Х

NIPTEIL

reviewer3@nptel.iitm.ac.in ▼

Courses » Semiconductor Devices and Circuits

Announcements Course Ask a Question Progress Mentor FAQ

Unit 11 - Week 10: MOSFET: II

Course **Assignment 10** outline The due date for submitting this assignment has passed. Due on 2018-10-10, 23:59 IST. How to access As per our records you have not submitted this the portal assignment. 1) Assume that the subthreshold current of a MOSFET (in amperes) is given by: 1 point Week 1: $I_D = 10^{-15} \exp(V_{GS} / 2.1 * V_t)$ **Excursion in** Quantum over the range 0 < V_{GS} < 1V and where the factor 2.1 takes into account the effect of interface states. Mechanics Assume that the value of thermal voltage V_t is 25.9 mV. Assume that 10^6 identical transistors on a chip are all biased at the same V_{GS} and at VDD = 5V. Week 2: **Excursion in** Solid State Calculate the ratio of subthreshold current in the MOSFET device at $V_{\!GS}=0.7V$ to the subthreshold **Physics** current at $V_{GS} = 0.5V$ Week 3: Density of States, Fermi 0 100 **Function and** Doping 82.5 39.5 Week 4: Recombination-Generation, Charge No, the answer is incorrect. Transport and Score: 0 Continuity **Equation Accepted Answers:** 39.5 Week 5 : Metal-2) With reference to details given in question-1, calculate the total current that must be 1 point Semiconductor **Junctions** supplied to the chip at $V_{GS}=0.7 V$ Week 6: PN Junction 0.388 mA 9.83 mA Week 7: Bipolar Junction 0.678 mA **Transistors** 9.83 pA

© 2014 NPTEL - Privacy & Terms - Honor Code - FAQs -

G+

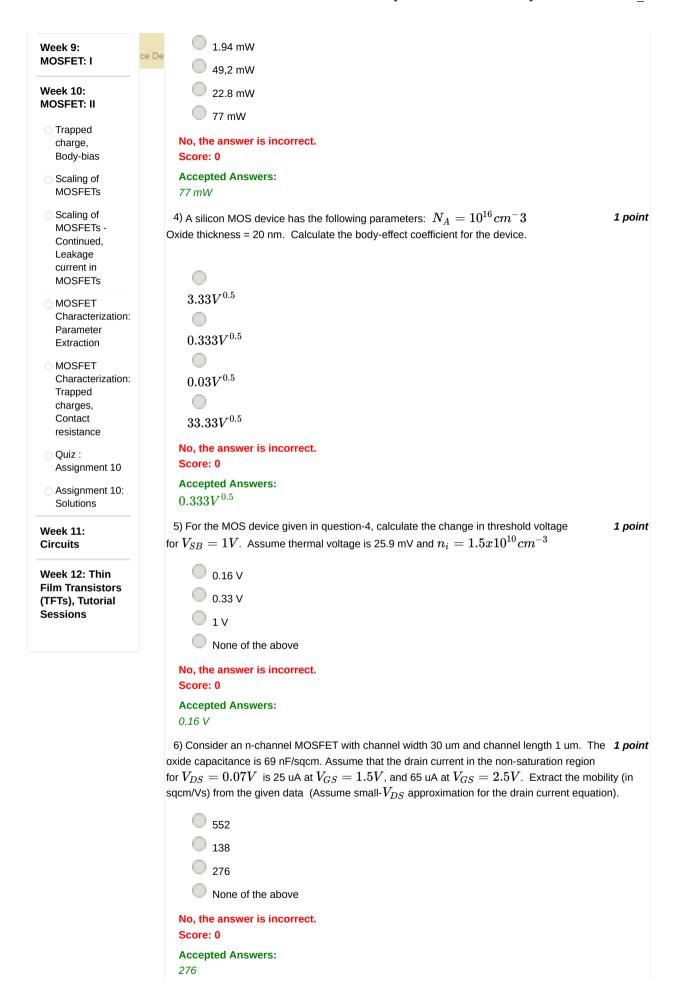
A project of





Funded by

In association with



7) Which of the following statements are true ?	1 point
i. The interface states affect the subthreshold-swing of a MOSFET due to presence of additional capacitances	d
ii. The C-V characteristics curve of a MOS-system shifts to left/right based on the presence of the charges in the oxide	ар
iii. Presence of trap-charges has no effect on the C-V characteristics of a MOS-system	
iv. Charges present at the oxide-semiconductor interface has strong effects on threshold voltage value.	е
i only	
ii and iii	
ii only	
i, ii and iv	
No, the answer is incorrect. Score: 0	
Accepted Answers: i, ii and iv	
8) Constant voltage scaling is applied to a MOSFET with a scaling factor of k=5. As the MOSFET features are scaled down, the current in the MOSFET:	1 point
increases by a factor of 5	
decreases by a factor of 5	
increases by a factor of 25	
decreases by a factor of 25	
No, the answer is incorrect. Score: 0	
Accepted Answers: increases by a factor of 5	
9) An n-MOS transistor has the following parameters: Channel length = 1 um, Channel width = 10 um, Oxide thickness = 25 nm, $N_A=5x10^{15}cm^{-3}$, applied voltages = 3V. If the device be scaled using constant-field scaling with a scaling factor of k = 0.7, the channel length and chandth for the scaled device would be:	e is to
7 um, 0.7 um	
7 um, 7 um	
0.7 um, 7 um	
0.7 um, 0.7 um	
No, the answer is incorrect. Score: 0	
Accepted Answers:	

