

AUDIT COURSE ELECTRONIC CIRCUITS 1: SIMULATION BASED STUDY

LAB 17

Kindly update your name and roll no, once this document is shared with you

Time slot to complete your work is **40 MINUTES**

Date: 05/10/2020

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 1 is 40 MINUTES

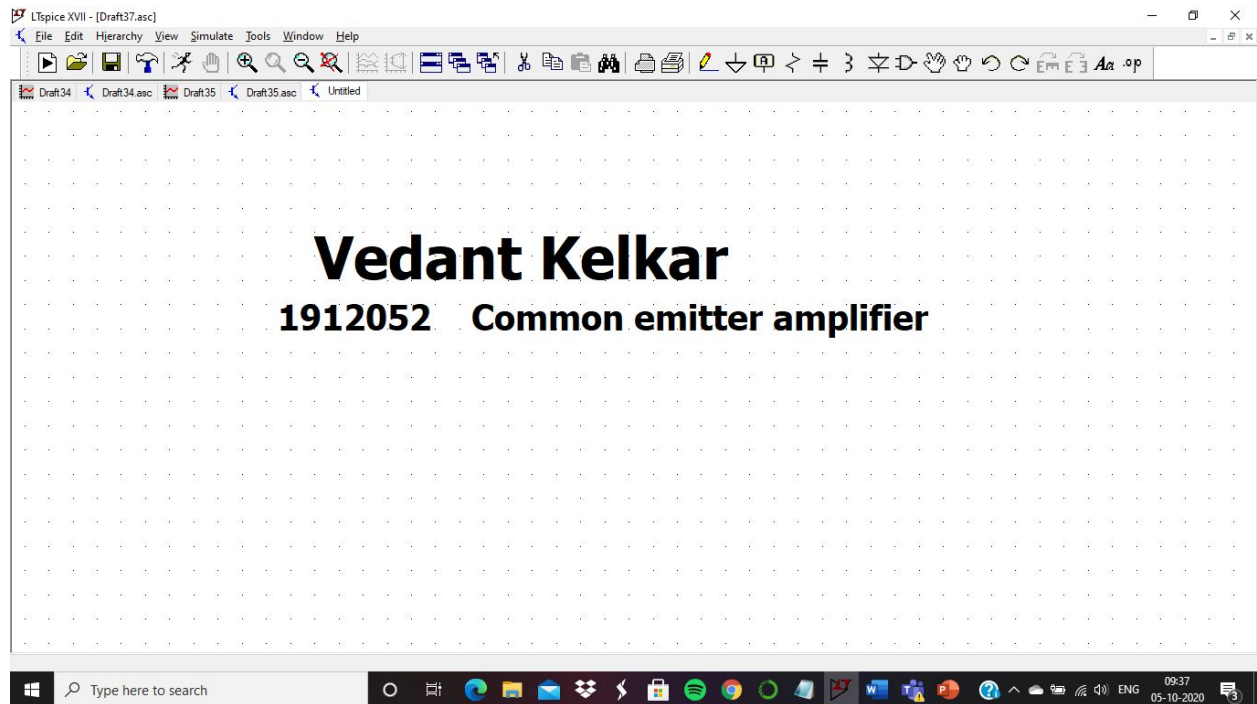
Kindly upload your work (only circuit schematic & waveform in LTSpice) in the shared google doc between this time slot only.

Follow these instruction strictly:

