

Audit Course Session 1

AUDIT COURSE ELECTRONIC CIRCUITS 2: SIMULATION BASED STUDY

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

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

Date: 18/1/2021

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 Session 1 is 40 MINUTES

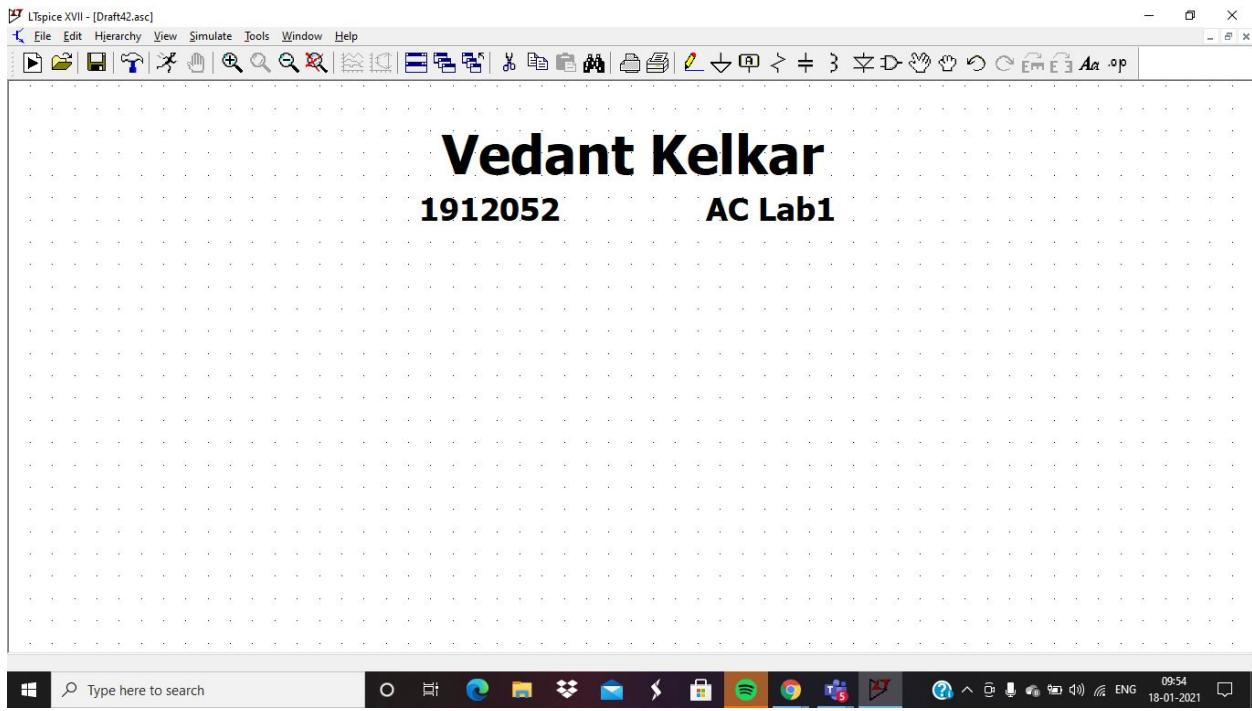
Kindly upload your work (only circuit schematic & waveform in LTSpice) in the shared google doc between this time slot only.

Follow these instruction strictly:

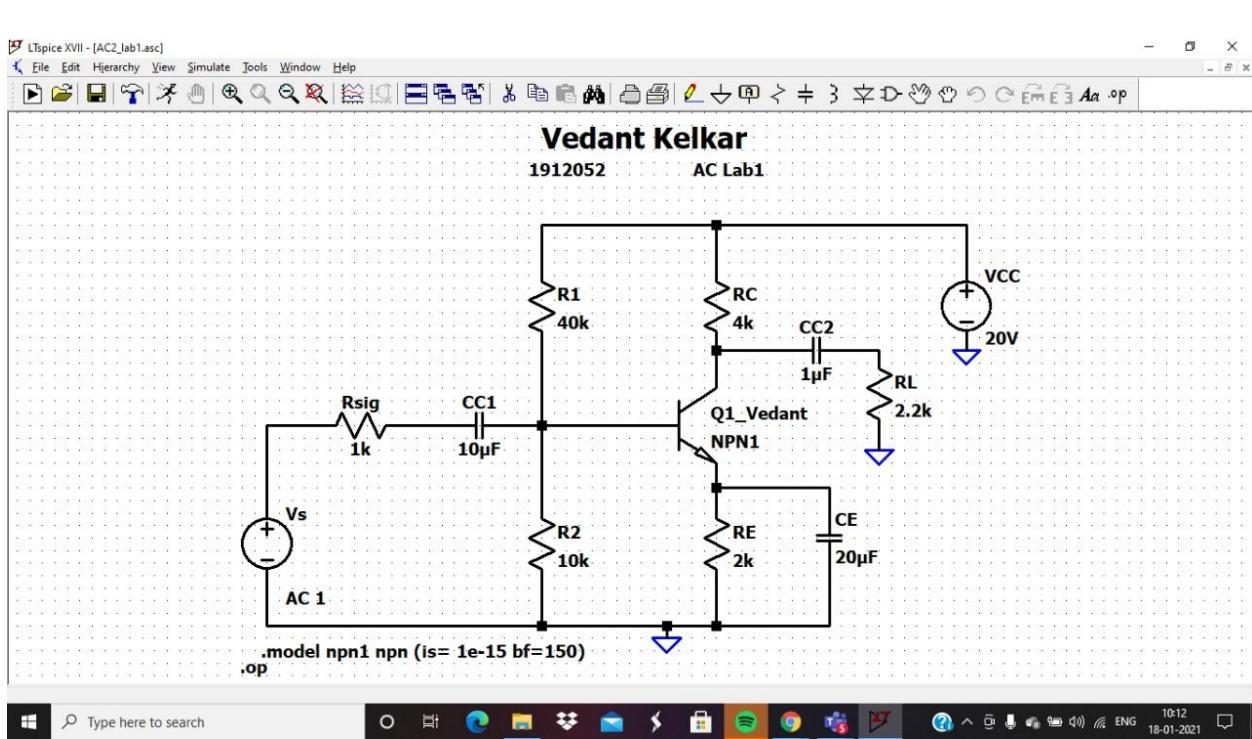
- 1, Start sharp ON TIME, by posting your name and roll no and **screenshot of your LT spice work screen (time and date MUST BE VISIBLE)**
2. Upload your work every 10 minutes, i.e LT spice work screen
3. This means you will upload LT spice work screen 4 times during this time slot.
4. Point 3 indicates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

