

II B. Tech II Semester Supplementary Examinations, February - 2022

ELECTRONIC CIRCUIT ANALYSIS

(Electronics Communication Engineering)

Time: 3 hours

Max. Marks: 75

Answer any **FIVE** Questions each Question from each unit

All Questions carry **Equal** Marks

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- 1 a) Explain various high frequency parameters of a BJT and derive the relation between them. [8M]
 b) Draw the Hybrid- π model for a common emitter transistor. At room temperature (300K) at $I_C=10\text{mA}$ and $V_{CE}=8\text{V}$. $h_{ie}=500$, $h_{oe}=2*10^{-4} \mu\text{s}$, $h_{fe}=100$ and $h_{re}=10^{-4}$. At the same operating point $f_T=50\text{MHz}$ and $c_{ob}=3\text{PF}$. Calculate the values of hybrid- π parameters. [7M]
- Or
- 2 a) Define f_α , f_β and f_T ? Derive the relationship between f_T and f_β ? Discuss the significance of f_T ? [8M]
 b) Transistor has $h_{ie}=6\text{k}\Omega$ and $h_{fe}=224$ at $I_C=1\text{mA}$, with $f_T=80\text{MHz}$ and $C_{b'c}=12\text{pF}$. Determine g_m , $r_{b'e}$, $r_{bb'}$, $C_{b'e}$ at room temperature. [7M]
- 3 a) Draw the circuit for CASCODE Amplifier. Explain its working, obtain overall values of the circuit in terms of h-parameters. [8M]
 b) Derive the effect of cascading on bandwidth of multistage amplifiers. [7M]
- Or
- 4 a) Explain RC-coupled CE transistor circuit? Write the expressions for current gain. [8M]
 b) Compute the overall lower cut-off frequency of an identical two stage cascade of amplifiers with individual lower cut-off frequency given as 412 Hz. [7M]
- 5 a) Draw the circuit of a voltage series feedback amplifier and derive the expressions for R_{if} and R_{of} . [8M]
 b) The open loop gain of an amplifier is 100. What will be the overall gain when a negative feedback of 0.5 is applied to the amplifier? [7M]
- Or
- 6 a) An amplifier has a gain of 50 with negative feedback. For a specified output voltage, if the input required is 0.1V without feedback and 0.8V with feedback, Compute β and open loop gain. [8M]
 b) Through the block schematics, show four types of negative feedback in amplifiers. [7M]
- 7 a) Establish the condition for frequency of oscillation in an RC phase shift oscillator with suitable diagram. [8M]
 b) With neat sketch explain the operation of LC oscillator. Derive the oscillation condition for LC circuits. [7M]
- Or
- 8 a) Derive an expression for frequency of oscillations of a wien bridge oscillator using transistor. [8M]
 b) List out the comparisons between RC-phase shift oscillator and Wien bridge oscillator? [7M]



- 9 a) Compare the various classes of operation of power amplifiers based on [8M]
i) Operating cycle ii) Position of Q point iii) Efficiency
- b) A complementary symmetry class B amplifier supplied output to a load of 3Ω [7M]
from the supply voltage of 20V. Calculate maximum power output, power output, power dissipation rating of each transistor?
- Or
- 10 a) Derive an expression for tuning frequency of a single tuned amplifier in terms of [8M]
quality factor and bandwidth of the amplifier?
- b) A single tuned transistor amplifier is used to amplify modulated RF carrier of [7M]
500kHz and bandwidth of 20kHz. The circuit has a total output resistance $R_t=40k\Omega$ and output capacitance $C_o=50pF$. Calculate values of inductance and capacitance of the tuned circuit?

