1. Large Signal Model Quiz

A 8 B 2 C 4 D 1 2. For an NMOS device, if VGS = 0.7 V and VTH = 0.5 V then the Vov is equal to V. A 0.4 B 0.5 C 0.2 D 0.1 5. If you have an NMOS and a PMOS, both with the same aspect ratio (W/L) and the same overdrive voltage (Vov), then what is the ratio of the NMOS current to the PMOS current? - Assume that μm is 450 cm²/Vs and μp is 150 cm²/Vs. A 2 B 1 C 4 D 5 4. Assume an NMOS device in pinch-off saturation with kn= μn² Cox² W/L = 500 uA/V²2, VTH = 0.4 V, the gate is connected to the ground, the drain to VDD, and the source to a current source sinking 10 μA. The voltage of the source terminal (VS) is equal to V. A 0.6 B -0.5 C -0.6 D 0.5 5. For a MOS transistor operating in pinch-off saturation, if the channel length is multiplied by 4 and ID and W remain unchanged, then the overdrive voltage (Vov) is multiplied by A 0.5 B 2 C 1 D 0.25 6. PMOS device with body connected to VDD, if the source voltage decreases then [VTH] = A remains unchanged C The answer depends on W/L D Decreases A remains unchanged C The answer depends on W/L D Decreases 7. For a MOSFET operating in velocity saturation, if the overdrive voltage (Vov) is doubled, then the drain current (ID) is multiplied by A 8 B 1 C 2 D 4 8. For a MOS transistor operating in pinch-off saturation, if the overdrive voltage (Vov) is doubled, then the drain current (ID) is multiplied by A 4 B 1 C 2 D 8 9. For an NMOS transistor with μn = 400 cm²/Vs, L = 0.18 μm, VTH = 0.4V and electrons saturation velocity (Vsa = 10°7 cm/s. If this MOSFET operates with VGS = 1 V, and VDS = 1 V, then it is operated in the region. A Velocity Sat. B Triode C Linear D Pinch-off 10. The transistor is best modeled as a A VCVS B VCCS C CCCS D CCVS		multiplied by	r operating in s	saturation, ii th	e aspect ratio (w/L) is double	a, tnen tne cur	rent (1D) is
A 0.4 B 0.5 C 0.2 D 0.1 3. If you have an NMOS and a PMOS, both with the same aspect ratio (W/L) and the same overdrive voltage (Vov), then what is the ratio of the NMOS current to the PMOS current? - Assume that µn is 450 cm²/Vs and µn is 150 cm²/Vs. A 2 B 1 C 4 D 5 4. Assume an NMOS device in pinch-off saturation with kn- µn*Cox*W/L - 500 uA/V^2, VTH - 0.4 V, the gate is connected to the ground, the drain to VDD, and the source to a current source sinking 10 µA. The voltage of the source terminal (VS) is equal to V. A 0.6 B -0.5 C -0.6 D 0.5 5. For a MOS transistor operating in pinch-off saturation, if the channel length is multiplied by 4 and ID and W remain unchanged, then the overdrive voltage (Vov) is multiplied by A 0.5 B 2 C 1 D 0.25 6. PMOS device with body connected to VDD, if the source voltage decreases then VTH A remains unchanged C The answer depends on W/L B Increases D Decreases 7. For a MOSFET operating in velocity saturation, if the overdrive voltage (Vov) is doubled, then the drain current (ID) is multiplied by A 8 B 1 C 2 D 4 8. For a MOS transistor operating in pinch-off saturation, if the overdrive voltage (Vov) is doubled, then the drain current (ID) is multiplied by A 4 B 1 C 2 D 8 9. For an NMOS transistor with µn = 400 cm^2/Vs, L = 0.18 µm, VTH = 0.4V and electrons saturation velocity (Vsal = 10°7 cm/s. If this MOSFET operates with VGS = 1 V, and VDS = 1 V, then it is operated in the region. A Velocity Sat. B Triode C Linear D Pinch-off 10. The transistor is best modeled as a	A	8	В	2	C	4	D	1
5. If you have an NMOS and a PMOS, both with the same aspect ratio (W/L) and the same overdrive voltage (Vov), then what is the ratio of the NMOS current to the PMOS current? - Assume that μn is 450 cm²/Vs and μp is 150 cm²/Vs. A 2 B 1 C 4 D 5 4. Assume an NMOS device in pinch-off saturation with kn- μn*Cox*W/L - 500 uA/V^2, VTH - 0.4 V, the gate is connected to the ground, the drain to VDD, and the source to a current source sinking 10 μΛ. The voltage of the source terminal (VS) is equal to V. A 0.6 B -0.5 C -0.6 D 0.5 5. For a MOS transistor operating in pinch-off saturation, if the channel length is multiplied by 4 and ID and W remain unchanged, then the overdrive voltage (Vov) is multiplied by A 0.5 B 2 1 D 0.25 6. PMOS device with body connected to VDD, if the source voltage decreases then VTH A remains unchanged C The answer depends on W/L Decreases 7. For a MOSFET operating in velocity saturation, if the overdrive voltage (Vov) is doubled, then the drain current (ID) is multiplied by A 8 B 1 C 2 D 4 8. For a MOS transistor operating in pinch-off saturation, if the overdrive voltage (Vov) is doubled, then the drain current (ID) is multiplied by A 1 C 2 D 8 9. For an NMOS transistor with μn = 400 cm²2/Vs, L = 0.18 μm, VTH = 0.4V and electrons saturation velocity (Vsa = 10°7 cm/s. If this MOSFET operates with VGS = 1 V, and VDS = 1 V, then it is operated in the region. A Velocity Sat. B Triode C Linear D Pinch-off	2.	For an NMOS device	e, if VGS = 0.7	V and VTH = 0.	5 V then the V	ov is equal to _	V.	