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

STUDENTS WORK AREA STARTS HERE



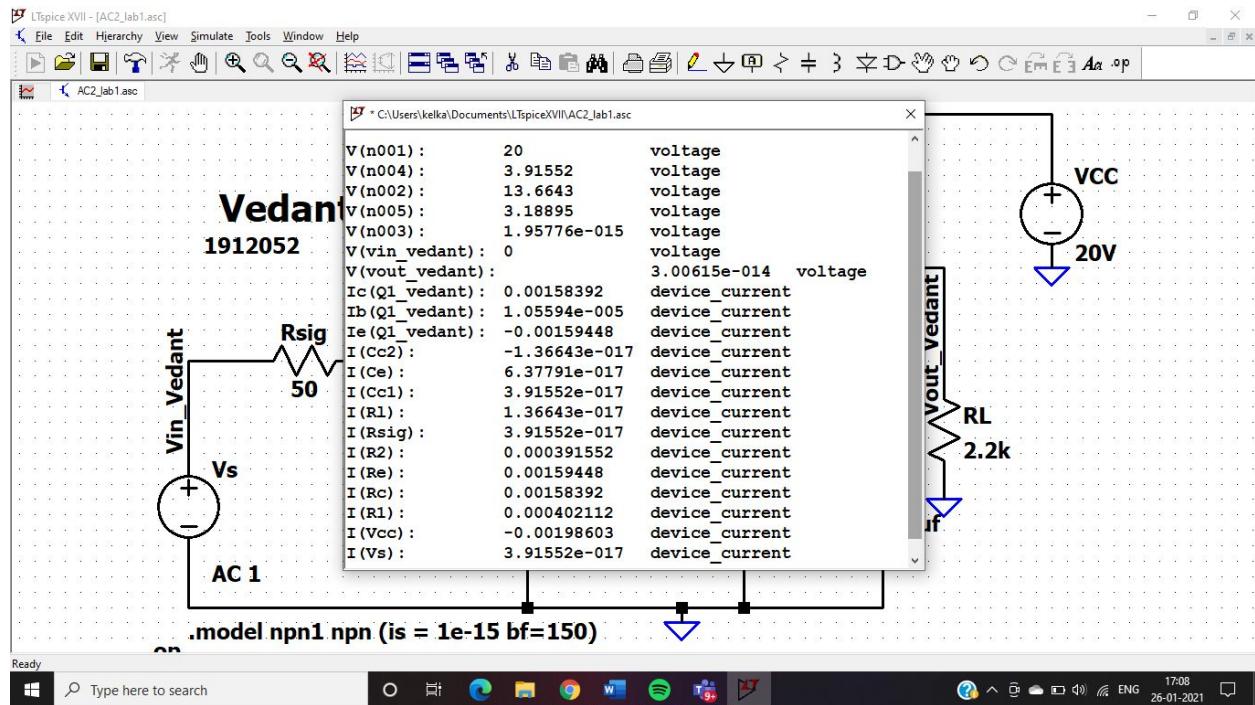
Vedant Kelkar
1912052 AC Lab1



Vedant Kelkar
1912052 AC Lab1

```
