University of Mumbai

Question bank

Program: **Electronics Engineering**
Curriculum Scheme: Rev2016
Examination: BE Semester VIII
Course Code: ELX802 and Course Name: Analog and Mixed VLSI Design
Max. Marks: 80

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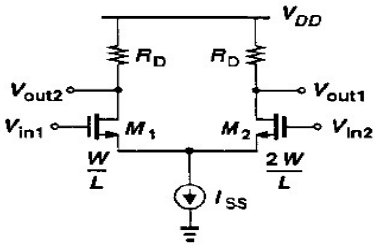
	Each Question Carries 02 Marks
1.	In current mirror circuit, in first MOSFET, which two terminals are shorted?
Option A:	Drain & Source
Option B:	Drain & Substrate
Option C:	Drain & Gate
Option D:	Gate & Source
2.	In a common source circuit with NMOS diode connected load M1 The impedance seen at the source of M1 is
Option A:	$1/(g_m+g_{mb})$
Option B:	$1/g_m$
Option C:	$1/g_{mb}$
Option D:	$1/(g_m+g_{mb}+r_o)$
3.	Which amplifier acts as voltage level shifter?
Option A:	CS amplifier
Option B:	CG amplifier
Option C:	CD amplifier
Option D:	CS amplifier with source degeneration
4.	ro is the internal resistance of a MOSFET is equal to
Option A:	$1/\lambda I_D$
Option B:	λ/I_D
Option C:	I_D/λ
Option D:	λI_D
5.	Which of the following OPAMP topology provides Highest voltage swing?
Option A:	Telescopic
Option B:	Folded Cascode
Option C:	Two stage
Option D:	Gain Boosted
6.	Slew rate is defined as the rate of change of _____.
Option A:	Output voltage with respect to time
Option B:	Input voltage with respect to time
Option C:	Both output input voltage with respect to time
Option D:	Output current with respect to time
7.	The PLL device is:
Option A:	Feedback system that compares output frequency and input frequency
Option B:	Feedback system that compares output phase and input phase

Option C:	Linear system that compares output resistance and input resistance
Option D:	Non Linear system that compares output current and input current
8.	The transfer function of PD is :
Option A:	Constant
Option B:	Varies with frequency
Option C:	Varies with voltage
Option D:	Varies with voltage and frequency
9.	In Switched Capacitor circuits, to achieve a higher sampling speed, _____ & _____ must be used.
Option A:	A small aspect ratio, a small capacitor
Option B:	A Large aspect ratio, a large capacitor
Option C:	A small aspect ratio, a large capacitor
Option D:	A Large aspect ratio, a small capacitor
10.	Find the resolution of a 10-bit AD converter for an input range of 10v?
Option A:	97.7mv
Option B:	9.77mv
Option C:	0.977mv
Option D:	977mv
11.	In current mirror circuit, the first MOSFET (which copy current from reference) is operating in which region
Option A:	Linear
Option B:	Saturation
Option C:	Cut-off
Option D:	deep triode region
12.	What is the use of constant-Gm biasing?
Option A:	To make transistor transconductance independent of temperature, process and supply
Option B:	To make transistor transconductance independent of only temperature.
Option C:	To make transistor transconductance independent of only process.
Option D:	To make transistor transconductance independent of only supply.
13.	The condition for MOSFET to be in deep triode region is----------.
Option A:	$V_{DS} << 2(V_{GS}-V_{TH})$
Option B:	$V_{DS} >> 2(V_{GS}-V_{TH})$
Option C:	$V_{DS} << (V_{GS}-V_{TH})$

Option D:	V_{DS}>> (V_{GS}-V_{TH})
14.	The maximum output voltage of CS amplifier can be achieved with diode connected load is
Option A:	$V_{out,max}=V_{DD}-V_{TH}$
Option B:	$V_{out,max}=V_{DD}$
Option C:	$V_{out,max}=V_{DD}+V_{TH}$
Option D:	$V_{out,max}=--V_{DD}$
15.	What is the relation between overall transconductance and differential input of differential amplifier?
Option A:	Transconductance is maximum for large positive differential input
Option B:	Transconductance is maximum for large negative differential input
Option C:	Transconductance is maximum for zero differential input
Option D:	Transconductance is not related to differential input
16.	The relation between input CM level and output swing of a differential amplifier is……
Option A:	Higher the input CM level, smaller output swing
Option B:	Higher the input CM level, higher output swing
Option C:	lower the input CM level, smaller output swing
Option D:	No relation between input CM level and smaller output swing
17.	In a three stage ring oscillator requires a low frequency gain of ……per stage
Option A:	2
Option B:	3
Option C:	4

Option D:	1
18.	Cascode OPAMP increases _____ but limits _____?
Option A:	Voltage swing, Gain
Option B:	ICMR, Voltage swing
Option C:	CMRR, Gain
Option D:	Gain, Voltage Swing
19.	What is the function of low pass filter in phase-locked loop (PLL) circuit?
Option A:	Improves low frequency noise
Option B:	Removes high frequency noise
Option C:	Tracks the voltage changes
Option D:	Changes the input frequency
20.	The smallest possible input voltage detected by 8-bit DAC with reference voltage of 10V is…
Option A:	5V
Option B:	78.125mV
Option C:	39.0625mV
Option D:	20mV

	Each Question Carries 10 Marks
1.	Explain in detail how to generate temperature independent reference
2.	Discuss the stability issues and frequency compensation of two stage opamp
3.	Explain AMS design flow. Compare full custom and semi custom design.
4.	Explain the concept of switched capacitor circuit. Explain switched capacitor integrator circuit along with output waveform
5.	Derive the expression of voltage gain and output resistance of source follower stage.
6.	Compare various opamp topologies along with circuit diagrams and gain equations.
7.	Explain Non-ideal effects in PLL
8.	What are the various types of ADC architectures? Explain any two architectures
9.	Derive the expression of input and output referred noise voltage of common source stage.

10.	Compare common source amplifier with following load a) NMOS diode connected load b)PMOS diode connected load c) Current source load d) Triode load
11.	What is a bandgap reference? Describe methods of implementation of band gap references.
12.	What are the different layout techniques used to : a) Reduce mismatch problem in the Analog layout. b) Reduce parasitic capacitance and noise in the analog layout..
13.	Compare various opamp topologies along with circuit diagrams and gain equations.
14.	Analyze following circuit to get voltage gain equation if M_2 is twice wide as that of M_1 and $Vin_1=Vin_2$ 
15.	Explain types of error contributes by charge injection in MOS switching circuit
16.	Draw and explain charge pump circuit
17.	What are the various types of DAC architectures? Explain any two architectures
18.	Using small signal behavior, prove that for differential pair the magnitude of differential gain is equal to gmRD regardless of how the inputs are applied.