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4. Assume an NMOS device in pinch-off saturation with kn= μn*Cox*W/L = 500 uA/V^2, VTH = 0.4 V, the gate is connected to the ground, the drain to VDD, and the source to a current source sinking 10 μA. The voltage of the source terminal (VS) is equal to V. A	3.	then what is the ratio	o of the NMOS	current to the	PMOS current		he same overd	rive voltage (Vov),
connected to the ground , the drain to VDD, and the source to a current source sinking 10 µA. The voltage of the source terminal (VS) is equal to V. A	A	2	В	1	С	4	D	3
A 0.5 B 2 C 1 D 0.25 6. PMOS device with body connected to VDD, if the source voltage decreases then VTH = A remains unchanged C The answer depends on W/L B Increases D Decreases 7. For a MOSFET operating in velocity saturation, if the overdrive voltage (Vov) is doubled, then the drain current (ID) is multiplied by A 8 B 1 C 2 D 4 8. For a MOS transistor operating in pinch-off saturation, if the overdrive voltage (Vov) is doubled, then the drain current (ID) is multiplied by A 4 B C 2 D 8 9. For an NMOS transistor with μm = 400 cm^2/Vs, L = 0.18 μm, VTH = 0.4V and electrons saturation velocity (Vsat = 10^7 cm/s. If this MOSFET operates with VGS = 1 V, and VDS = 1 V, then it is operated in the region. A Velocity Sat. B Triode C Linear D Pinch-off 10. The transistor is best modeled as a	A 5.	connected to the gro source terminal (VS) 0.6 For a MOS transisto	und , the drain) is equal to B r operating in j	to VDD, and th _V. -0.5 pinch-off satura	C C	-0.6	inking 10 μA. T	The voltage of the 0.5
6. PMOS device with body connected to VDD, if the source voltage decreases then VTH = A remains unchanged C The answer depends on W/L B Increases D Decreases 7. For a MOSFET operating in velocity saturation, if the overdrive voltage (Vov) is doubled, then the drain current (ID) is multiplied by A 8 B 1 C 2 D 4 8. For a MOS transistor operating in pinch-off saturation, if the overdrive voltage (Vov) is doubled, then the drain current (ID) is multiplied by A 4 B 1 C 2 D 8 9. For an NMOS transistor with μn = 400 cm ² /Vs, L = 0.18 μm, VTH = 0.4V and electrons saturation velocity (Vsater 10 ² cm/s. If this MOSFET operates with VGS = 1 V, and VDS = 1 V, then it is operated in the region. A Velocity Sat. B Triode C Linear D Pinch-off 10. The transistor is best modeled as a							D	0.25
B	6.	PMOS device with b	ody connected	to VDD, if the	source voltage	decreases then	VTH =	
7. For a MOSFET operating in velocity saturation, if the overdrive voltage (Vov) is doubled, then the drain current (ID) is multiplied by A		re		ed				
 8. For a MOS transistor operating in pinch-off saturation, if the overdrive voltage (Vov) is doubled, then the drain current (ID) is multiplied by A		_	rating in velocit	y saturation, if		voltage (Vov) is		the drain current
current (ID) is multiplied by A	A	8	В	1	C	2	D	4
9. For an NMOS transistor with μn = 400 cm ² /Vs, L = 0.18 μm, VTH = 0.4V and electrons saturation velocity (Vsat = 10 ⁷ cm/s. If this MOSFET operates with VGS = 1 V, and VDS = 1 V, then it is operated in the region. A Velocity Sat. B Triode C Linear D Pinch-off 10. The transistor is best modeled as a	8.			oinch-off satura	ation, if the ove	rdrive voltage (Vov) is double	l, then the drain
= 10^7 cm/s. If this MOSFET operates with VGS = 1 V, and VDS = 1 V, then it is operated in the region. A Velocity Sat. B Triode C Linear D Pinch-off 10. The transistor is best modeled as a	A	4	В	1	С	2	D	8
10. The transistor is best modeled as a	9.							•
	A	Velocity Sat.	В	Triode	С	Linear	D	Pinch-off
A VCVS B VCCS C CCCS D CCVS	10.	The transistor is bes	t modeled as a	·				
	A	VCVS	В	VCCS	C	CCCS	D	CCVS

2. Small Signal Model Quiz

Α.			onductance in analog cir	,	pinen on outdition is a		onan verserey savaracrem			
A		True		В		False				
2.	Assume a MOSFET in pi remains constant, then th				-	doub	led and the width			
A	0.5	В	2	С	1	D	1.4			
3.	3. One important property that measures the performance of the transistor in analog design is the current efficiency, which is the transconductance per unit current (gm/ID for MOSFET). Usually we need large transconductance, but we want to spend small current because we want to save the energy of our battery. So, the higher the current efficiency, the better. The MOSFET current efficiency is equal to									
A	4/Vov	В	2/Vov	С	1/Vov	D	1 / 2 Vov			
4.	Assume two MOSFETs i same ro regardless of VD	-	h-off saturation have the	same	VGS and the same dim	ensior	as. They will have the			
A		True		В		False				