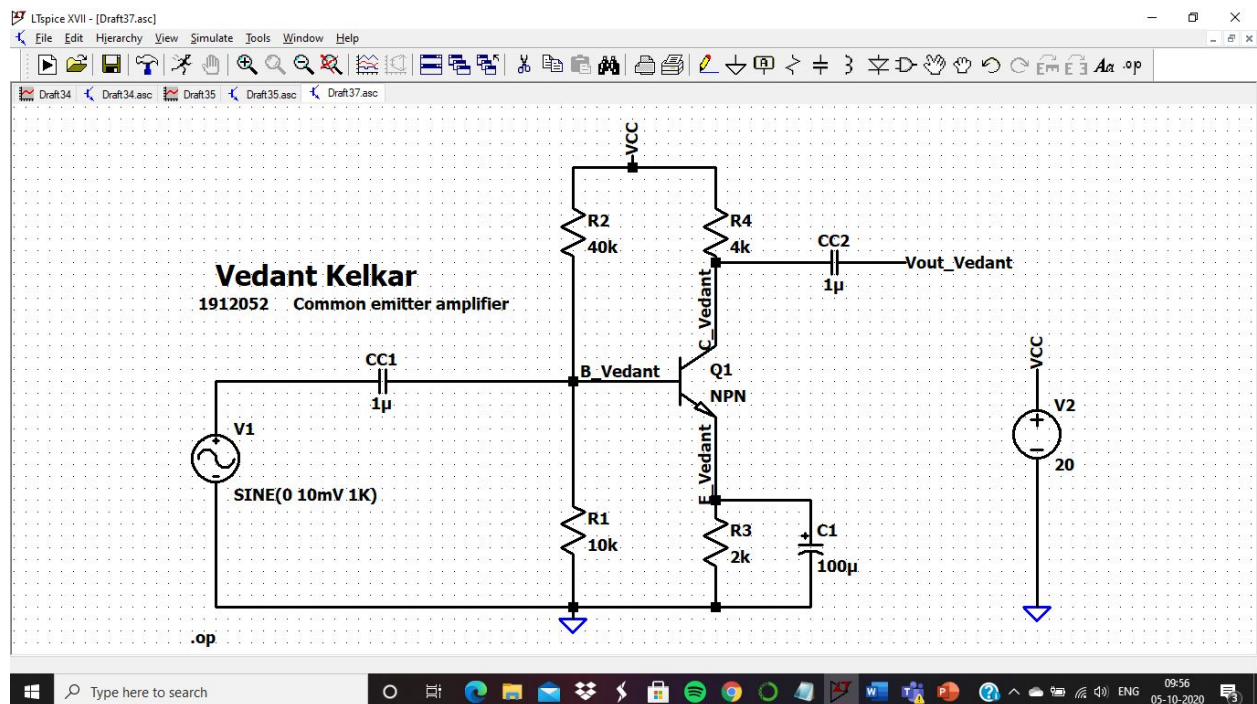
- 1, Start sharp ON TIME, by posting your name and roll no and **screenshot of your LT spice work screen (time and date MUST BE VISIBLE)**
2. Upload your work every 10 minutes, i.e LT spice work screen
3. This means you will upload LT spice work screen 4 times during this time slot.
4. Point 3 indicates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

