AUDIT COURSE ELECTRONIC CIRCUITS 1:
SIMULATION BASED STUDY

LAB 18

Kindly update your name and roll no, once this document is shared with you
Time slot to complete your work is **40 MINUTES**
Date: 06/10/2020
Kindly upload your schematic & waveform images here, every 10 minutes, indicating your progress and intention to completion of WORK within time slot allotted

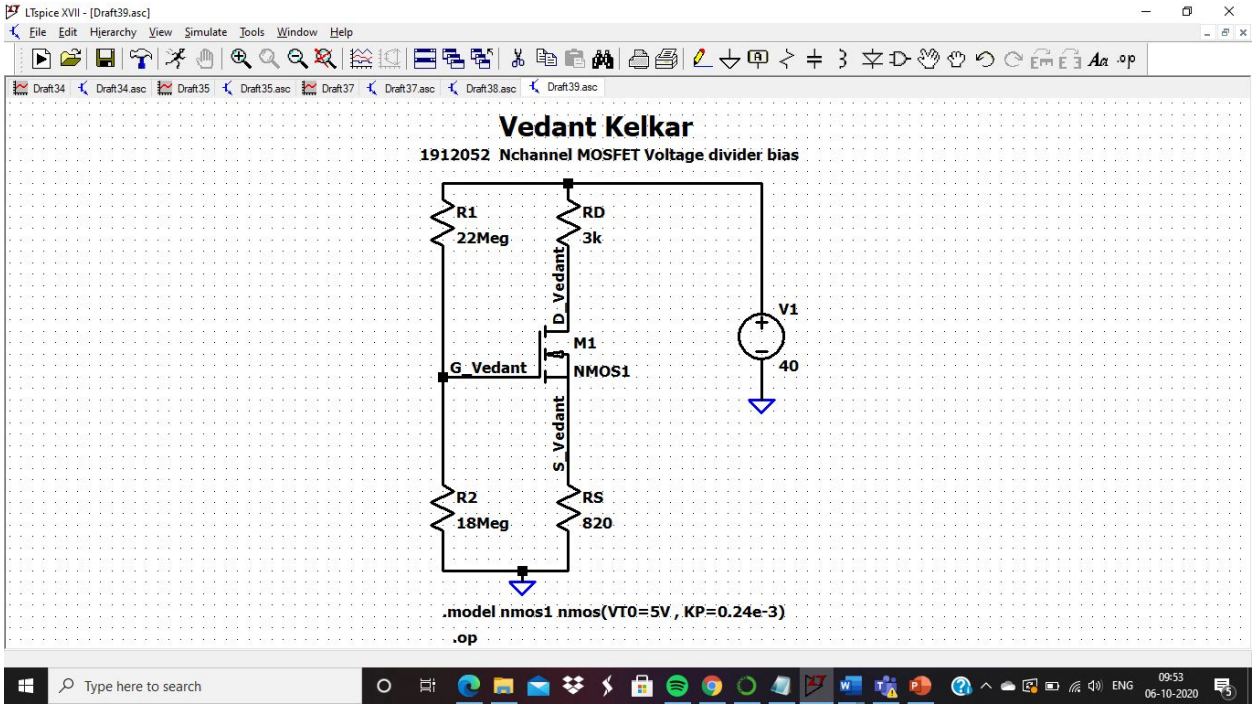
Time slot allotted to you all for the completion of WEEK 9 DAY 2 is 40 MINUTES

Kindly upload your work (only circuit schematic & waveform in LTSpice) in the shared google doc between this time slot only.

Follow these instruction strictly:
1, Start sharp ON TIME, by posting your name and roll no and **screenshot of your LT spice work screen (time and date MUST BE VISIBLE)**
2. Upload your work every 10 minutes, i.e LT spice work screen
3. This means you will upload LT spice work screen 4 times during this time slot.
4. Point 3 indicates your readiness and presences for completion of WEEK 9 DAY 2

You are entitled for 1 CREDIT per Lab only if you follow above instruction to the details

STUDENTS WORK AREA STARTS HERE



V(d_vedant): 19.8263 voltage
V(g_vedant): 18 voltage
V(s_vedant): 5.51414 voltage
V(n001): 40 voltage
Id(M1): 0.00672457 device_current
Ig(M1): 0 device_current
Ib(M1): -1.43222e-011 device_current
Is(M1): -0.00672457 device_current
I(Rs): 0.00672457 device_current
I(R2): 1e-006 device_current
I(R1): 1e-006 device_current
I(Rd): 0.00672457 device_current
I(V1): -0.00672557 device_current

ta

Day

Date

syngenta

1912052.

