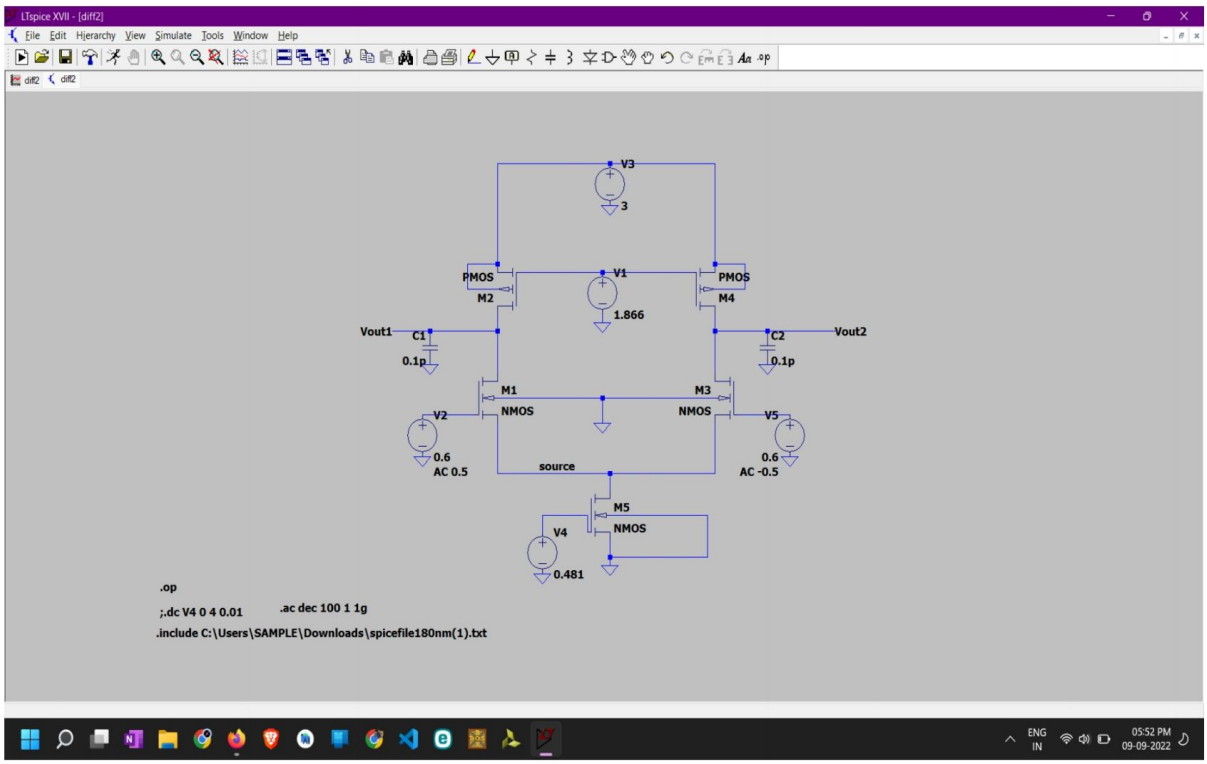
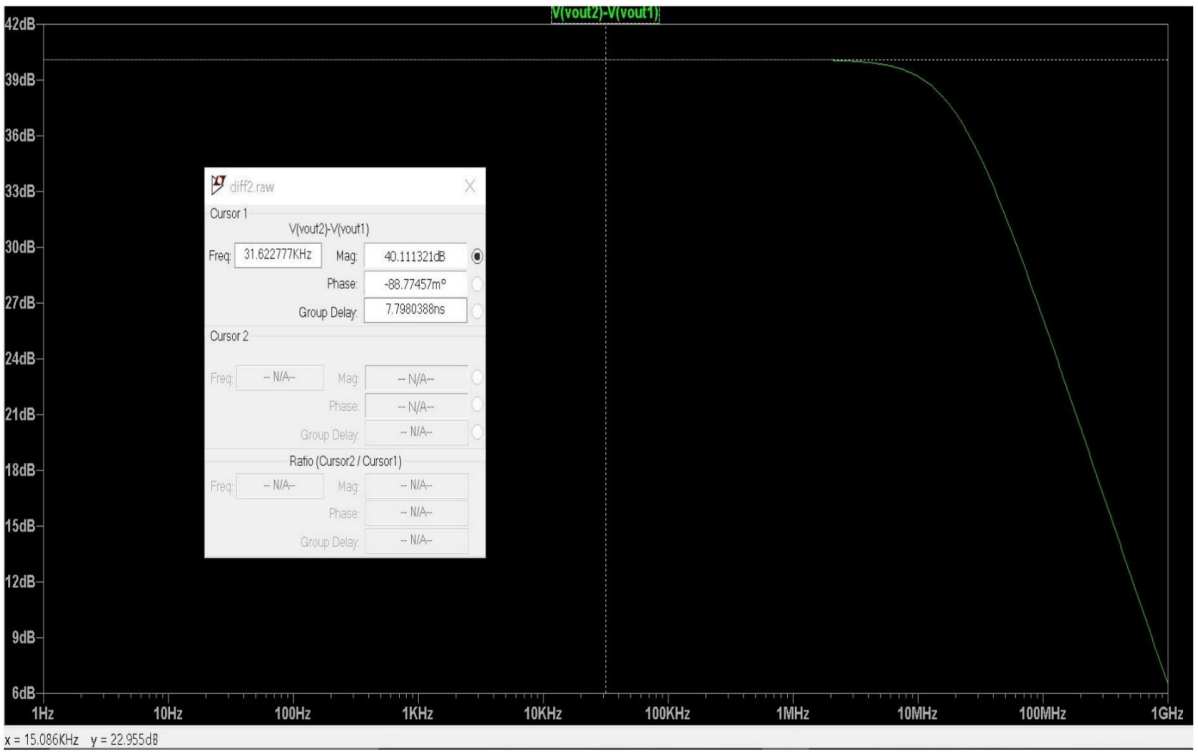
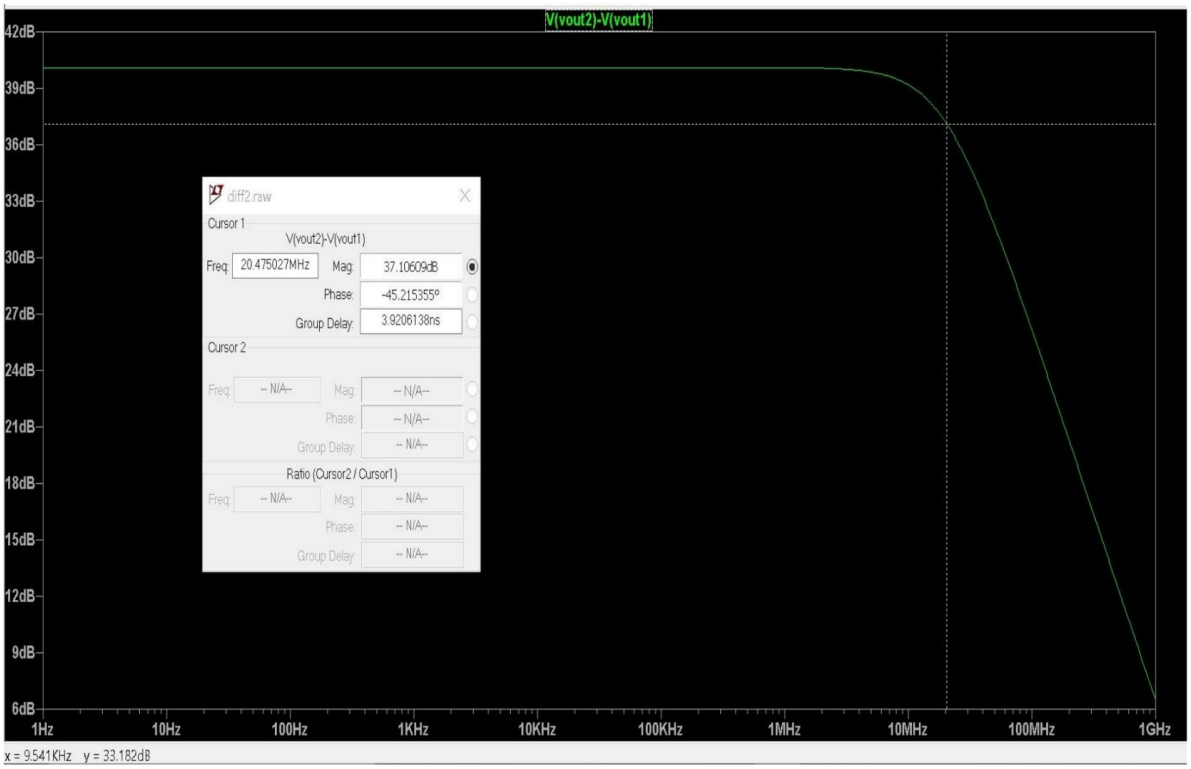
QUESTION:

Design a differential amplifier with minimum gain 40dB with nmos input pair and pmos current source load . Sum of widths of all the transistors should not exceed 1000u meter. At the input as well as output, connect a 0.1pF(100fF) capacitor. Find the bandwidth of the amplifier.





Gain of the circuit= 40.111321dB



Bandwidth of the circuit= 20.475MHz

Values:

Mosfet characteristics:

parameter	M1 (NMOS) Input	M2 (PMOS) Load	M3 (NMOS) Input	M4 (PMOS) Load	M5 (NMOS) tail source
Length	0.72um	1.8um	0.72um	1.8um	1.8um
Width	180um	22.5um	180um	22.5um	522um
Kn’	44.7mA/v²	-	44.7mA/v²	-	0.615m
Kp’	-	43.5uA/v²	-	43.5uA/v²	-
|Vov|	0.004v	0.716v	0.004v	0.716v	0.056v

Differential amplifier characteristics:

Parameter	**Values**
Total width of all mosfets	927um
V bias of pmos current source	1.866V
Vdd	3V
Gain	40.111db (101.28)
3db Bandwidth	20.47MHz

..... **THANK YOU**

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