Code No: 183AA **R22**

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)

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

PART-B

(50 Marks)

2.a) Explain the need for bias compensation in transistor circuits.
b) Draw the fixed bias circuit and explain it. Write the draw backs of it. [5+5]

OR

3.a) 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}=25μA. Determine the amplifier parameters for CC configuration when R_S=R_L=10K.
b) Discuss the self-bias circuit and derive the expression for S. [5+5]

4.a) Differentiate between a BJT amplifier and FET amplifier.
b) Write the advantages and disadvantages of using JFETs and BJTs in different amplifier configurations. [5+5]

OR

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

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 KΩ, with a certain negative feedback introduced in the above amplifier, the input resistance is found to be 20 MΩ 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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