1 – Analysis: Create a table of the calculated expected output voltages for v_in from 0V to 5V in 0.5V increments.　　　　　　　　　　　　　　40pts

VDD

5.0V
VDD

R1
1.2KΩ

v_out　　　v_out

Q1

v_in　v_in

Vt = 1v
Kn' = 2e-3A/V2
W/L = 1

0

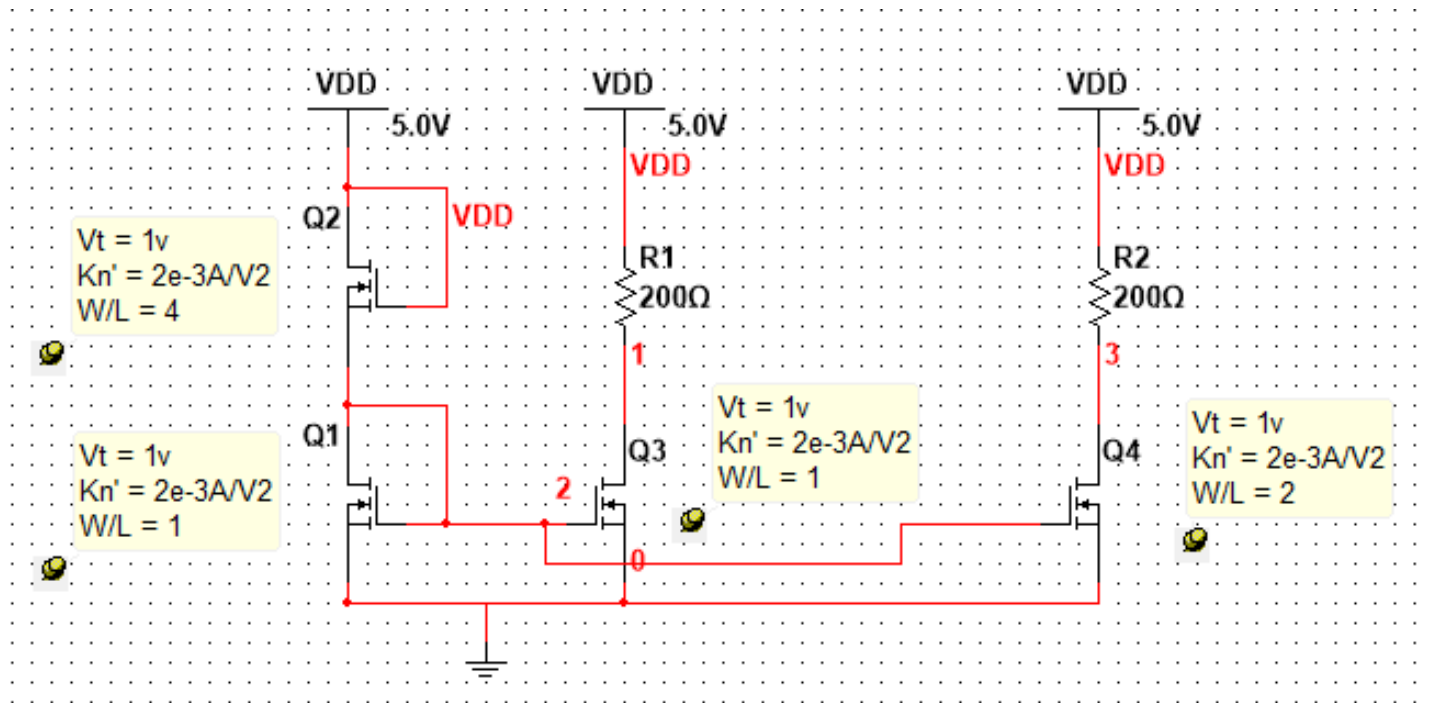| Vin	ID	VDS	Mode

2 – Analysis: Calculate the currents in R1 and R2.   30pts

VDD
5.0V

VDD
5.0V
VDD

VDD
5.0V
VDD

Q2
VDD

Vt = 1v
Kn' = 2e-3A/V2
W/L = 4

R1
200Ω

1

R2
200Ω

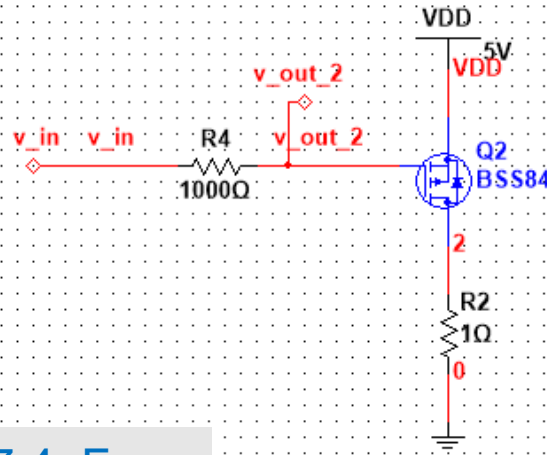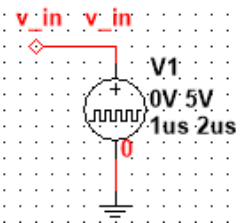3

Q1

Vt = 1v
Kn' = 2e-3A/V2
W/L = 1

Q3

Vt = 1v
Kn' = 2e-3A/V2
W/L = 1

2

0

Q4

Vt = 1v
Kn' = 2e-3A/V2
W/L = 2

3 – Simulation: Calculate the input capacitance for the two MOSFETS
Hint: setup a step input and measure the RC rise at v_out_1 and v_out_2, use the
result to estimate tau   30pts

VDD
5V
VDD

R3
1Ω

1

v_out_1

v_in v_in   R1   v_out_1   Q1
              1000Ω   2N7000

0

VDD
5V
VDD

v_out_2

v_in v_in   R4   v_out_2   Q2
              1000Ω   BSS84

2

R2
1Ω

0
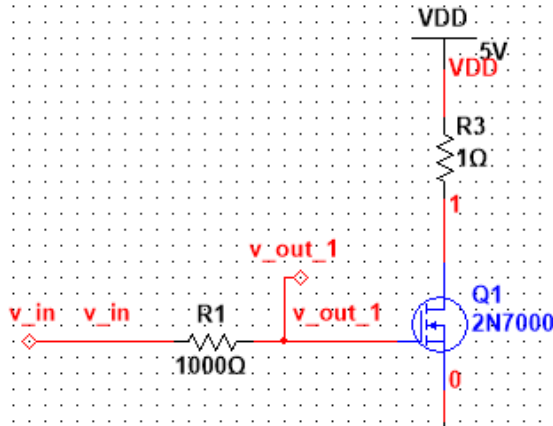
44.3pF
spec = <50pF

87.4pF
spec = 73pF typ

v_in v_in

V1
0V 5V
1us 2us
0

delay = 0
rise, fall = 1n
width = 1u
period = 2u

Title: HW5_Part3
Desc.: Input Capacitance Estimate
Designed by: tj   Revision:
Date: 3/31/2022   Size:

MSOE