Code No: 133AB **R16**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech II Year I Semester Examinations, September/October - 2023
ANALOG ELECTRONICS
(Electronics and Communication Engineering)

Time: 3 Hours **Max. Marks: 75**

Note: i) Question paper consists of Part A, Part B.
ii) Part A is compulsory, which carries 25 marks. In Part A, answer all questions.
iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A

(25 Marks)

1.a) Write the characteristic of CB amplifier. [2]
b) Write the difference between cascade and cascode amplifiers? [3]
c) Why the h parameter model is not suitable to analyze transistor at high frequencies?[2]
d) What are the elements in the hybrid π model? [3]
e) What is folded Cascode amplifier? [2]
f) Distinguish between enhance mode and depletion mode of MOSFET. [3]
g) List the four basic feedback topologies. [2]
h) Draw the diagram of voltage series and current series feedback amplifiers? [3]
i) Compare class A and class B amplifier. [2]
j) What is meant by loaded and unloaded Q? [3]

PART – B

(50 Marks)

2.a) Discuss briefly Cascode amplifier.
b) Explain the different coupling schemes used in amplifiers. [5+5]

OR

3. Draw simplified h parameter equivalent circuit and calculate Ai, Av, Avs, Ri′ and Ro′ for the cascode circuit shown in figure 1. Assume that transistors are identical with $h_{fe} = 10$, $h_{ie} = 2\ K\Omega$, $h_{re} = h_{oe} = 0$. [10]

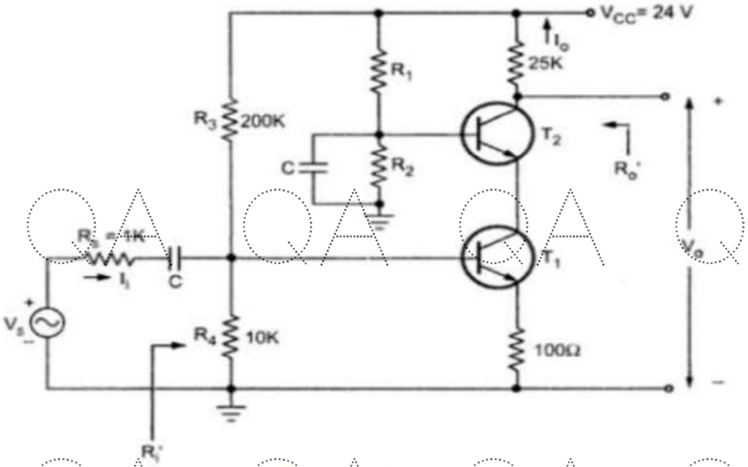

Figure: 1

4. A BJT has the following parameters measured at I_c =1 mA, h_{ie} = 3 K Ω, h_{fe} = 100, f_T = 4 MHz, C_C = 2pF and C_e =18 pF. Find $r_{b'e}$, $r_{bb'}$, g_m and f_H for R_L=1 KΩ. [10]

OR

5.a) Prove that in Hybrid - π model, the diffusion capacitance is proportional to emitter bias current.

b) Define f_β and f_T and derive the relation between f_β and f_T. [5+5]

6.a) Draw and explain the drain characteristics of JFET and mark the regions of operation.

b) A JFET has a drain current of 6mA. If I_{DSS} = 12mA and V_P = 4V find:

i) V_{GS}

ii) For an n-channel amplifier FET I_{DSS} = 5.8 mA. V_P = -3V and V_{GS} = -2V, find I_D and g_m. [5+5]

OR

7. Analyze common source MOSFET amplifier in terms of gains and impedances, with a) Resistive load b) Diode connected load c) current source load. [10]

8. Discuss the working principle of Wein bridge oscillator and derive the expression for frequency of oscillations. [10]

OR

9.a) Derive the expressions of input and output resistances for Voltage Series feedback amplifier.

b) Mention the features and advantages of the crystal oscillator. [5+5]

10.a) Explain the principle of operation of class-AB power amplifier with a neat sketch.

b) Draw the circuit diagram of class B push pull amplifier and explain its operation. Also prove that its conversion efficiency is 78.5%. [3+7]

OR

11.a) Draw and explain the frequency response of tuned amplifier.

b) Discuss the principle operation of class-C amplifier. [5+5]

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