BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLOGY & SCIENCE
(AUTONOMOUS)
II - B.Tech II-Semester Supplementary Examinations (BR23), Aug - 2025
ELECTRONIC CIRCUIT ANALYSIS (ECE)

Time: 3 hours   Max. Marks: 70

Question Paper consists of Part-A and Part-B
*Answer **ALL** the question in **Part-A** and **Part-B***

PART–A (10X2 = 20M)

		Marks	CO	BL
1. a)	Explain the terms (i) g_m (ii) $c_{b'e}$ (iii) $c_{b'c}$ in the Hybrid - π model.	(2M)	CO 1	2
b)	Explain why h-parameter model is not suitable for high frequency analysis.	(2M)	CO 1	2
c)	List out different types of coupling used in multistage amplifiers.	(2M)	CO 2	2
d)	Three amplifiers of gain 20dB,30dB and 40dB are cascaded. Find the overall gain in dB.	(2M)	CO 2	2
e)	What is effect of negative feedback on amplifier gain?	(2M)	CO 3	2
f)	Give the expression of R_{if} and R_{of} for voltage series feedback amplifier.	(2M)	CO 3	2
g)	Why RC oscillators are not used at high frequencies.	(2M)	CO 4	2
h)	State Barkhausen criterion	(2M)	CO 4	2
i)	Classify power Amplifiers	(2M)	CO 5	2
j)	Define Q factor of tuned amplifier	(2M)	CO 5	2

PART–B (5X10 = 50M)

2a.	Derive the voltage gain equation for common Drain amplifier at high frequencies.	5(M)	CO 1	3
b.	Draw the High frequency model of a Transistor. Derive the relationship between high frequency and low frequency parameters.	5(M)	CO 1	3

(OR)

3a.	Explain various hybrid-pi capacitances and conductances of a BJT.	5(M)	CO 1	2
b.	Derive the expressions for f_T and f_β	5(M)	CO 1	3

4a.	Compare the three types of coupling methods used in multistage amplifiers	5(M)	CO 2	2
b.	Draw the circuit diagram of Darlington pair circuit and derive its overall current gain.	5(M)	CO 2	3

(OR)

5a.	Draw and explain the emitter coupled differential amplifier and explain its modes of operation.	5(M)	CO 2	2
b.	Draw the circuit diagram of two stage RC coupled CE - CE cascade amplifier circuit and analyze its performance (use appproximate analysis).	5(M)	CO 2	3

6a.	The distortion in an amplifier is found to be 3%, when the feedback ratio of a negative feedback amplifier is 0.04, when the feedback is removed, the distortion becomes 15%. Find the open loop gain and closed loop gain.	5(M)	CO 3	3
b.	What are the different types of feedback amplifiers? Give their equivalent circuits.	5(M)	CO 3	2

(OR)

7a.	Explain the method of analysis of feedback amplifier.	5(M)	CO 3	2
b.	An amplifier with negative feedback gives an output of 12.5 with an output of 1.5V. When feedback is removed, it requires 0.25V input for the same output. Find i) values of voltage gain without feedback ii) Value of β, if the input and output are in phase and β is real	5(M)	CO 3	3
8a.	Derive the expression for frequency of oscillation of a FET based RC Phase shift oscillator.	5(M)	CO 4	3
b.	In the Wein-bridge oscillator, if the RC network consists of resistors of 200KΩ and the capacitors of 300pF, find its frequency of oscillation.	5(M)	CO 4	3
	(OR)			
9a.	Derive the expression frequency of oscillation and condition for sustained oscillations of a Colpitts oscillator.	5(M)	CO 4	3
b.	In an Hartley oscillator, if L1= 0.2mH, L2 = 0.3mH and C = 0.003µF, calculate the frequency of its oscillation	5(M)	CO 4	3
10a.	Show that the conversion efficiency of a transformer coupled class A power amplifier is 50%.	5(M)	CO 5	3
b.	Explain the operation of class B push-Pull power amplifier.	5(M)	CO 5	2
	(OR)			
11a.	What is the effect of cascading single tuned amplifier on bandwidth	5(M)	CO 5	2
b.	Draw the equivalent circuit of capacitance coupled single tuned amplifier and derive the equation for voltage gain	5(M)	CO 5	3

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