.model npn1 npn (is= 1e-15 bf=150)
.op
```

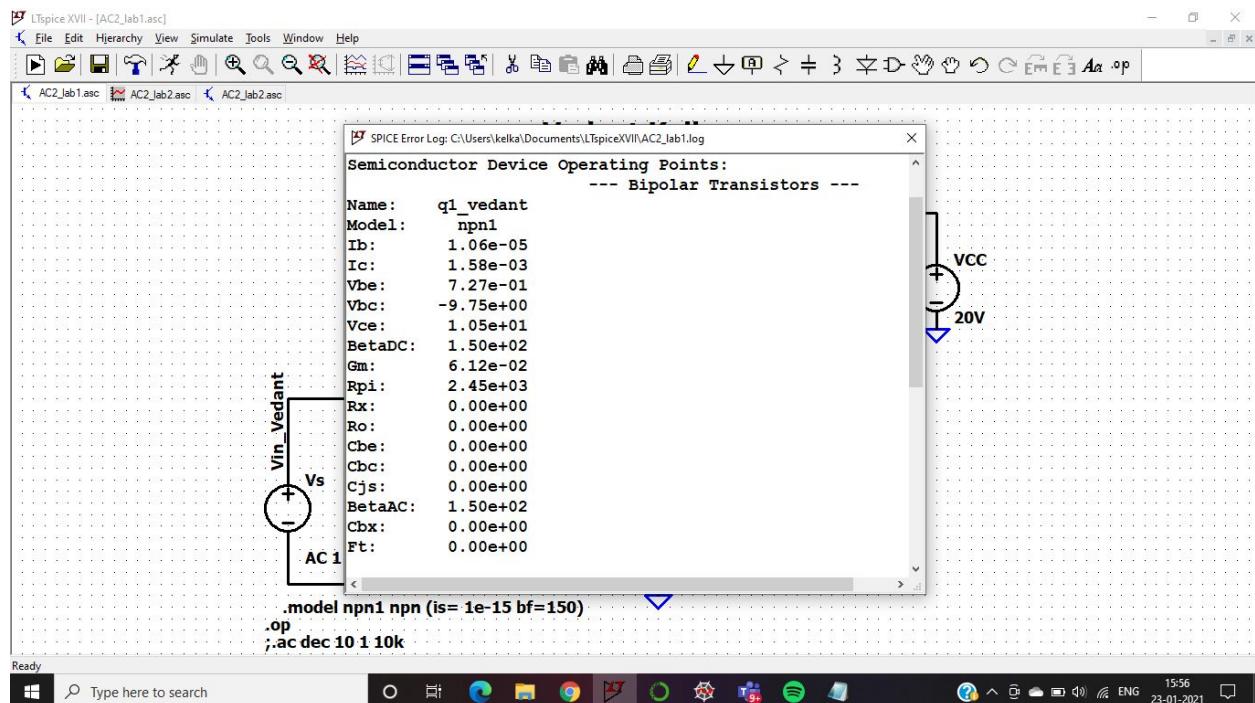
DC



Ready

Type here to search

17:08
26-01-2021

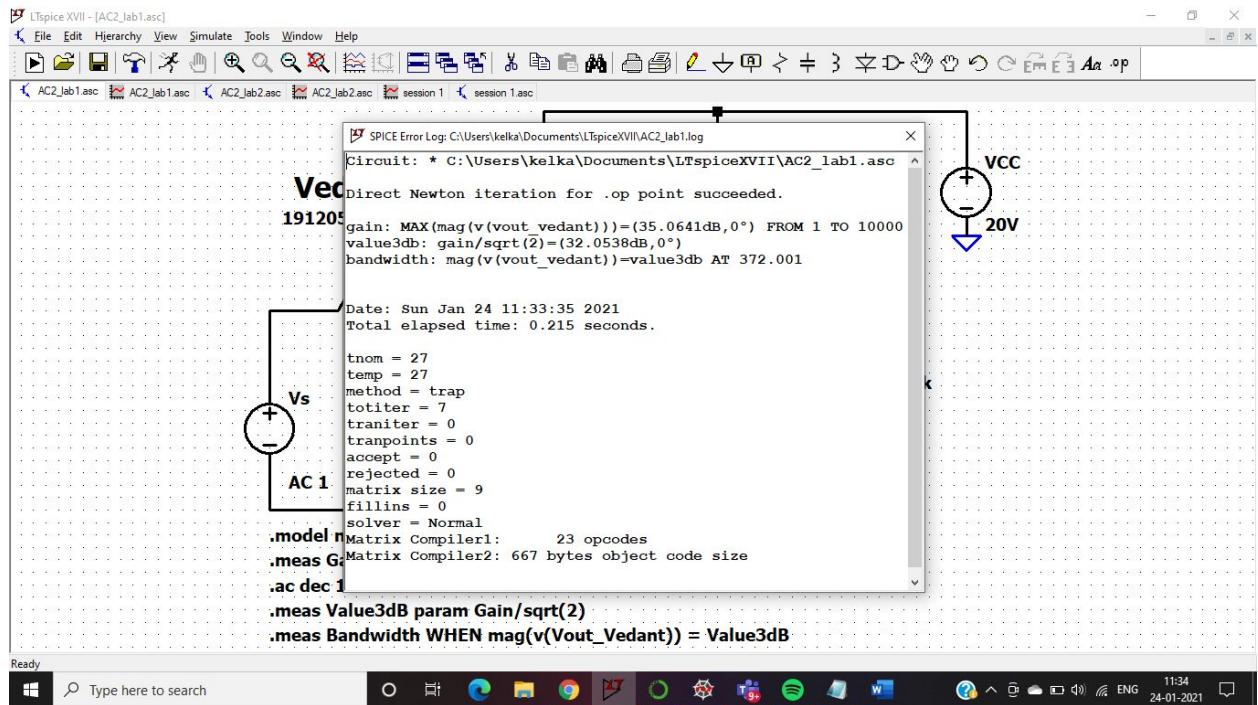
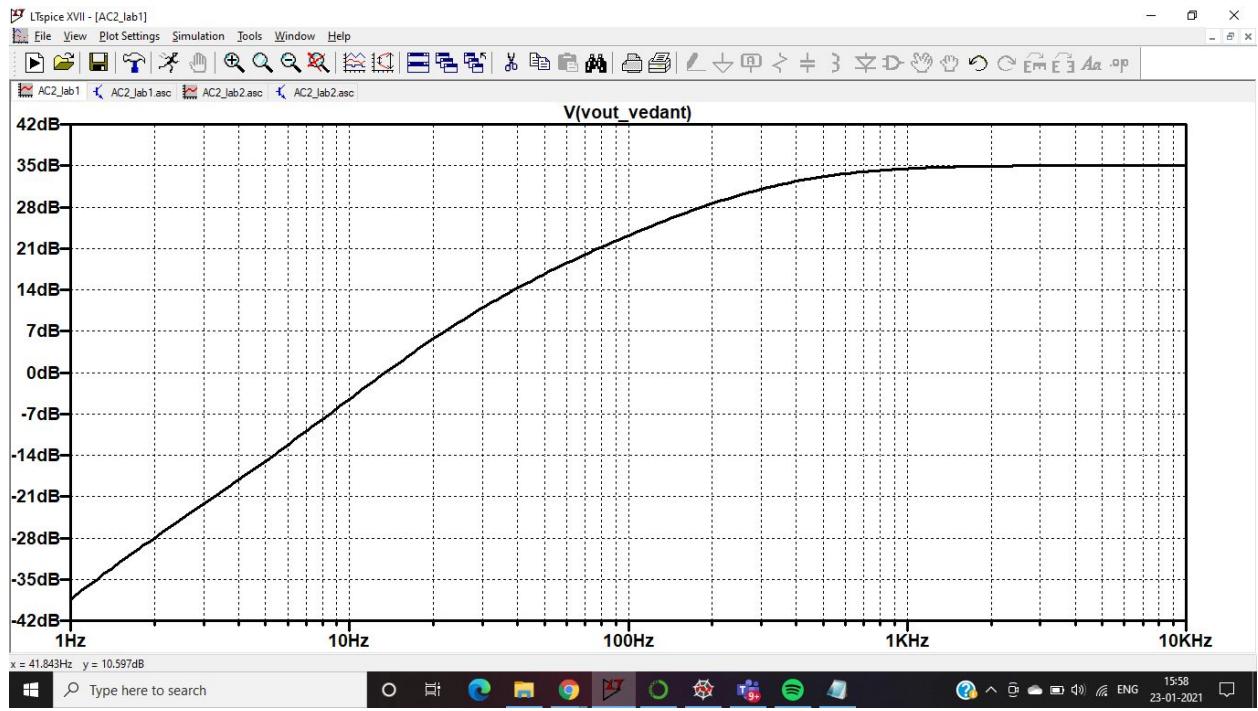


