ECE515/315 QUIZ 3

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 14th Oct. 2025 12:05 PM – 12:20 PM

Q.1 In Figure 1, Assume all transistors are identical and Q1, Q2 are in the active region.

a) Find I in terms of Io. (5 Marks)

b) Draw the appropriate circuit equivalent using only MOS transistors and resistance. (5 Marks)

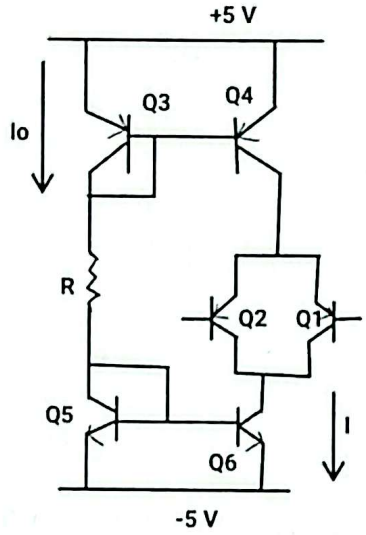


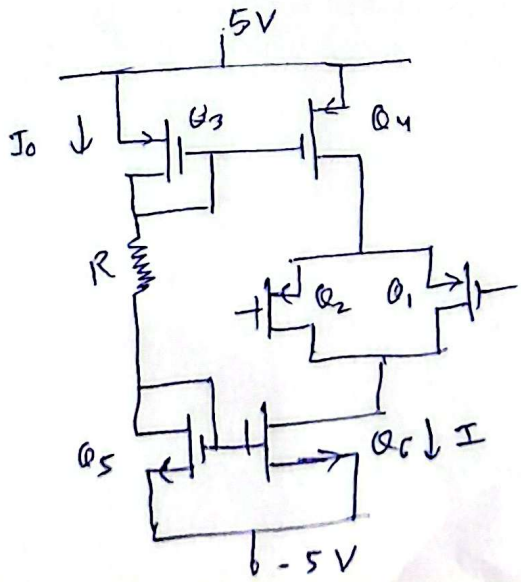
Figure 1

Answer.

(a) Since Q_3 and Q_4 are identical and it's a current mirror. Q_5 and Q_6 are identical and are current mirror. So $I_0 = I_5 = I_4$

Thus, $I_4 = I_0 \Rightarrow I = I_0$.

(b)



Q.2 For the differential amplifier shown in Figure 2, when both inputs VIN1 & VIN2 = 0 we are getting an output VOUT1-VOUT2 ≠ 0 . What are the reasons for having a non zero output.

(10 Marks)

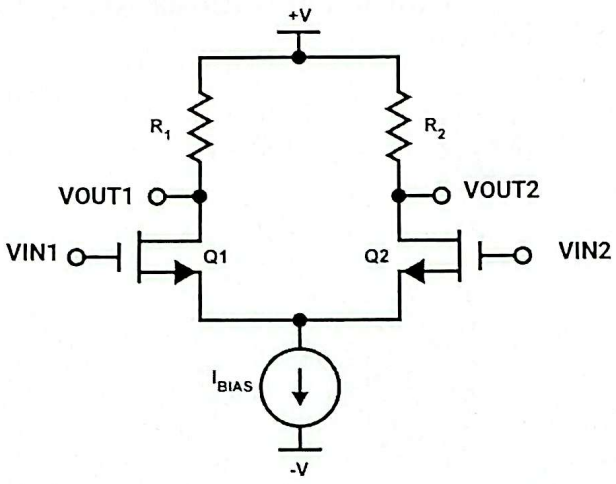


Figure 2

Answer.

(i) Transistors are not identical.

(ii) Resistances are not identical.

(iii) Process variations in two transistors fabrication.