

Code: EC4T3

II B.Tech - II Semester–Regular/Supplementary Examinations–April 2018

**ANALOG ELECTRONIC CIRCUITS
(ELECTRONICS & COMMUNICATION ENGINEERING)**

Duration: 3 hours

Max. Marks: 70

PART – A

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

11 x 2 = 22M

1. a) Sketch the emitter follower circuit.
- b) Define the h-parameters of CE configuration.
- c) What are the merits of high frequency hybrid π CE model?
- d) Explain base spreading resistance.
- e) Define pinch off voltage.
- f) How is FET used as a voltage variable resistance?
- g) Sketch the circuit diagram of a voltage shunt feed-back amplifier.
- h) List the steps required to carry out the analysis of a feed-back amplifier.
- i) State Nyquist criterion for stability.
- j) What is meant by cross over distortion? How it is reduced?
- k) Explain the significance of tank circuit in oscillators.

PART – B

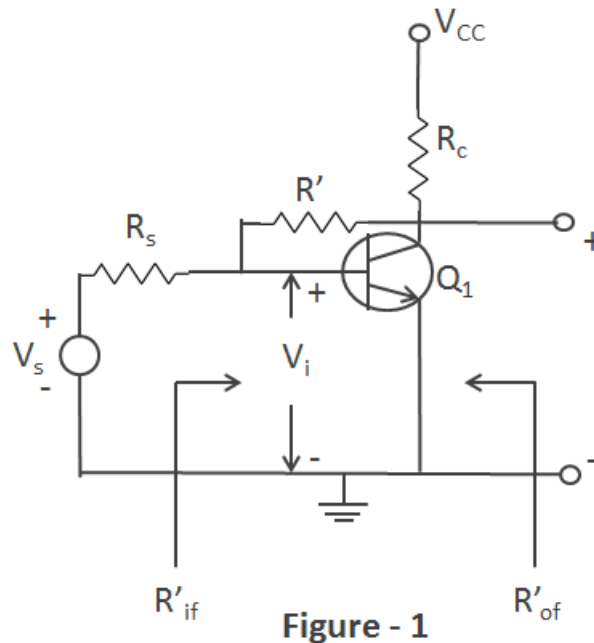
Answer any **THREE** questions. All questions carry equal marks.

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

2. a) Prove that a Darlington emitter follower input impedance is higher than that of a single stage emitter follower and draw its circuit diagrams. 8 M
- b) Derive current gain, voltage gain, input resistance and output resistances of emitter follower circuit. 8 M
3. a) Sketch and explain the equivalent circuit of emitter follower using high frequency hybrid π - model. 8 M
- b) Consider a CE stage with a resistive load R_L . 8 M
- i) Using miller's theorem, what is the mid-band input capacitance?
- ii) Assuming the output time constant is small compared to input, what is the high 3-db frequency f_H for the current gain?
4. a) Derive the transconductance g_m and drain resistance r_d of Field Effect Transistor small signal model. 8 M
- b) Sketch the RC coupled amplifier and explain its frequency versus gain response. 8 M

5. a) The circuit of Figure -1, has the following parameters;
 $R_c = 5K\Omega$, $R' = 50K\Omega$, $R_s = 10K\Omega$, $h_{ie} = 1.1 K\Omega$,
 $h_{fe} = 50$, $h_{re} = h_{oe} = 0$, find i) A_{vf} and ii) R'_{if} and iii) R'_{of} .

8 M



- b) Sketch and explain step by step method of analysis of a feedback amplifier.

8 M

6. a) Explain the operation of wien bridge oscillator and derive its frequency of oscillation with neat sketch.

8 M

- b) Define conversion efficiency of an amplifier and derive expression for the same of class A amplifier, neglect all distortions.

8 M