

R13

Code No: 114CV

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 $h_{oe} = 25 \mu A/V$. 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 $I_C = 5$ mA and $V_{CE} = 5$ V and at room temperature. $h_{ie} = 600$ ohms, $h_{fe} = 100$, $C_{b'c} = 3$ PF 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 $R_L = 5$ K, $R_G = 10$ Mohms, $\mu = 50$ 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 $V_m = 2V_{cc}/\pi$. [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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