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

STUDENTS WORK AREA STARTS HERE



20 mV

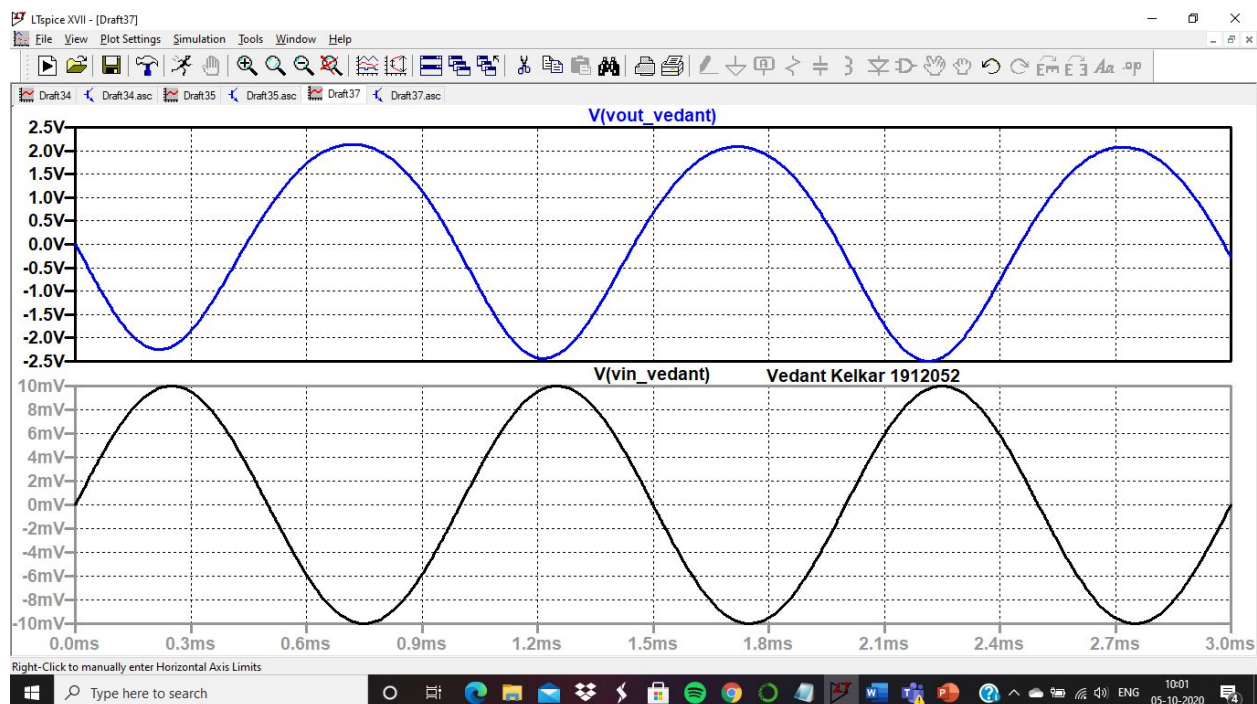


V(n001): 0 voltage

V(b_vedant): 3.87753 voltage

V(vcc): 20 voltage
V(c_vedant): 13.8767 voltage
V(e_vedant): 3.09229 voltage
V(vout_vedant): 1.38766e-005 voltage
Ic(Q1): 0.00153084 device_current
Ib(Q1): 1.53083e-005 device_current
Ie(Q1): -0.00154614 device_current
I(C1): 3.09229e-016 device_current
I(Cc2): -1.38766e-017 device_current
I(Cc1): 3.87753e-018 device_current
I(R4): 0.00153084 device_current
I(R3): 0.00154614 device_current
I(R2): 0.000403062 device_current
I(R1): 0.000387753 device_current
I(V2): -0.0019339 device_current
I(V1): 3.87753e-018 device_current