Ready

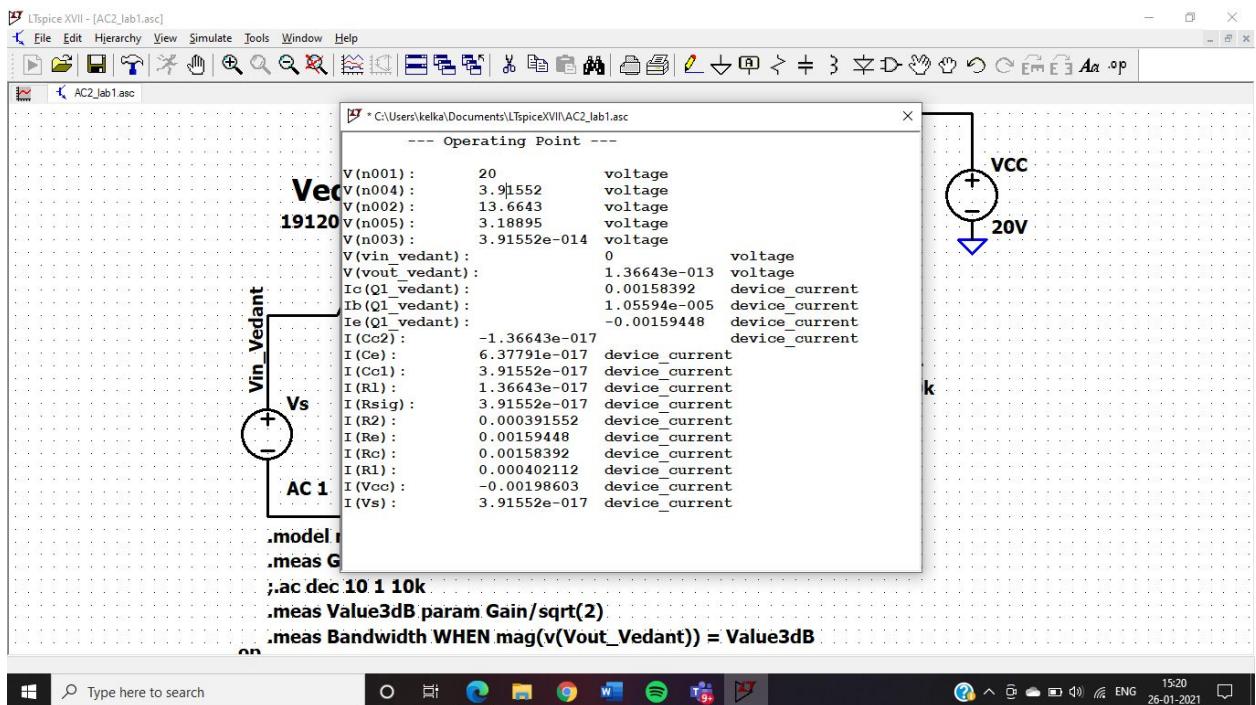
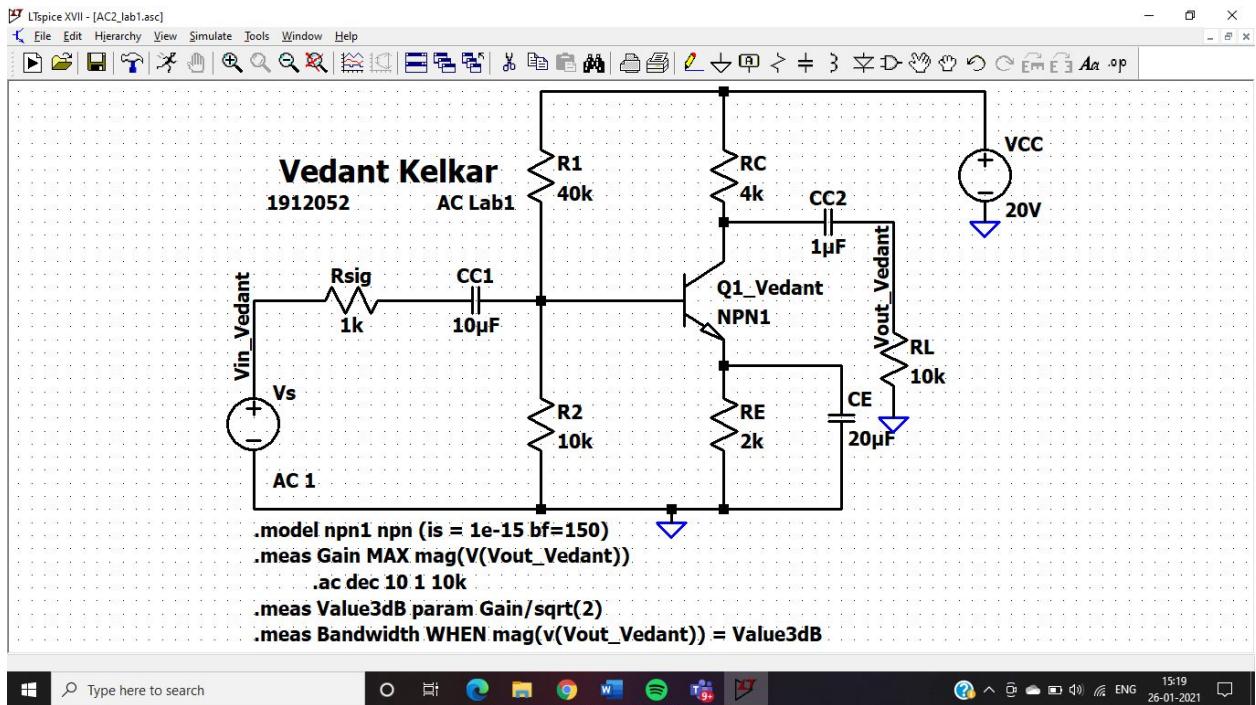
Type here to search

15:56
23-01-2021

AC



EX 1
 RL=10k ohms



Ltspice XVII - [AC2_lab1.asc]

File Edit Hierarchy View Simulate Tools Window Help

AC2_lab1 AC2_lab1.asc

SPICE Error Log: C:\Users\kelka\Documents\LTspiceXVII\AC2_lab1.log

Circuit: * C:\Users\kelka\Documents\LTspiceXVII\AC2_lab1.asc

Direct Newton iteration for .op point succeeded.

Semiconductor Device Operating Points:

--- Bipolar Transistors ---

Vec 19120

```

Name: q1_vedant
Model: npn1
Ib: 1.06e-05
Ic: 1.58e-03
Vbe: 7.27e-01
Vbc: -9.75e+00
Vce: 1.05e+01
BetaDC: 1.50e+02
Gm: 6.12e-02
Rpi: 2.45e+03
Rx: 0.00e+00
Ro: 0.00e+00
Cbe: 0.00e+00
Cbc: 0.00e+00
Cjs: 0.00e+00
BetaAC: 1.50e+02
Cbx: 0.00e+00
Ft: 0.00e+00

```

.model
.meas G
.ac dec 10 1 10k
.meas Value3dB param Gain/sqrt(2)
.meas Bandwidth WHEN mag(v(Vout_Vedant)) = Value3dB

