Code: EC4T3

II B.Tech - II Semester–Regular/Supplementary Examinations
April 2019

ANALOG ELECTRONIC CIRCUITS
(ELECTRONICS & COMMUNICATION ENGINEERING)

Duration: 3 hours   Max. Marks: 70

PART – A

Answer **all** the questions.   All questions carry equal marks

$$11 \times 2 = 22M$$

1.

   a) What are h parameters? Why are they called so?

   b) State the conditions for using simplified h-parameter model.

   c) Draw hybrid-π model for a transistor at high frequencies.

   d) Define the circuit parameters g_m and $r_{b'e}$ of hybrid-π model.

   e) Draw equivalent circuit of CS -FET at high frequencies.

   f) What are the benefits of cascading transistor amplifiers?

   g) Negative feedback improves the gain stability of the amplifier. Justify this statement.

   h) State the characteristics of negative feedback amplifiers.

   i) What is cross over distortion? How it can be minimized?

   j) Classify amplifiers based on the position of Q-point.

   k) A crystal has L=0.33 H, C=0.06 PF, C_M=1PF, R=5.5KΩ. Calculate series and parallel resonance frequencies.

PART – B

Answer any **THREE** questions. All questions carry equal marks.

$$3 \times 16 = 48 \text{ M}$$

2. a) Find the expressions for A_i, R_i, A_V and R_o of Common Emitter Amplifier with emitter resistor (using approx. analysis). 8 M

b) A CC amplifier is drawn by a voltage source of internal resistance Rs=1000Ω, and the load impedance is R_L=2000 Ω. The h-parameters are

h_{ie}=1.1K Ω, h_{re}=2.5*10^{-4}, h_{fe}=50, h_{oe}=25uA/V.
Find A_i, R_i, A_V, R_o. 8 M

3. a) Derive the expression for the CE short circuit voltage gain with resistive load. 8 M

b) How does the parameters of GIACOLETTO model of a CE transistor at high frequencies vary with |Ic| and |Vce|. 8 M

4. a) Draw the high frequency equivalent circuit of CS amplifier and derive the expressions for voltage gain, input and output impedance. 8 M

b) Evaluate quantitatively the effect of emitter bypass capacitor on low frequency response of CE amplifier.

8 M

5. a) Explain in detail how to identify the feedback topology for practical amplifier.   8 M

   b) For the transistor feedback amplifier stage shown, $h_{ie}=1K\ \Omega$, $h_{fe}=100$, h_{oe} and h_{re} are negligible. Determine R_{Mf}, A_{Vf}, R_{if}, $R_{of}^{|}$.
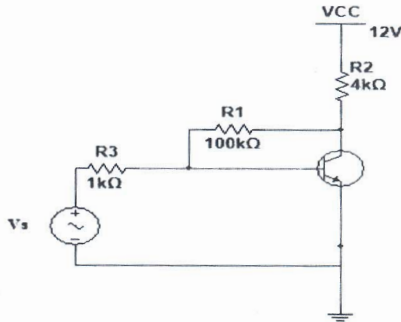
                                                                    8 M

6. a) Obtain the expression for frequency of oscillations and condition of oscillations for Hartley oscillator.   8 M

   b) Draw the circuit diagram of transformer coupled class-A power amplifier and explain its operation.   8 M