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Question: Question: Using the techniques that you have learned in class, i...

Question:
Using the techniques that you have learned in class, investigate and compare the **gain versus frequency response** of common emitter (CE) BJT and common source (CS) MOSFET amplifiers.
Task:
Your experimental requirements are:
1. Collect valid simulated data for both common emitter (CE) BJT and common source (CS) MOSFET amplifiers.
2. Interpreting the data with analysis for frequency response of both the amplifiers.
3. Conclusion with acknowledging the limitations.
Steps to be followed:
1. Construct the single stage common emitter (CE) BJT and common source (CS) MOSFET amplifiers separately in the simulation platform (like Multisim, Pspice, etc.)
2. Choose the parameter values for the amplifier circuits.
3. Simulate the circuits for AC Analysis to investigate **voltage gain versus frequency response** of both the amplifiers.
4. Change the parameter values to attain the required voltage gain, **Av**.
[The voltage gain, **Av**, for each group will be decided by the course teacher.]
5. Find the frequency Bandwidth for voltage gain, **Av**, from the **voltage gain versus frequency response** curve.
6. To attain certain voltage gain, **Av**, compare the **gain versus frequency response** of common emitter (CE) BJT and common source (CS) MOSFET amplifiers.

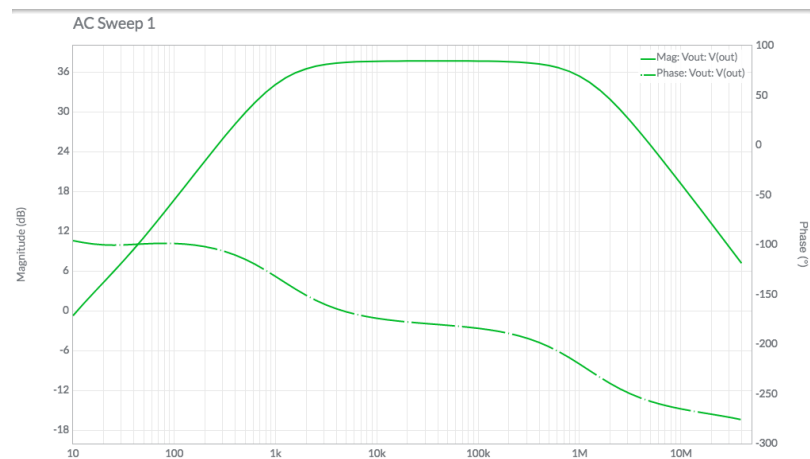
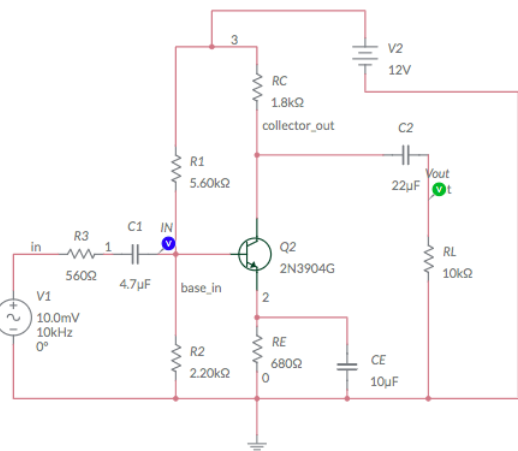
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Expert Answer