Ready

Type here to search

File Edit Hierarchy View Simulate Tools Window Help

AC2_lab1 AC2_lab1.asc

SPICE Error Log: C:\Users\kelka\Documents\LTspiceXVII\AC2_lab1.log

CUDA: 0.00e+00

Ft: 0.00e+00

Vec 19120

```

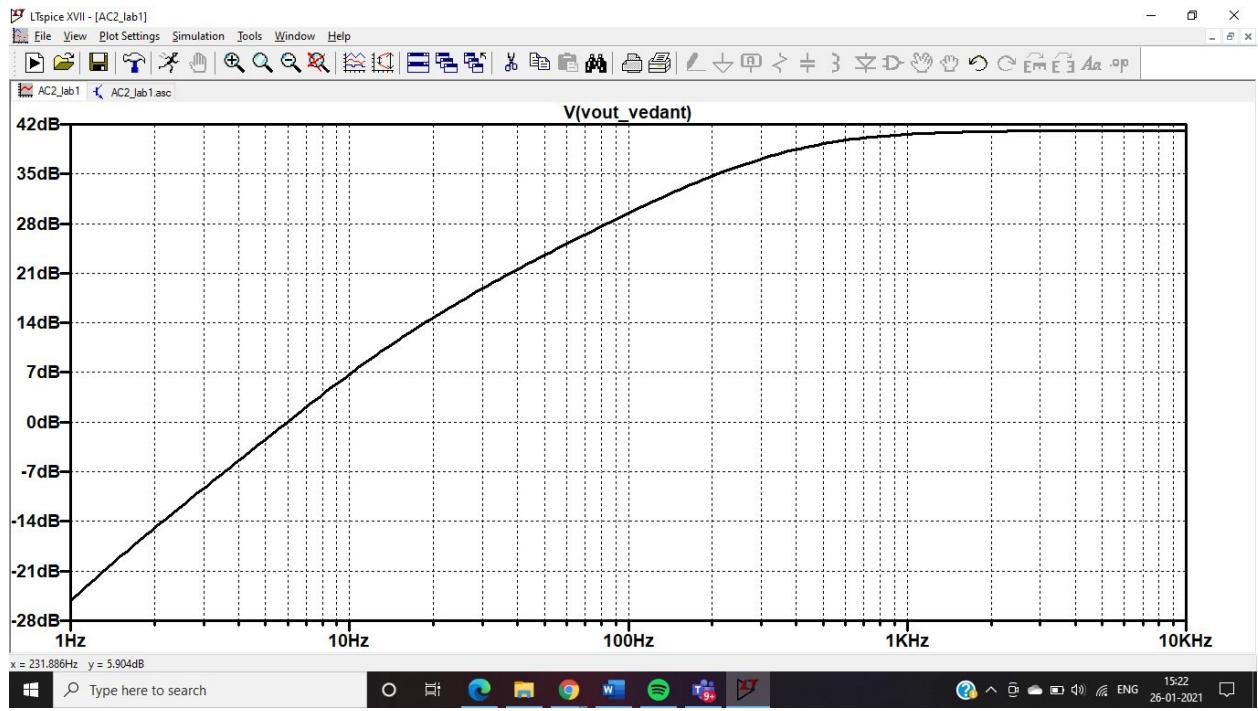
gain: MAX(mag(v(vout_vedant)))=(41.1409dB,0°) FROM 1 TO 10000
value3db: gain/sqrt(2)=(38.1306dB,0°)
bandwidth: mag(v(vout_vedant))=value3db AT 370.635

Date: Tue Jan 26 15:21:04 2021
Total elapsed time: 0.070 seconds.

tnom = 27
temp = 27
method = trap
totiter = 7
tranriter = 0
trampoints = 0
accept = 0
rejected = 0
matrix size = 9
fillins = 0
solver = Normal
Matrix Compiler1: 23 opcodes
Matrix Compiler2: 667 bytes object code size

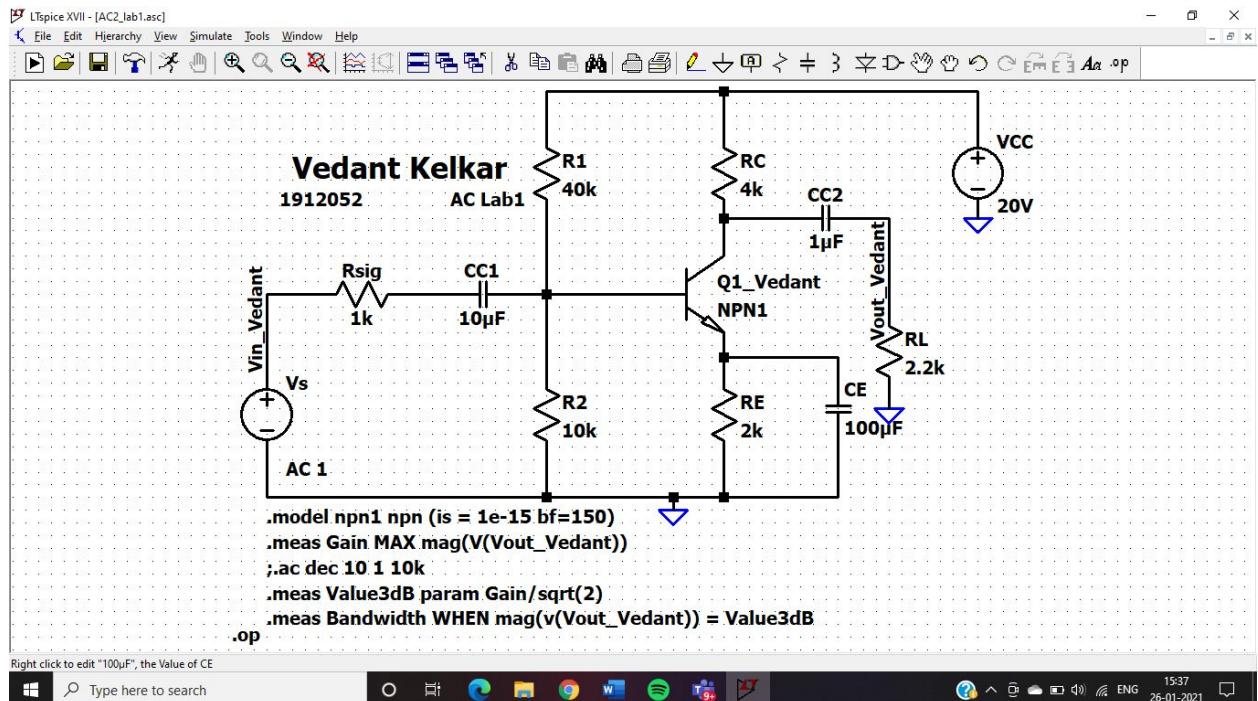
```

.model
.meas G
.ac dec 10 1 10k
.meas Value3dB param Gain/sqrt(2)
.meas Bandwidth WHEN mag(v(Vout_Vedant)) = Value3dB