5.	For a short channel MOS	SFET,	the behavior of gm vs V(GS for	VGS > VTH will be	·				
A			en linear	С			aturates			
В	Li	near o	only	D	Qua	dratic	only			
6.	One important property (gm*ro). If Lambda = 1 / 1		=		-	sign is	the intrinsic gain			
A	(2*VA)/Vov	В	VA/Vov	С	VA/(2*Vov)	D	(4*VA)/Vov			
7.	One important property which is the transconduct but we want to spend sm efficiency, the better. CM means that if ID = 10 uA,	that m tance all cur IOS ar	easures the performance per unit current (gm/ID rent because we want to nalog designers typically	of the for Manager save	e transistor in analog de (OSFET). Usually we ne the energy of our batter	esign i ed lar y. So,	s the current efficiency, ge transconductance, the higher the current			
	One important property which is the transconduct but we want to spend sm efficiency, the better. CM means that if ID = 10 uA,	that m tance all cur IOS ar	easures the performance per unit current (gm/ID rent because we want to nalog designers typically	of the for Manager save	e transistor in analog de (OSFET). Usually we ne the energy of our batter	esign i ed lar y. So,	s the current efficiency, ge transconductance, the higher the current			
7.	One important property which is the transconduct but we want to spend sm efficiency, the better. CM means that if ID = 10 uA,	that m tance all cur IOS ar then	easures the performance per unit current (gm/ID rent because we want to nalog designers typically gm will be in the range o 10-20 uS turation being measured	of the for M save use a	e transistor in analog de (OSFET). Usually we ne the energy of our batter n overdrive voltage of an 	esign i ed lar y. So, cound	s the current efficiency, ge transconductance, the higher the current 100-200mV. This			
7.	One important property which is the transconduct but we want to spend sm efficiency, the better. CM means that if ID = 10 uA, 200-400 uS For a MOSFET in pinch-gain (gm*ro) will be mult	that m tance all cur IOS ar then	easures the performance per unit current (gm/ID rent because we want to nalog designers typically gm will be in the range o 10-20 uS turation being measured	of the for M save use a	e transistor in analog de (OSFET). Usually we ne the energy of our batter n overdrive voltage of an 	esign i ed lar y. So, cound	s the current efficiency, ge transconductance, the higher the current 100-200mV. This			
7. A	One important property which is the transconduct but we want to spend sm efficiency, the better. CM means that if ID = 10 uA, 200-400 uS For a MOSFET in pinch-gain (gm*ro) will be mult	that m tance all cur IOS ar then B off sa iplied	easures the performance per unit current (gm/ID rent because we want to halog designers typically gm will be in the range of 10-20 uS turation being measured by	e of the for M save use a f C	e transistor in analog de (OSFET). Usually we ne the energy of our batter n overdrive voltage of an 100-200 uS	esign i ed lar y. So, cound D	s the current efficiency, ge transconductance, the higher the current 100-200mV. This 50-100 uS			
7. A	One important property which is the transconduct but we want to spend sm efficiency, the better. CM means that if ID = 10 uA, 200-400 uS For a MOSFET in pinchgain (gm*ro) will be mult 0.5 Technology scaling impro	that m tance all cur IOS ar then B off sa iplied	easures the performance per unit current (gm/ID rent because we want to halog designers typically gm will be in the range of 10-20 uS turation being measured by	e of the for M save use a f C	e transistor in analog de (OSFET). Usually we ne the energy of our batter n overdrive voltage of an 100-200 uS	esign i ed lar y. So, cound D	s the current efficiency, ge transconductance, the higher the current 100-200mV. This 50-100 uS			
7. A 8. A 9. A	One important property which is the transconduct but we want to spend sm efficiency, the better. CM means that if ID = 10 uA, 200-400 uS For a MOSFET in pinchgain (gm*ro) will be mult 0.5 Technology scaling impro	that m tance all cur IOS are then so off sariplied B	easures the performance per unit current (gm/ID rent because we want to halog designers typically gm will be in the range of 10-20 uS turation being measured by 1 he intrinsic gain of the tr	c of the for M save use a f C C ansist	e transistor in analog de lOSFET). Usually we ne the energy of our batter n overdrive voltage of an 100-200 uS e lab, if the current is question 1.5 or (gm*ro).	esign i ed lar y. So, round D adrup	s the current efficiency, ge transconductance, the higher the current 100-200mV. This 50-100 uS led then the intrinsic			