

R22

Code No: 183AA

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech II Year I Semester Examinations, February - 2024

ANALOG CIRCUITS

(Common to ECE, EIE)

Time: 3 Hours

Max. Marks: 60

Note: This question paper contains two parts A and B.

i) **Part- A** for 10 marks, ii) **Part - B** for 50 marks.

- Part-A is a compulsory question which consists of ten sub-questions from all units carrying equal marks.
- Part-B consists of **ten questions** (numbered from 2 to 11) **carrying 10 marks each**. From each unit, there are two questions and the student should answer one of them. Hence, the student should answer five questions from Part-B.

PART- A

(10 Marks)

- Define DC load line in transistor biasing. [1]
- What is the low-frequency response of BJT amplifiers primarily influenced by? [1]
- What is the purpose of biasing in FET circuits? [1]
- What is the primary advantage of the source follower configuration? [1]
- Define various coupling methods. [1]
- Classify the amplifiers. [1]
- Define the loop gain or return ratio. [1]
- Define degenerative feedback. [1]
- Draw the equivalent circuit of crystal. [1]
- How does an oscillator differ from an amplifier? [1]

PART-B

(50 Marks)

- Explain the need for bias compensation in transistor circuits.
 - Draw the fixed bias circuit and explain it. Write the draw backs of it. [5+5]
- OR**
- The h parameters of a transistor used in single stage amplifier circuit are $h_{ic} = 1100$, $h_{rc} = 1$, $h_{fc} = 51$ and $h_{oc} = 25\mu A$. Determine the amplifier parameters for CC configuration when $R_S = R_L = 10K$.
 - Discuss the self-bias circuit and derive the expression for S. [5+5]
 - Differentiate between a BJT amplifier and FET amplifier.
 - Write the advantages and disadvantages of using JFETs and BJTs in different amplifier configurations. [5+5]

OR

- With neat sketch, discuss about common source JFET amplifier.
 - Derive the equation for voltage gain of a common source JFET amplifier. [5+5]

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6. Draw and explain the operation of Darlington amplifier and derive equation for its input impedance. [10]

OR

- 7.a) Define unity gain frequency. Obtain the necessary relation using transistor frequency response.

- b) Draw the circuit of a Two stage RC-Coupled Amplifier and explain its working along with its advantages. [5+5]

- 8.a) Draw the circuit for Voltage series feedback amplifier and justify the type of feedback.

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

OR

- 9.a) Show that the bandwidth increases in negative feedback amplifiers.

- b) Draw and explain the block diagram of voltage shunt feedback amplifier. [5+5]

10. Obtain the expression for frequency of oscillations and condition of oscillations for RC Phase- shift oscillator. [10]

OR

- 11.a) Derive the expression for the frequency of colpitt's oscillators.

- b) How does the frequency stability of an LC oscillator depend upon the Q-factor of the LC circuit? Explain. [7+3]

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