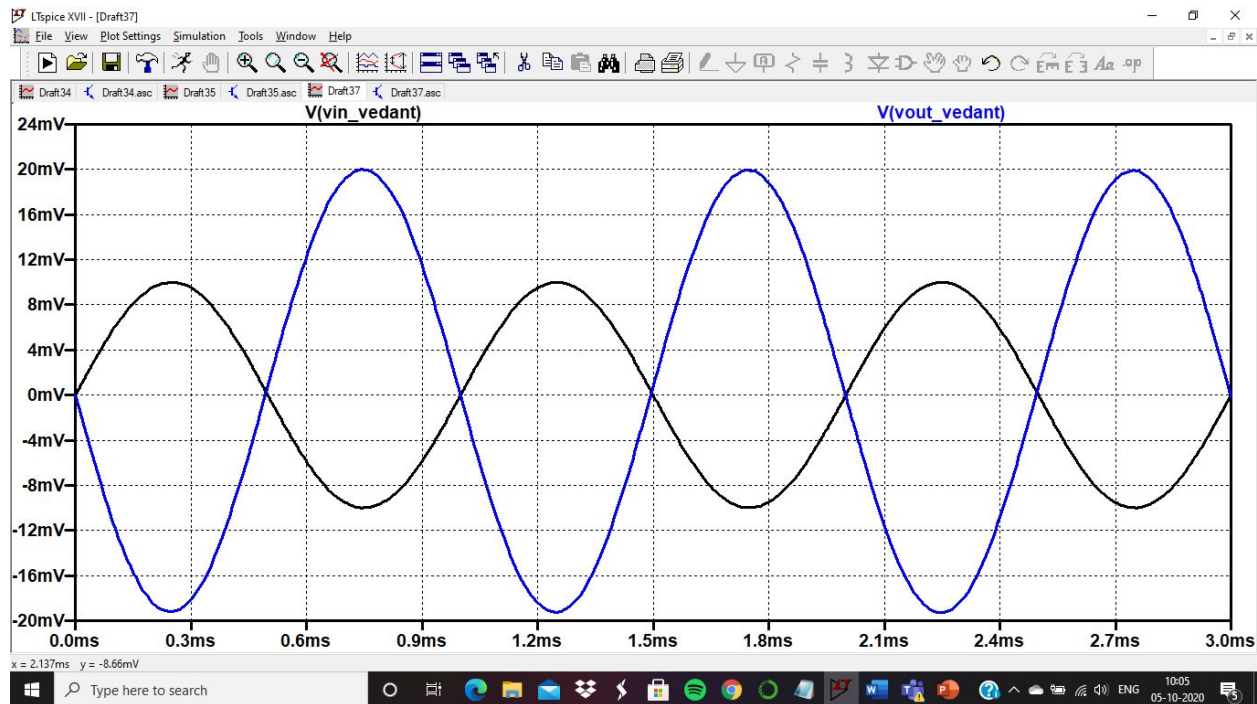
bypassed



Vout

4.52 peak to peak

Unbypassed

