transistors? Discuss the VTC characteristics of a Depletion load inverter in detail.

2. Consider an nMOS transistor having following parameters: $V_{T0n} = 0.7V$, $\gamma = 0.08V^{1/2}$ and $2|\phi_F| = 0.58V$. Calculate the threshold Voltage V_{Tn} at different body bias voltages: $V_{SBn} = 0, 1, 2, 3$. Plot the graph between V_{Tn} & V_{SBn} .
3. Derive the expression for threshold voltage of a MOS transistor & give the significance of each term
4. Differentiate between:
 - (a) Dry etching & wet etching
 - (b) Diffusion, Deposition and Implantation
5. What is crystal growth? Discuss the various crystal growth techniques in detail.
6. Describe the Si oxidation techniques. What are the uses of SiO_2 in VLSI circuits? Classify the SiO_2 layer formation techniques & discuss them in detail.
7. What is epitaxy? Discuss the various epitaxial techniques in detail.
8. What is ion implantation? How doping is done using ion implantation? Draw and explain the working ion implanter.

==END OF PAPER==