INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)
Dundigal, Hyderabad – 500 043

LABORATORY WORK SHEET

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Exp No: 2 Experiment Name: Two Stage RC coupled Amplifier

DAY TO DAY EVALUATION:

	Preparation	Algorithm / Performance in the Lab	Source Code / Calculations and Graphs	Program Execution / Results and Error Analysis	Viva	Total
Max. Marks	4	4	4	4	4	20
Obtained	4	4	4	4	4	20

Signature of Lab I/C

START WRITING FROM HERE:

Aim:

1. To plot frequency response of a RC coupled amplifier with a pair of bunted emitter capacitor of 10 uf and 100 uf
2. To calculate gain
3. To calculate bandwidth

Software Required

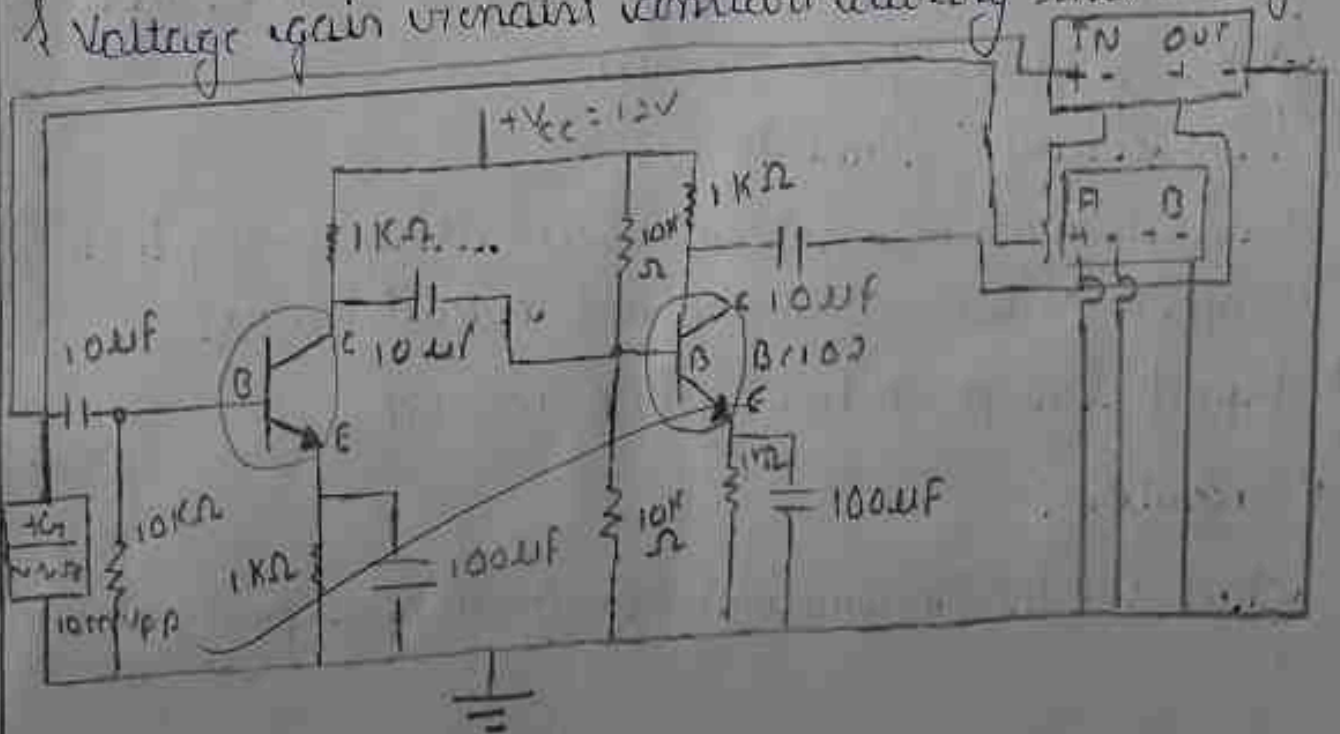
Multisim Analog Device Edition 13.0

components and Equipments Required

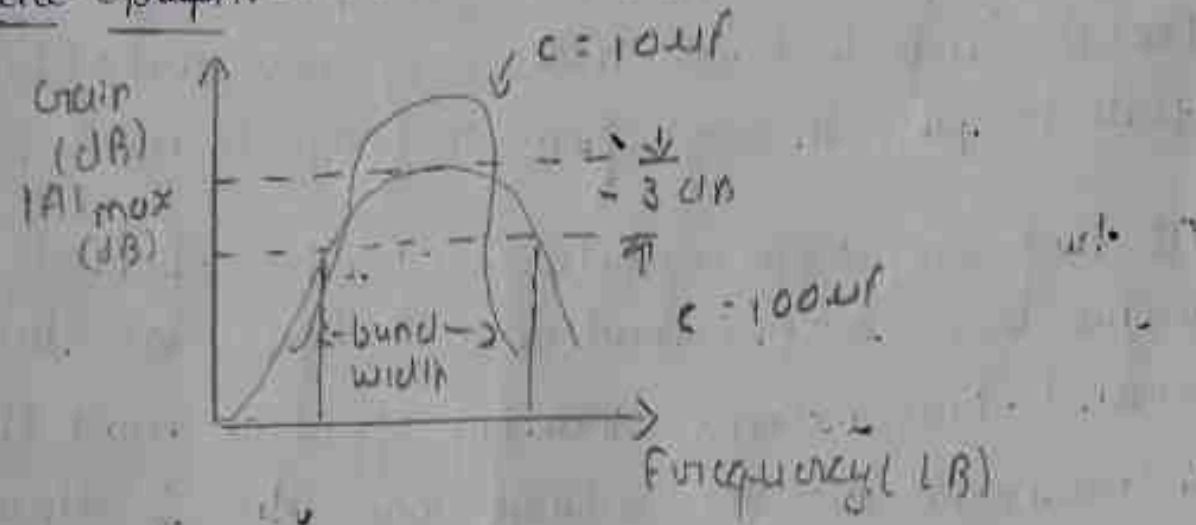
1. Trainer Board containing
   DC supply Voltage – 12V
   NPN Transistor – 2 BC107 (1)

At low frequencies reactance of coupling capacitors (Xc) is quite high and hence very small part of signal will be pass through from one stage to next stage

At high frequencies reactance of inter electrode capacitance is very small and behaves as short circuit. This increases loading effect on next stage & serves to reduce voltage gain due to these reasons voltage gain drops at high frequencies At mid frequencies effect of coupling capacitors is negligiable and acts like short circuit, where as inter electrode capacitors acts like open circuit. So, circuit becomes resistive at mid frequencies & voltage gain remains constant during this range



Expected Graph:-



Procedure:-

1. Connect circuit as shown in fig for 10uF