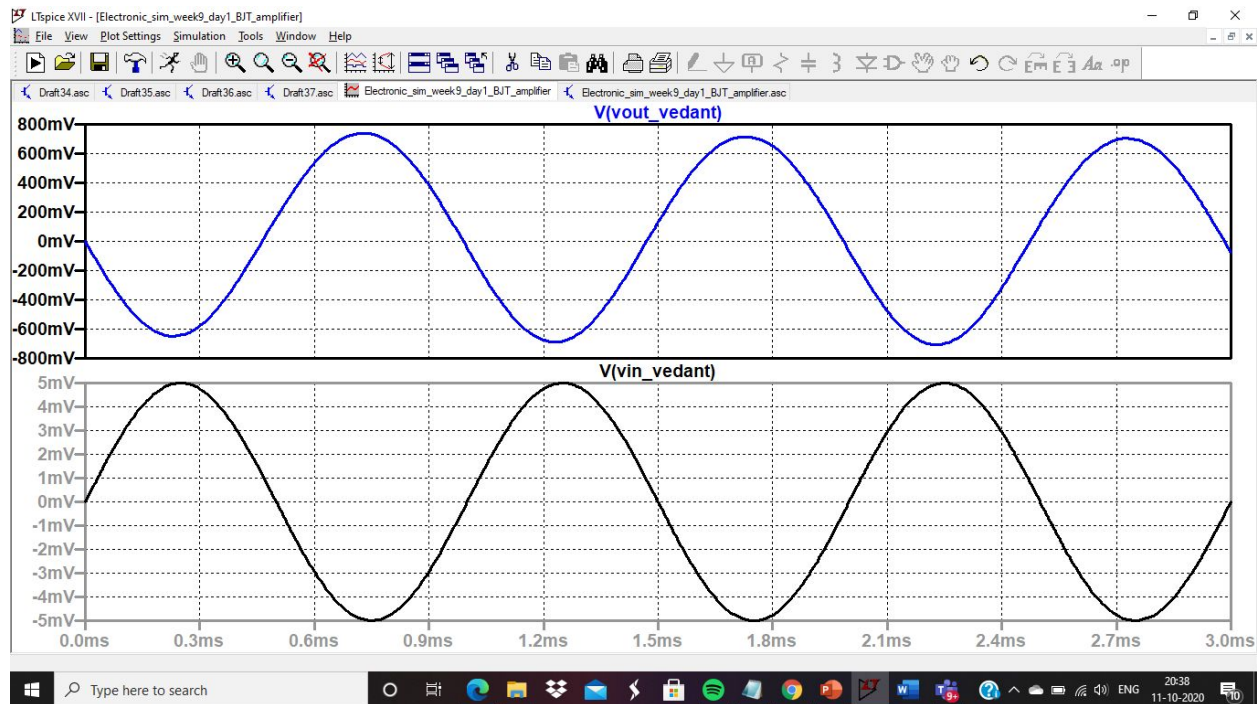
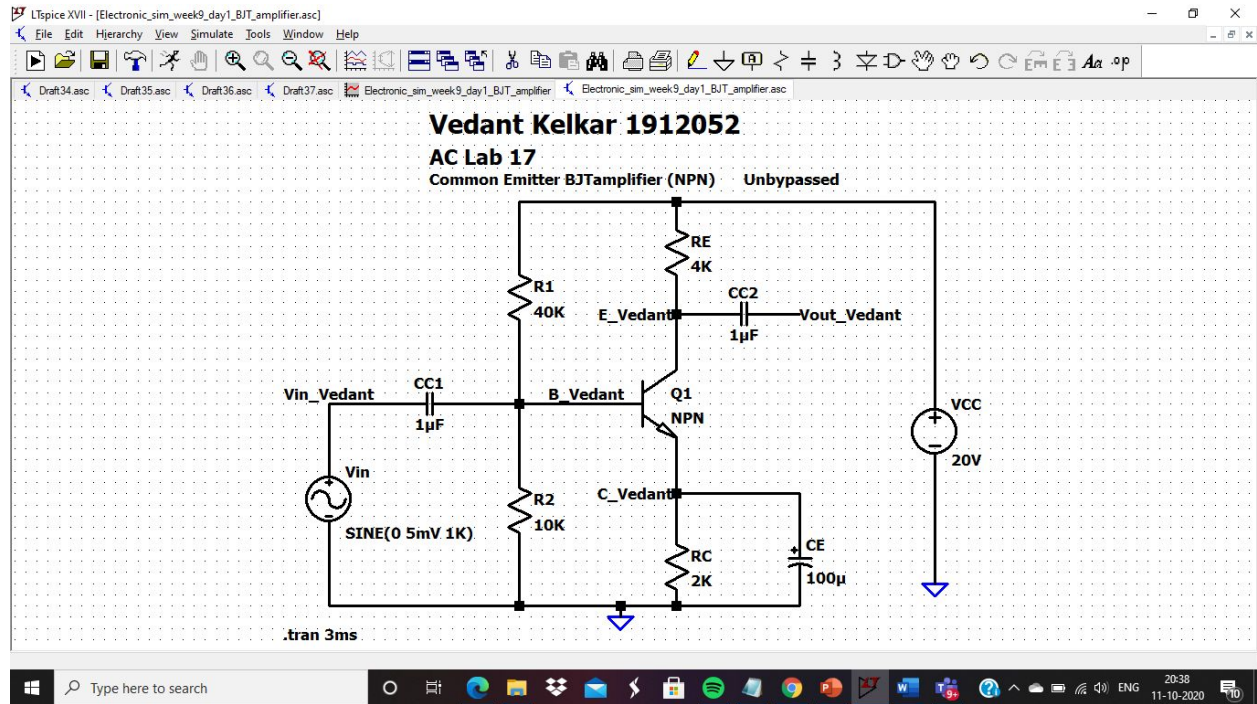


