

Code: EC4T3

**II B.Tech - II Semester – Regular / Supplementary Examinations
October - 2020**

**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) Draw the hybrid model for CE transistor configuration. Define its h-parameters.
- b) Write the h-parameter conversion formulas from CE configuration to CC configuration.
- c) Define f_{α} , f_{β} and f_T for high frequency transistor amplifiers.
- d) Explain the Common Source (CS) amplifier with circuit diagram.
- e) What is Cascode amplifier? How is it different from Cascade amplifier?
- f) Explain the functions of coupling device used in multistage amplifiers.
- g) Write the general characteristics of negative feedback amplifiers.
- h) What is the sensitivity of an amplifier?
- i) State the Barkhausen criteria.
- j) Draw the circuit diagram of RC phase shift oscillator and write its frequency of oscillation formula.

k) What is the classification of power amplifiers? Explain its conduction angle.

PART – B

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

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

2. a) Derive the equations for current gain, input impedance, voltage gain and output impedance for BJT by using h-parameters. 8 M
- b) Draw the circuit diagram of an emitter follower and explain its operation. 8 M
3. a) Derive the expression for short circuit current gain for the CE amplifier. 8 M
- b) The following low-frequency parameters are known for a transistor at $I_C = 10 \text{ mA}$ and $V_{CE} = 10 \text{ V}$ at 25°C . The h-parameters are $h_{ie} = 500 \Omega$, $h_{fe} = 100$, $h_{re} = 10^{-4}$ and $h_{oe} = 4 \times 10^{-5}$. Compute the values of all the hybrid- π parameters. 8 M
4. a) What are the limitations of single stage amplifiers and how are they overcome in multistage amplifiers? What are the problems involved in multistage amplification? 8 M

- b) Draw the circuit diagram of Darlington pair and explain its operation. 8 M
5. a) Draw the block diagram of Voltage-series feedback amplifier and derive its gain, input impedance and output impedances. 8 M
- b) An amplifier requires an input signal of 60 mV to produce a certain output. With a negative feedback to get the same output, the required input signal is 0.5 V. The voltage gain with feedback is 90. Find the open loop gain and feedback factor. 8 M
6. a) Draw the circuit diagram of Hartley oscillator, derive the expression for frequency of oscillation. 8 M
- b) Draw and explain the operation of transformer coupled class A power amplifier. Derive its efficiency. 8 M