2. Adjust I/P signal amplitude in function generator, & observe an amplified voltage at O/P without distortion.
3. By keeping I/P signal voltage, say at 50mV, Vary I/P signal frequency from 0-1 MHz
4. Save circuit & simulate
5. Calculate max gain & bandwidth using Bode plotter. compare values with practical circuit values.
6. Repeat same procedure for C = 100 uF

Precautions:-

check whether connections are made properly or not

Tabular form:-

Vin = 10mv Gain (Av) = Vo/vin

Vo = 2

S.NO	C = 10uF		C = 100uF	
	Frequency (in HZ)	Gain (dB) 20log(Vo/Vi)	frequency (in HZ)	Gain (dB) 20log(V_o/V_{in})
	10 HZ	288.783mV	28.8784	29.2116
	20 HZ	1.18V	118.6	41.48
	30 HZ	2.662V	315.9	48.50
	40 HZ	3.459V	496	51.58
	50 HZ	4.9V	501.3	53.80
	60 HZ	5.923V	656.4	55.45
	70 HZ	6.586V	720.5	56.34
	100 HZ	7.205V	751.1	57.15
	200 HZ	7.501V	776.9	57.52
	500 HZ	7.640V	773.9	57.71
	1 KHZ	7.730V	774.4	57.77
	2 KHZ	7.774V	775.1	57.77
	5 KHZ	7.795V	774.4	57.78
	10 KHZ	7.794V	773.8	57.77
	50 KHZ	7.738V	784.6	57.88
	100 KHZ	7.840V	674.9	57.88
	500 KHZ	6.744V	674.8	56.58
	1 MHZ	6.748V	674.1	56.58
	50 KHZ	1.041V	107.1	41.45
	70 KHZ	1.671V	117.4	41.39
	80 KHZ	1.174V	101.8	40.15
	100 KHZ	701.63mV	74.46	38.00

calculations

1. ~~For C = 10uF~~

~~Gain =~~

~~Bandwidth = $[f_{H1} - f_L]$~~

2. ~~For C = 100uf~~

~~Gain =~~

~~Bandwidth = $[f_H - f_L]$~~

maximum gain dB = 57.88dB

F_H = 100KHz

f_L = 70Hz

Bandwidth = $f_H - f_L$

= 7MHz - 39.98Hz

= 6.90 MHz

To find the band width

= Gain in dB - 3dB

= 57.88dB - 3dB

= 54.88dB

Precautions:-

check whether the connections are made properly or not.

Result:-

Hence Frequency Response of RC coupled (2 stage) amplifier for 10uf and 100uf is plotted.

Semi-log paper (5cycles x 1/10")