Vout

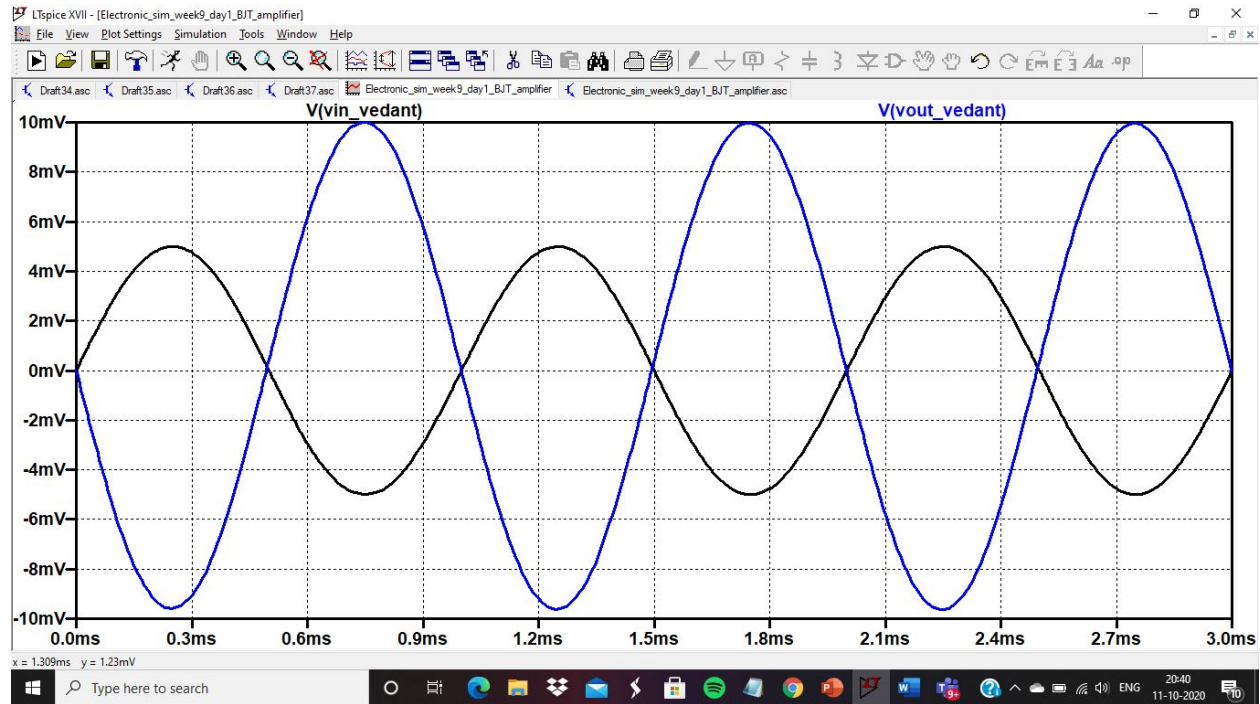
39.19 peak to peak

10mV

BYPASSED



UNBYPASSED



Vin	Vout	Vout	Av (bypassed)	Av (bypassed)	Av (unbypassed)	Av (unbypassed)
	(bypassed)	(unbypassed)	Cal	Sim	Cal	Sim
10mV	-2.2763 V	-19.584 mV	-241.68	-227.63	-1.9836	-1.9284
20mV	-4.577 V	-39.171 mV	-241.68	-228.85	-1.9836	1.9585

Date _____

1912052

$$V_{in} = \frac{R_2}{R_1 + R_2} \times V_{CC} = \frac{10k}{40k + 10k} \times 20 = 4.0V$$

$$R_{th} = R_1 || R_2 = 8k\Omega$$

$$I_{BQ} = \frac{V_{th} - V_{BE(on)}}{R_{th} + (1 + \beta)R_E} = \frac{4 - 0.7}{8k + (101 \times 2k)} = 15.71 \mu A$$

$$I_{CQ} = \beta(I_{BQ}) = 100 \times 15.71 \times 10^{-6}$$

$$I_{CQ} = 1.571 mA$$

$$r_{\pi} = \frac{\beta V_T}{I_{CQ}} = \frac{100 \times 26m}{1.571m} = 1.655k\Omega$$

$$g_m = \frac{I_{CQ}}{V_T} = \frac{1.571mA}{26m} = 60.42 mA/V$$

$$\textcircled{1} A_{V(bj)} = -g_m R_C = -60.42 \times 10^{-3} \times 4 \times 10^{-3}$$

$$= -241.68$$

$$\textcircled{2} A_{V(unb)} = \frac{-R_C}{1/g_m + R_E} = \frac{-4k}{1/60.42 \times 10^{-3} + 2k} = -1.9836$$

AC LAB 17 is approved: Inderjit Singh Dhanjal