Ex2

CE=100 μ F



Ltspice XVII - [AC2_lab1.asc]

File Edit Hierarchy View Simulate Tools Window Help

AC2_lab1.ac

V(n001) : 20 voltage
V(n004) : 3.91552 voltage
V(n002) : 13.6643 voltage
V(n005) : 3.18895 voltage
19120 V(n003) : 3.91552e-014 voltage
V(vin_Vedant) : 0 voltage
V(vout_Vedant) : 3.00615e-014 voltage
Ic(Q1_Vedant) : 0.00158392 device_current
Ib(Q1_Vedant) : 1.05594e-005 device_current
Ie(Q1_Vedant) : -0.00159448 device_current
I(Cc2) : -1.36643e-017 device_current
I(CE) : 3.18895e-016 device_current
I(CC1) : 3.91552e-017 device_current
I(R1) : 1.36643e-017 device_current
I(Rsig) : 3.91552e-017 device_current
I(R2) : 0.000391552 device_current
I(Re) : 0.00159448 device_current
I(RC) : 0.00158392 device_current
I(R1) : 0.000402112 device_current
I(Vcc) : -0.00198603 device_current
I(Vs) : 3.91552e-017 device_current

.model
.meas
.ac dec 10 1 10K
.meas Value3dB param Gain/sqrt(2)
.meas Bandwidth WHEN mag(v(Vout_Vedant)) = Value3dB
.op

Ltspice XVII - [AC2_lab1.asc]

File Edit Hierarchy View Simulate Tools Window Help

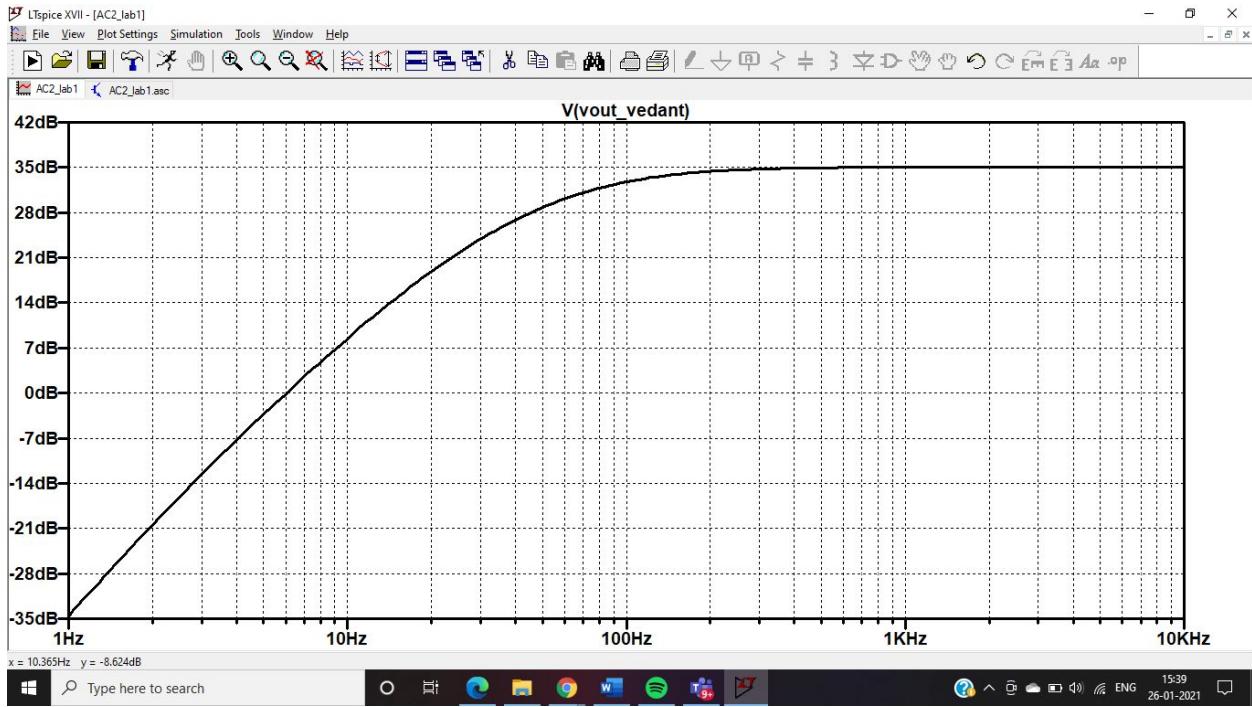
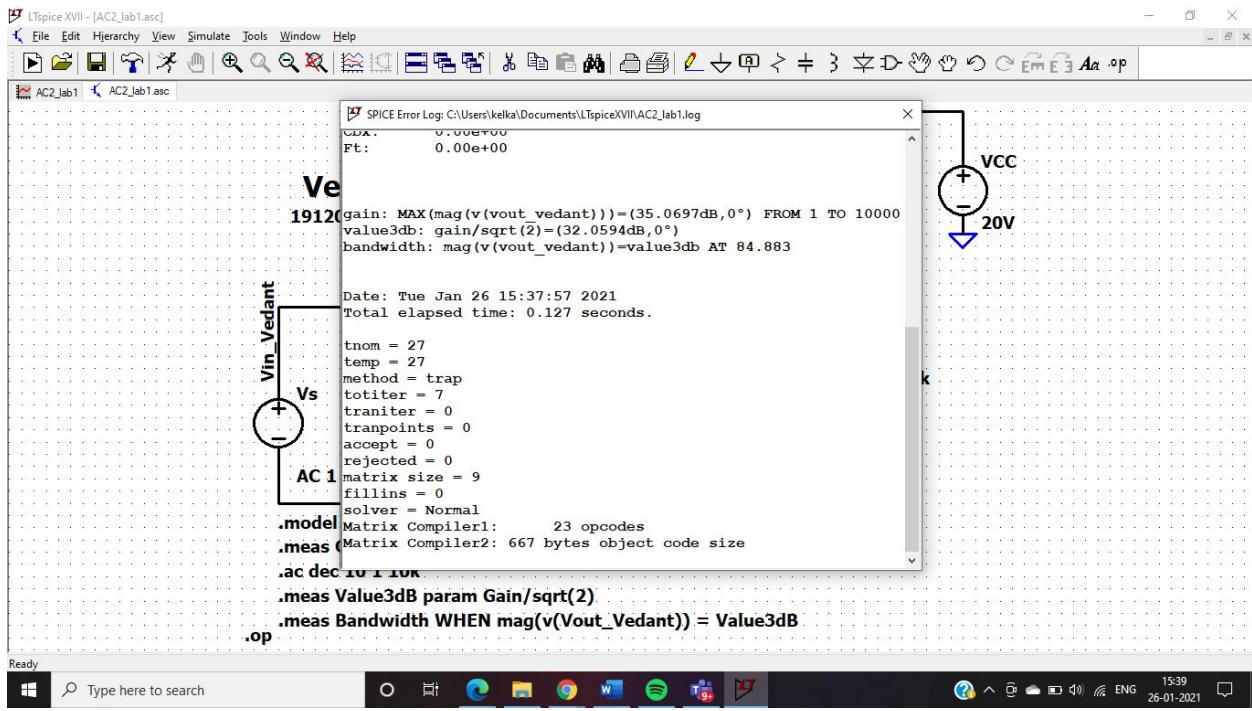
AC2_lab1 AC2_lab1.ac

