

## Rubric Quiz-2

ECE515/315 QUIZ 2

Roll No.

Name

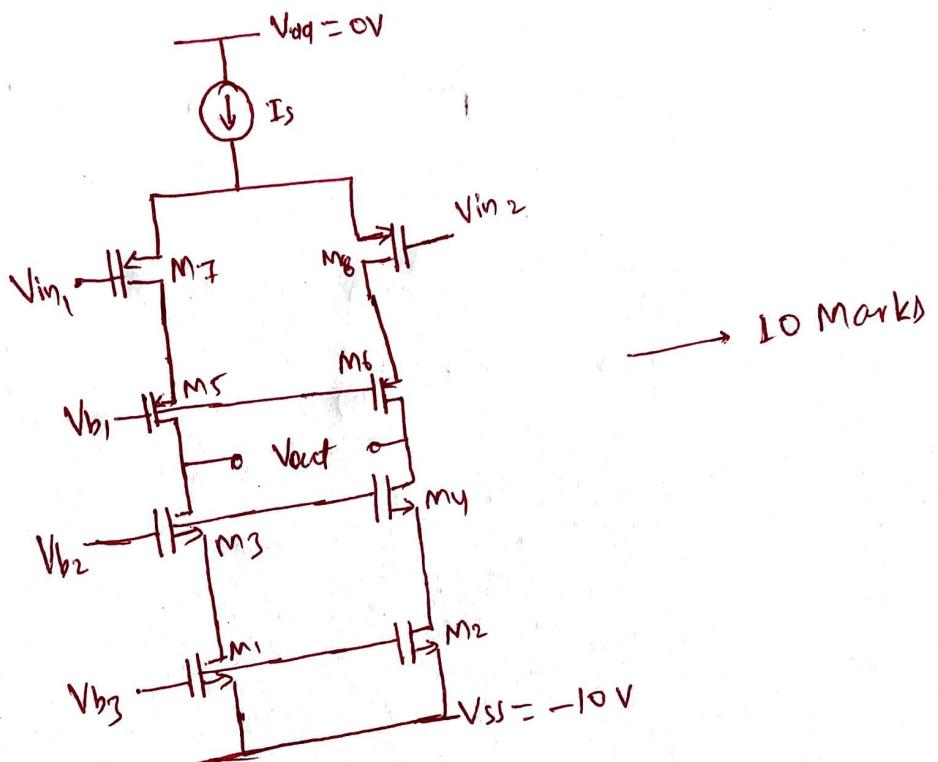
OPEN NOTES QUIZ. EXCHANGE OF NOTES NOT ALLOWED. ANSWER ALL QUESTIONS IN BRIEF. THERE ARE TWO QUESTIONS IN TWO PAGES.

Maximum Marks 20

7<sup>th</sup> Oct. 2025 12:05 PM - 12:20 PM

Q.1 Draw the topology of a MOS Telescopic Cascode differential amplifier with  $V_{DD} = 0$ ,  $V_{SS} = -10$  V. The differential input signals are applied to PMOS transistor pair. (10 Marks)

Answer



Q.2 Compare the performance of following amplifiers with respect to typical values of different parameters:

| Type of Amplifier                       | Gain                                    | BW   | UNITY GAIN BW   | OUTPUT RESISTANCE          |
|---|---|--|---|----------------------------|
| Common Source                           | $-g_m R_D \gg 1$<br>High                | Low<br>(due to miller effect on $C_{gd}$ ) | Moderate<br>$(V_{G,W} = A_v \cdot BW = \text{High} \cdot \text{low})$ | $R_D$<br>(High)            |
| Common drain<br>(or)<br>Source follower | $\frac{g_m R_S}{1 + g_m R_S} \approx 1$ | High<br>(no miller multiplication)         | High  | $R_{out} = 1/g_m$<br>(Low) |
| Common Gate                             | $g_m R_D$<br>High                       | Very high<br>(miller effect negligible)    | Very high   | $R_{out} = R_D$<br>(High)  |

Tabulate your answers in above table.

(10 Marks)