Code No: 114CV **R13**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year II Semester Examinations, May - 2016
ELECTRONIC CIRCUIT ANALYSIS
(Common to ECE, EIE, ETM)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART- A (25 Marks)

1.a) What is the main application of CC amplifier and Why? [2]
b) What are the conditions for approximate h-parameter model? [3]
c) What is base-spreading resistance? [2]
d) What is the bypass capacitor and why it is connected in CE amplifier? [3]
e) What is the effect of negative feedback on stability? [2]
f) What is Barkhausen criterion? [3]
g) What are the advantages of class-B operation? [2]
h) What is harmonic distortion? [3]
i) What are the properties of Q of a tuned circuit? [2]
j) What is the effect of cascading on double tuned amplifier? [3]

PART-B (50 Marks)

2.a) Draw the CC amplifier and derive the expression for A_I, R_I, A_V, Y_O.
b) A CE amplifier is drawn by a voltage source of internal resistance R_S = 800 ohms and load impedance is a resistance R_L = 1000 ohms. The h-parameters are h_{ie} = 1.0 K ohms, $h_{re} = 2 \times 10^{-4}$, h_{fe} = 50 and h_{oe} = 25 μ A/V. compute A_I, R_I, A_V, R_o using exact analysis. [5+5]

OR

3.a) Derive the expression for the bandwidth of multistage amplifier.
b) What is the use of transformer coupling in the output of multistage amplifier? [5+5]

4.a) Derive the equation for the lower 3dB frequency of CE configuration due to emitter bypass capacitor.
b) Given the following transistor measurements made at I_C=5mA and V_{CE} = 5 V and at room temperature. h_{ie} = 600 ohms, h_{fe}=100, $C_{b'c}$=3PF and A_i=10 at 10 MHz. Find f_β, f_T, $C_{b'e}$, $r_{b'e}$ and $r_{bb'}$ of hybrid equivalent circuit in CE configuration. [5+5]

OR

5.a) Derive the expression for voltage gain of a common source FET amplifier with and without source resistance included in the circuit.
b) In the CS amplifier R_L=5K, R_G=10 Mohms, μ=50 and r_d = 35 K. Evaluate voltage gain, input impedance and output impedance. [5+5]

6.a) Show that bandwidth increases in negative feedback amplifiers.

b) An amplifier has a input resistance of 200 K ohms, with a certain negative feedback introduced in the above amplifier the input resistance is found to be 20 M ohms and overall gain is found to be 1000. Calculate the loop gain and feedback factor. [5+5]

OR

7. Draw the circuit diagram of RC-Phase shift oscillator using BJT and derive the expressions for frequency of oscillations and condition on gain. [10]

8.a) Derive the expression for maximum conversion efficiency for a Transformer-coupled Class A power amplifier.

b) List out the advantages of complementary symmetry configuration over push pull configuration. [7+3]

OR

9.a) Show that the maximum conversion efficiency of the idealized class B push-pull circuit is 78.5%.

b) For an ideal class B transistor amplifier the collector supply voltage V_{cc} and the effective load resistance $R_L = (N_1/N_2)^2 R_L$ are fixed as the base current excitation is varied. Show that the collector dissipation P_c is zero at no signal, rises as V_m increases and passes through a maximum at $V_m = 2Vcc/\pi$. [5+5]

10.a) Derive an expression for the bandwidth of a synchronous tuned circuit.

b) Discuss the necessity of stabilization circuits in tuned amplifiers. [7+3]

OR

11. Draw the equivalent circuit of double tuned amplifier and derive the expression for gain at resonance. [10]

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