SPIKE Error Log: C:\Users\kelka\Documents\LtspiceXVII\AC2_lab1.log

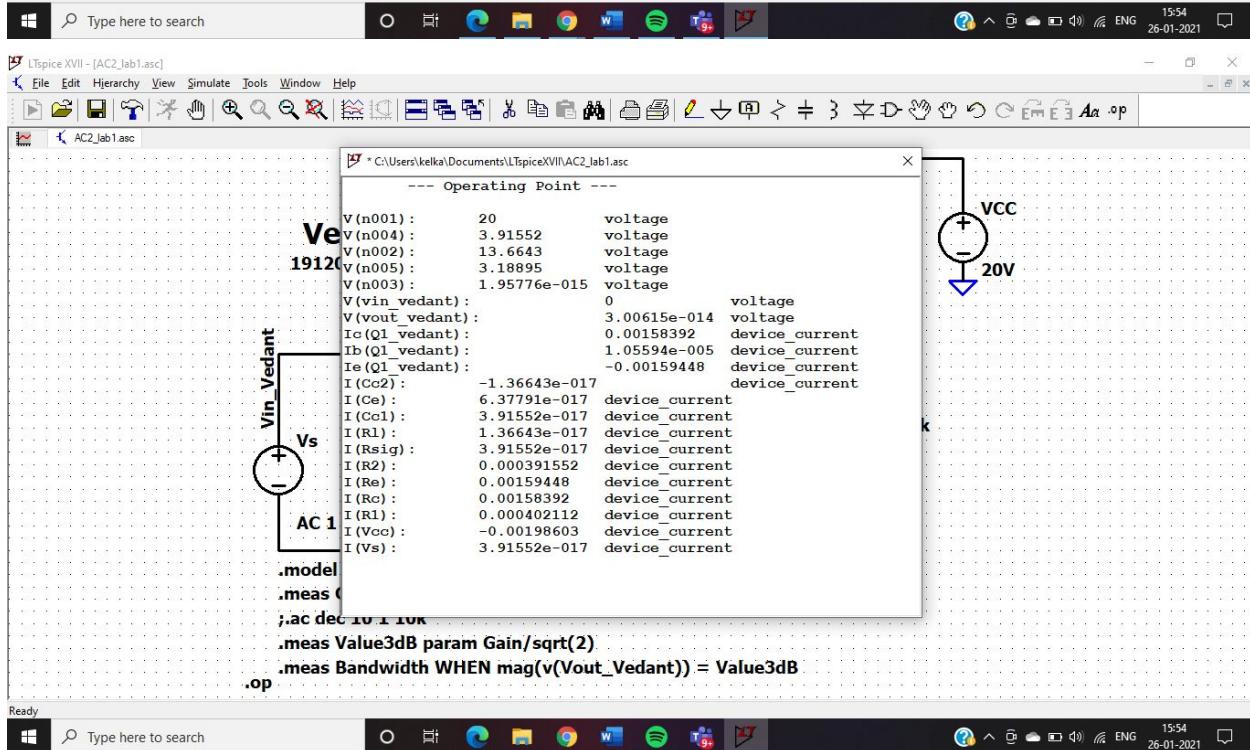
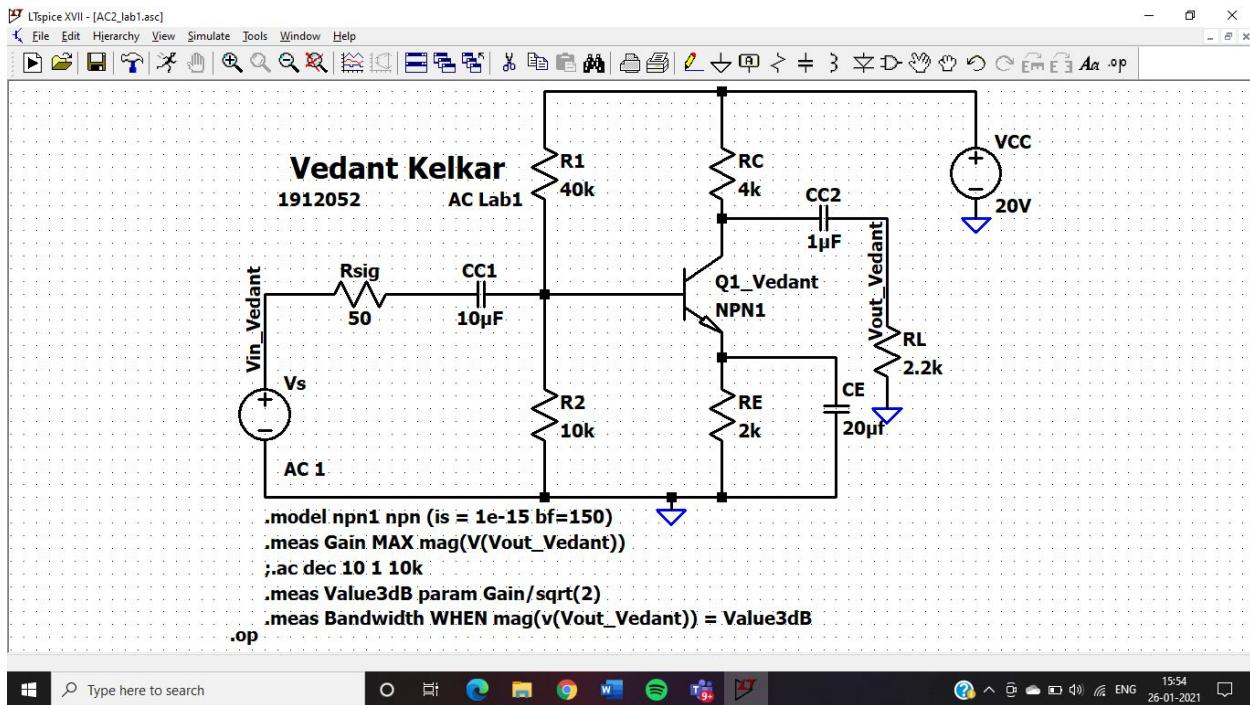
Semiconductor Device Operating Points:
--- Bipolar Transistors ---

