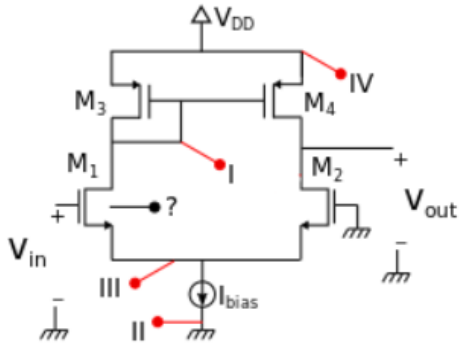
Evaluation Test II

1. A folded-cascode circuit has been designed with a moderate gain of 50 dB. An extra stage is added to the output of the circuit, being composed of a common-drain based structure. What could be the purpose of this extra stage?

a) A high output resistance will be required to feed moderate capacitances.
b) The folded-cascode structure itself does not have enough phase margin, which is achieved by means of the extra stage.
c) The folded-cascode circuit will be connected to low resistances (around 100 ohms).
d) Higher gain is required.

2. The following input stage has been designed for the first stage of an operational amplifier. Where do we need to connect M1's bulk to avoid body effect?



a) I.
b) II.
c) III.
d) IV.

3. In relation to circuit microelectronic's miniaturization process, which of the following sentences is true?

a) Voltage supply becomes higher.
b) Transistor's switching frequency becomes lower.
c) Intrinsic gain of a single transistor becomes lower.
d) All of the sentences are false.

4. We have measured the drain current of an NMOS transistor with respect to the gate-source voltage. The resulting current-voltage function shows an exponential behavior. What can we say about the transistor?

a) The transistor is working in weak-inversion.
b) We have no enough data to know which is the operating region of the transistor.
c) The transistor is working in very strong- inversion.

d) The transistor is working in strong-inversion.

5. If we want to avoid weak inversion in a NMOS transistor we need:

a) To increase the effective voltage drop in the channel.
b) To decrease V_{GS}.
c) To decrease its length.
d) To decrease V_{DD}.

6. In a cascode current mirror some transistors will have different threshold voltage than others due to:

a) Body effect. This will happen only in those transistors with VBS≠0.
b) Body effect. This will happen always in this circuit.
c) Channel length modulation. This will happen always in this circuit.
d) Channel length modulation. This will happen only in those transistors with $V_{BS}≠0$.

7. If we want to increase ft in a MOS transistor we need to:

a) Decrease its length.
b) Decrease its V_{GS}.
c) Increase C_{GD}.
d) Increase C_{SB}.

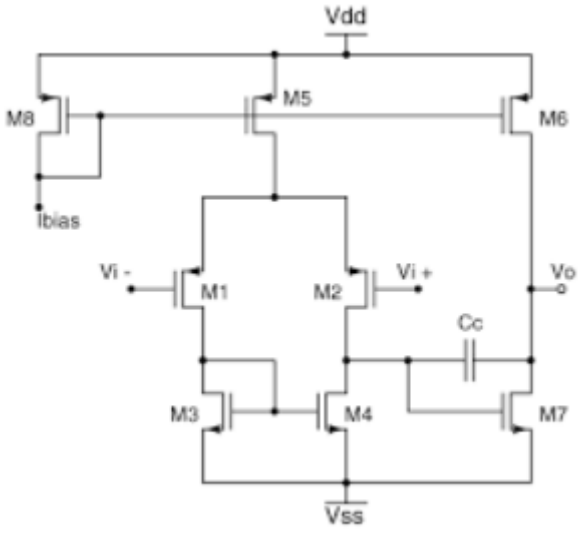
8. What is true about cascode current mirrors?

a) Their output resistance is higher than in regulated current mirrors.
b) Their output resistance can be enhanced with a small amplifier.
c) They are not suitable for low voltage circuits.
d) They behave as ideal current sources.

9. In a regular cascode current mirror:

a) The minimum output voltage depends only on the output current.
b) The minimum output voltage is the saturation voltage plus the threshold voltage of the transistors.
c) The minimum output voltage is twice the current mirror transistor saturation voltage.
d) The minimum output voltage is twice the saturation voltage plus the threshold voltage of the transistors.

10. This amplifier is:



a) A folded cascode opamp targeted for large capacitive loads.
b) A folded cascode opamp targeted for small capacitive loads.
c) A Miller opamp targeted for small capacitive loads.
d) A Miller opamp targeted for large capacitive loads.