$V_G = \frac{R_2}{R_1 + R_2} \times V_{DD} = \frac{18\times10^6}{18\times10^6 + 22\times10^6} \times 40 = 18V$

$K_n = \frac{I_{D(on)}}{[V_{GS(on)} - V_{GS(th)}]^2} = \frac{3\times10^{-3}}{(10-5)^2} = 0.12 mA/V^2$

$\boxed{K_n = 0.12 mA/V^2}$

$V_{GS} = V_G - V_S = V_G - I_D R_S = 18 - I_D(820)$ - ①

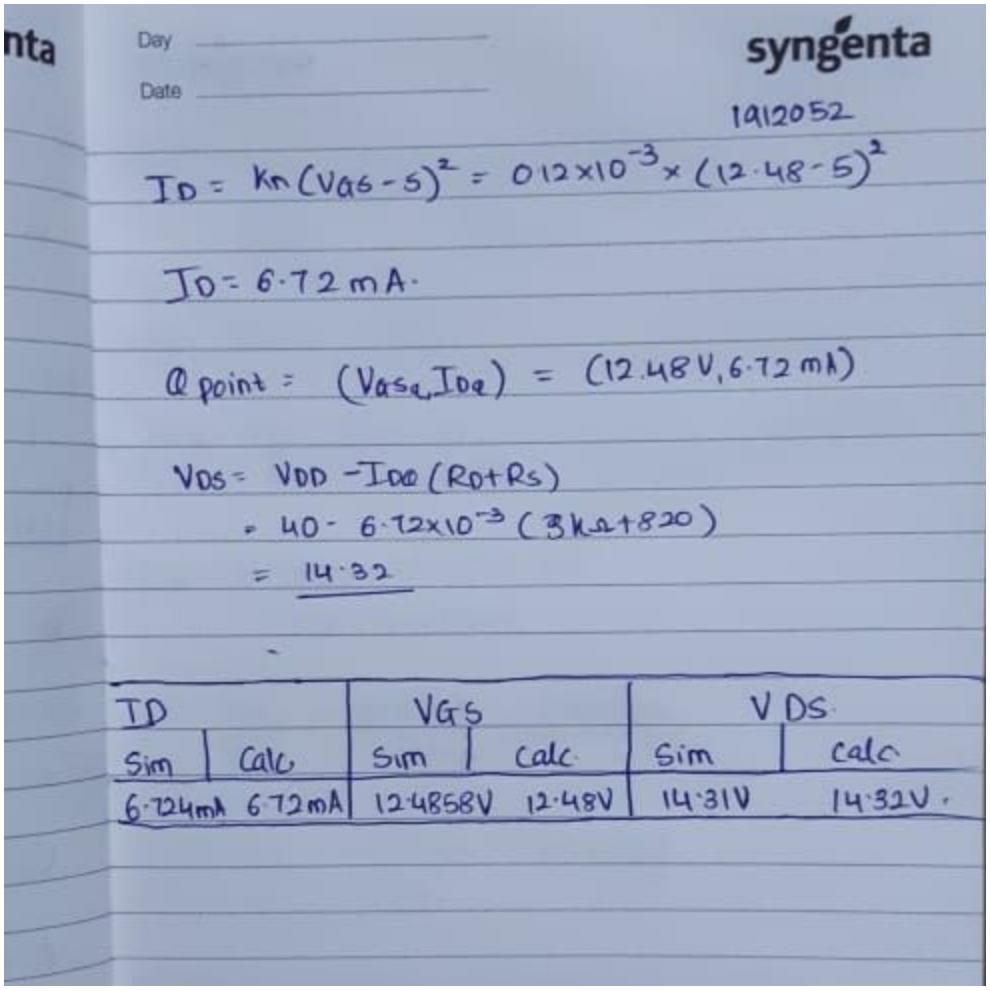
for saturation region

$I_D = K_n(V_{GS} - V_{GS(th)})^2 = 0.12\times10^{-3}(V_{GS}-5)^2$

$V_{GS} = 18 - 820 \times 0.12\times10^{-3} \times (V_{GS}-5)^2$

$0.0984(V_{GS}^2) + 0.016 V_{GS} - 15.54 = 0$

$V_{GS} = 12.48 V$ ✓ / $V_{GS} = -12.64 V$ ×



nta

Day

Date

syngenta

1912052

$I_D = K_n (V_{GS} - 5)^2 = 012 \times 10^{-3} \times (12.48 - 5)^2$

$I_D = 6.72\ mA.$

Q point = $(V_{GSQ}, I_{DQ}) = (12.48V, 6.72\ mA)$

$V_{DS} = V_{DD} - I_{DQ}(R_D + R_S)$

$= 40 - 6.72 \times 10^{-3} (3k\Omega + 820)$

$= 14.32$

ID		VGS		VDS	
Sim	Calc	Sim	calc	Sim	Calc
6.724mA	6.72mA	12.4858V	12.48V	14.31V	14.32V.

AC LAB 18 is approved: Inderjit Singh Dhanjal