Anonymous answered this
466 answers

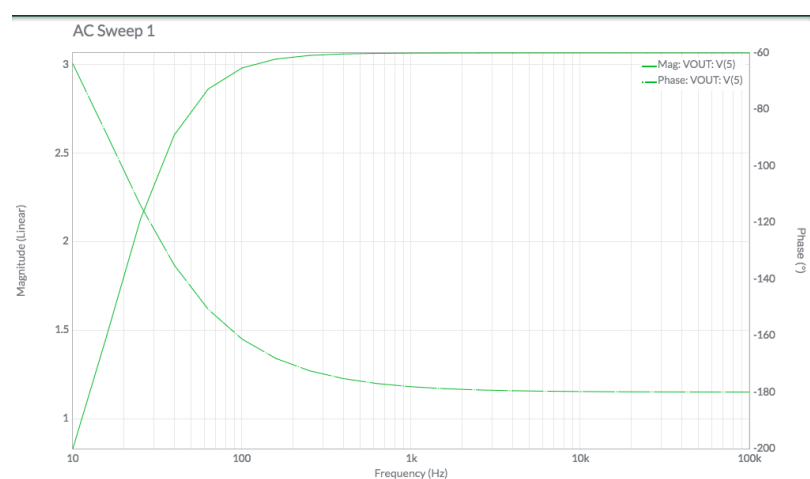
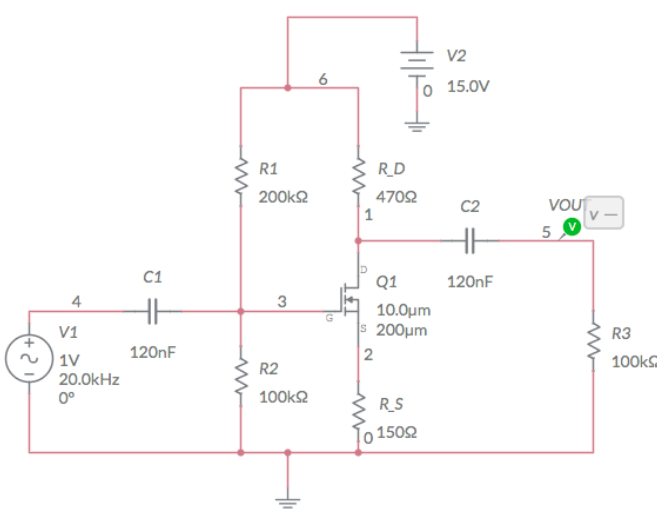
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Solution-
1) CE AMPLIFIER



FREQUENCY	Vin	Vout	Voltage Gain	Gain in dB
10.00	0.02	0.92	46.09	33.37
15.85	0.02	1.36	67.95	38.64
25.12	0.02	1.98	98.80	39.90
39.81	0.02	2.92	146.03	43.29
63.10	0.02	4.44	222.00	46.93
100.00	0.02	6.88	344.24	50.74
158.49	0.02	10.78	537.80	54.63
251.19	0.02	16.75	837.28	58.46
398.11	0.02	25.60	1280.00	62.14
630.96	0.02	37.52	1876.03	65.46
1000.00	0.02	55.95	2847.05	68.12
1584.89	0.02	82.54	4127.03	69.90
2511.89	0.02	125.00	6250.00	70.88
3981.07	0.02	181.81	9090.90	71.34
6309.57	0.02	272.72	13636.36	71.54
10000.00	0.02	409.09	20454.54	71.62
15848.93	0.02	613.63	30681.81	71.65
25118.86	0.02	920.92	46046.04	71.66
39810.72	0.02	1381.38	69069.06	71.67
63095.73	0.02	2071.07	103553.55	71.68
100000.00	0.02	3162.27	158489.32	71.69
158489.32	0.02	4755.55	237133.33	71.69
251188.64	0.02	7142.85	357142.85	71.70
398107.17	0.02	10714.28	535714.28	71.71
630957.34	0.02	15848.93	795925.92	71.71
1000000.00	0.02	23713.33	118866.66	71.72
1584893.19	0.02	35714.28	226415.18	71.73
2511886.43	0.02	53571.42	342857.14	71.74
3981071.71	0.02	79432.81	518181.81	71.75
6309573.44	0.02	118866.66	774398.77	71.76
10000000.00	0.02	177827.84	111220.24	71.77
15848931.91	0.02	269153.54	170952.38	71.78
25118864.32	0.02	401887.81	259688.88	71.79
39810713.96	0.02	594826.07	381818.18	71.80

CE AMPLIFIER USING MOSFET-



AC FREQUENCY	VIN	VOUT	GAIN	GAIN DB
10.00	2.00	1.83	0.91	-7.62
15.85	2.00	1.47	0.73	-2.69
25.12	2.00	1.12	0.56	-2.54
39.81	2.00	0.85	0.43	-2.39
63.10	2.00	0.63	0.31	-3.11
100.00	2.00	0.48	0.24	-3.47
158.49	2.00	0.35	0.17	-3.61
251.19	2.00	0.26	0.13	-3.67
398.11	2.00	0.19	0.09	-3.70
630.96	2.00	0.14	0.07	-3.71
1000.00	2.00	0.11	0.05	-3.71
1584.89	2.00	0.08	0.04	-3.71
2511.89	2.00	0.06	0.03	-3.71
3981.07	2.00	0.05	0.02	-3.71
6309.57	2.00	0.04	0.02	-3.71
10000.00	2.00	0.03	0.01	-3.71
15848.93	2.00	0.02	0.01	-3.71
25118.86	2.00	0.02	0.01	-3.71
39810.72	2.00	0.02	0.01	-3.71
63095.73	2.00	0.02	0.01	-3.71
100000.00	2.00	0.02	0.01	-3.71

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