Name: q1_Vedant
Model: npn1
Ib: 1.06e-05
Ic: 1.58e-03
Vbe: 7.27e-01
Vbc: -9.75e+00
Vce: 1.05e+01
BetaDC: 1.50e+02
Gm: 6.12e-02
Rpi: 2.45e+03
Rx: 0.00e+00
Ro: 0.00e+00
Cbe: 0.00e+00
Cbc: 0.00e+00
Cjs: 0.00e+00
BetaAC: 1.50e+02
Cbx: 0.00e+00
Ft: 0.00e+00

.model
.meas
.ac dec 10 1 10K
.meas Value3dB param Gain/sqrt(2)
.meas Bandwidth WHEN mag(v(Vout_Vedant)) = Value3dB
.op



Ex3
Rsig=50



Ltspice XVII - [AC2_lab1.asc]

File Edit Hierarchy View Simulate Tools Window Help

AC2_lab1 AC2_lab1.asc

LTSpice Error Log: C:\Users\kelka\Documents\LTspiceXVII\AC2_lab1.log

Circuit: * C:\Users\kelka\Documents\LTspiceXVII\AC2_lab1.asc

Direct Newton iteration for .op point succeeded.

Semiconductor Device Operating Points:

--- Bipolar Transistors ---

19120

```

Name: q1_vedant
Model: npn1
Ib: 1.06e-05
Ic: 1.58e-03
Vbe: 7.27e-01
Vbc: -9.75e+00
Vce: 1.05e+01
BetaDC: 1.50e+02
Gm: 6.12e-02
Rpi: 2.45e+03
Rx: 0.00e+00
Ro: 0.00e+00
Cbe: 0.00e+00
Cbc: 0.00e+00
Cjs: 0.00e+00
BetaAC: 1.50e+02
Cbx: 0.00e+00
Ft: 0.00e+00

```

.model
.meas
.ac dec 1 10K
.meas Value3dB param Gain/sqrt(2)
.meas Bandwidth WHEN mag(v(Vout_Vedant)) = Value3dB
.op

Ready

Type here to search

LTSpice XVII - [AC2_lab1.asc]

File Edit Hierarchy View Simulate Tools Window Help

AC2_lab1 AC2_lab1.asc

LTSpice Error Log: C:\Users\kelka\Documents\LTspiceXVII\AC2_lab1.log

CDX: 0.00e+00

Ft: 0.00e+00

Ve

19120

```

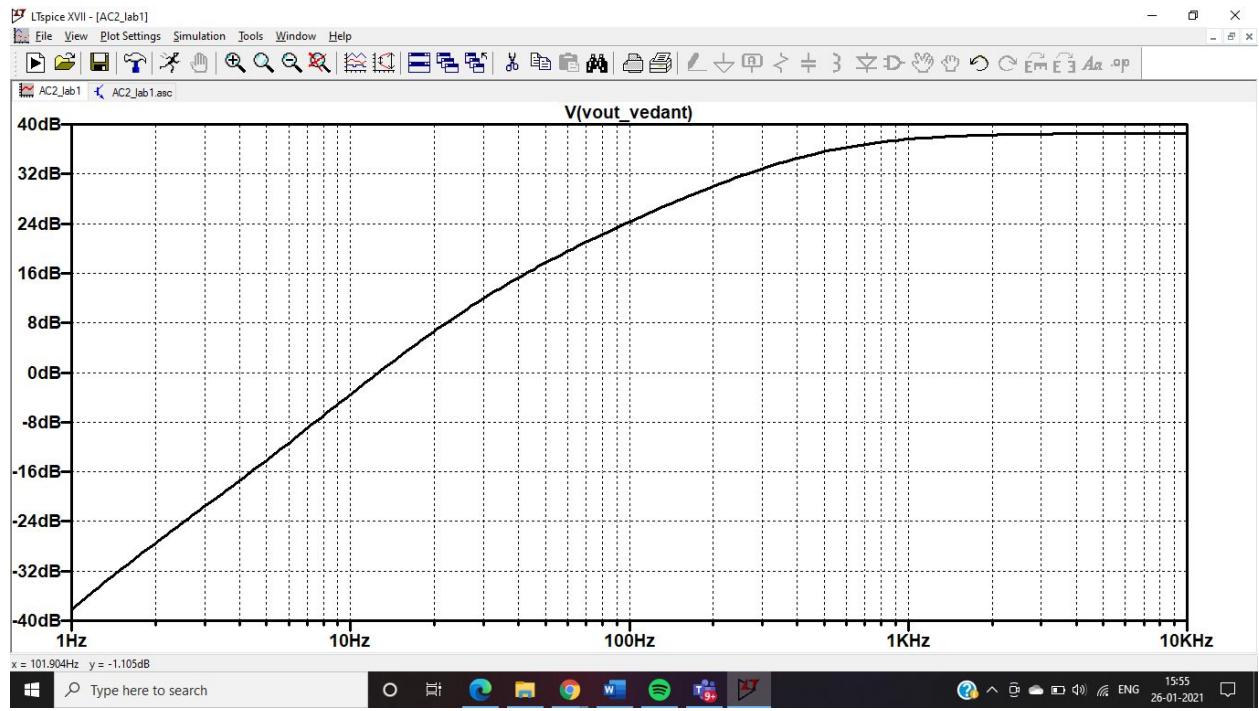
gain: MAX(mag(v(vout_vedant)))=(38.5432dB,0°) FROM 1 TO 10000
value3db: gain/sqrt(2)=(35.5329dB,0°)
bandwidth: mag(v(vout_vedant))=value3db AT 492.543

Date: Tue Jan 26 15:55:29 2021
Total elapsed time: 0.127 seconds.

tnom = 27
temp = 27
method = trap
totiter = 7
tranriter = 0
trampoints = 0
accept = 0
rejected = 0
matrix size = 9
fillins = 0
solver = Normal

```

.model
.meas
.ac dec 1 10K
.meas Value3dB param Gain/sqrt(2)
.meas Bandwidth WHEN mag(v(Vout_Vedant)) = Value3dB
.op



Your AC LAB 1 is approved: Inderjit Singh Dhanjal