

EC201 : ANALOG CIRCUITS

QUIZ 2 — Maximum Marks 20 — TIME - 1 Hour

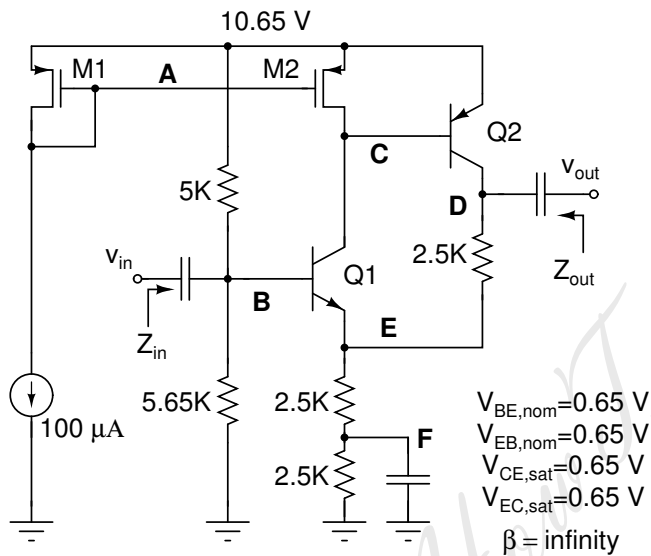
Roll Number :
Name :

Please explicitly state all assumptions you make. In your own interest, do not skip steps while working the problems. *NO CREDIT WILL BE GIVEN FOR ANSWERS WITHOUT CLEAR EXPLANATIONS AS TO HOW YOU CAME TO THE SOLUTION. THE INSTRUCTORS JUDGMENT WILL BE FINAL IN THIS REGARD.*

WRITE THE FINAL ANSWERS IN THE COLUMNS 2 & 3 BELOW. **DO NOT WRITE ANYTHING IN COLUMN 4**

Problem 1

Problem 1 (20 Marks)



$V_{TP} = 0.45 \text{ V}$ $(1/2)\mu C_{ox}(W/L) = 2.5 \text{ mA/V}^2$

Figure 1: Circuit diagram for Problem 1.

Consider the circuit shown in Figure 1. M1 and M2 are identical devices. All capacitors are infinite.

- Find the quiescent voltages at nodes A,B,C,D,E and F. (3 Marks)
- Find the quiescent currents through M1, M2, Q1 and Q2. (2 Marks)
- Determine the small signal gain v_{out}/v_{in} . (5 marks)
- Determine the input and output impedances Z_{in} and Z_{out} . (4 marks)
- Determine the amplitude of the largest input sinewave that will result in a distortion free output. **Do not skip steps.** (6 marks)

(a)	A	B	1
	C	D	1
	E	F	1
(b)	M1	M2	1
	Q1	Q2	1
(c)	v_{out}/v_{in}		5
(d)	Z_{in}	Z_{out}	4
(e)	Max. amplitude		6