Name:	ID:	Section:

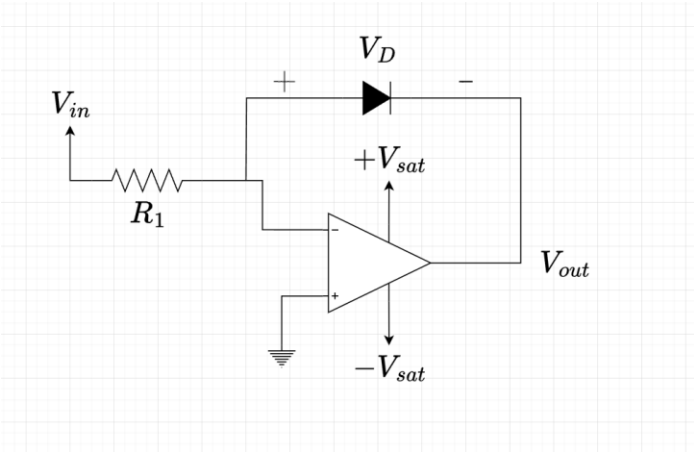
Assignment 3

BRAC Unviversity

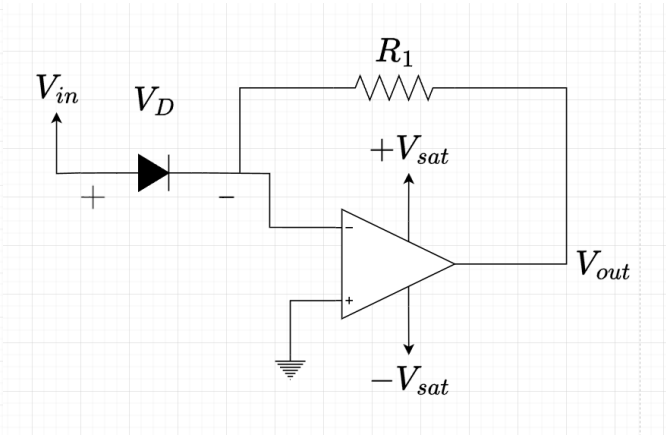
Semester: Fall 20023

Course No.: CSE251	Marks:
Course title: Electronic Devices and Circuits	Submission Date: 24/10/2023
Faculty: TMT	

1. Consider the following two circuits given below:



Circuit – 1



Circuit – 2

a) Solve both circuits and find their expressions of $\mathbf{V_{out}}$. What mathematical operations are the two circuits performing on the input voltages? **[CO1] [10]**

b) Find the output values of the two circuits with $\mathbf{V_{in}}$ **= 0.01V, 0.02V, 0.05V** and **0.1V.** Draw a table with two columns, one for output of Circuit-1 and one for Circuit-2, and enter 3 entries for the three input voltages above. **[CO1] [4]**

c) From the table obtained from **(b)**, which of the outputs of the two circuits seem to grow faster? Explain your reasoning from the expressions obtained in **(a)** and tabular values from **(b)**. **[CO2] [6]**

d) Now connect the output of the first circuit with the input of the second circuit. Draw the connected circuit and find the output voltage expression from an arbitrary input, V_{in}. **[CO2] [10]**

Given that, $\mathbf{I_s = 10^{-9}\ A}$, $\mathbf{R_1 = 10\ M\Omega}$ **and** $\mathbf{V_T = 0.0259\ V}$. Also, the diode shockley equation that relates the current through it to the voltage across the diode is given by: $\mathbf{I_D = I_s * exp[(V_D/V_T)-1]}$ where **exp()** is the exponential function.