Code No: R2022041 **R20** **SET - 1**

II B. Tech II Semester Supplementary Examinations, December- 2023

ELECTRONIC CIRCUIT ANALYSIS

(Common to ECE, EIE, & ECT)

Time: 3 hours **Max. Marks: 70**

Answer any **FIVE** Questions each Question from each unit
All Questions carry **Equal** Marks

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UNIT--I

1 a) With relevant mathematical expressions, explain about hybrid-π capacitances. [7M]

b) Derive the expressions for voltage gain and input admittances of a common drain (CD) amplifier at high frequencies. [7M]

Or

2 a) For the following measurements, $I_C = 5$ mA , $V_{CE} = 10$ V at room temperature $h_{fe} = 100$, $h_{ie} = 600\ \Omega$, $A_{ie} = 10$ at 10 MHz, $C_C = 3$ pF. Determine f_β, f_T, $r_{b'e}$, $r_{bb'}$ and C_e . [7M]

b) Derive the expressions for transconductance (g_m) and input conductance ($g_{b'e}$) of a hybrid-π model? Also, mention the typical values of hybrid-π parameters. [7M]

UNIT--II

3 a) Derive the overall current gain, voltage gain, input impedance and output impedance of Darlington pair amplifier in terms of h-parameters? [8M]

b) Three amplifiers of gain 20dB, 30dB and 40dB are connected together. Find the overall gain in dB and normal units. [6M]

Or

4 a) List out the advantages, disadvantages and applications of multistage amplifiers. [6M]

b) Derive the expression for differential mode gain of BJT based differential amplifier. Also, mention the features of differential amplifier. [8M]

UNIT--III

5 a) Derive an expression for the voltage gain, input and output impedances with feedback of a voltage series feedback amplifier? [7M]

b) The mid band gain of an amplifier is 500, the lower cut-off frequency is 70 Hz and upper cut-off frequency is 150 Hz. The mid band gain is reduces to 20 on employing negative feedback. Determine the effect of feedback on the upper and lower cut-off frequency. [7M]

Or

6 a) Distinguish between regenerative and degenerative feedback in amplifiers and give their applications. [7M]

b) Enumerate the procedure employed in the analysis of feedback amplifiers and discuss in detail the effect of feedback on the amplifier parameters. [7M]

UNIT--IV

7 a) What is an Oscillator? Explain the Barkhausen criterion for oscillations in sinusoidal oscillator. [7M]

b) Derive an expression for frequency of oscillations of a Wein bridge oscillator using transistors. Also, mention its advantages. [7M]

Or

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8 a) In a FET based RC phase shift oscillator, $R = 200\ K\Omega$ and $C = 200\ pF$. Find the frequency of the oscillator. [7M]

b) Derive the expression for frequency of oscillation and conditions of oscillation of a Colpitt's oscillator? Also, mention its applications. [7M]

UNIT--V

9 a) A transformer coupled class A power amplifier supplies the power to an 80 Ω load connected across the secondary of a transformer having turns ratio of 5:1, if $I_c = 120\ mA$, determine maximum output power. [7M]

b) What is class C amplifier? How are harmonics avoided in the output of such an amplifier? [7M]

Or

10 a) What is single tuned amplifier? Give its advantages and limitations. [7M]

b) Draw the equivalent circuit of capacitance coupled single tuned amplifier and derive the expression for voltage gain. [7M]