

RGM COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

27th October 2022

II B.Tech. II Sem. (R20) End Examinations (Supplementary)

ELECTRONIC CIRCUITS – ANALYSIS AND DESIGN

ECE

Time: 3 Hrs

Total Marks: 70

Note 1: Answer Question No.1 (Compulsory) and 4 from the remaining

2: All Questions Carry Equal Marks

- 1a Draw the basic MOS differential pair configuration.
- b Give the typical h-parameter values for a transistor at $I_E = 1.3 \text{ mA}$.
- c Define class B power amplifier.
- d Define growing oscillations.
- e What is the figure of merit for the amplifier and define?
- f List the disadvantages of negative feedback amplifier.
- g A multistage amplifier consists of three stages. The voltage gain of individual stages are 30, 50 and 80. Calculate the overall voltage gain in dBs?
- 2 A common-emitter amplifier uses load resistor $R_C = 2 \text{ K}\Omega$ in the collector circuit and is driven by a voltage source of internal resistance $R_s = 1000\Omega$. The h- parameters of the transistor are $h_{ie} = 1300 \Omega$, $h_{re} = 2 \times 10^{-4}$, $h_{fe} = 55$ and $h_{oe} = 22 \mu\text{A/V}$. Compute
 - a) The current gain A_I (4)
 - b) The input impedance Z_i (3)
 - c) Voltage gain A_V and (3)
 - d) The output impedance Z_o (4)
- 3
 - a) draw the circuit diagram of practical current shunt negative feedback amplifier using BJT. (4)
 - b) Explain the analysis of above circuit to find its voltage gain, input resistance and output resistance. (10)
- 4
 - a) Draw the circuit diagram of single tuned amplifier and explain its operation. (7)
 - b) Write short notes on coil losses and quality factor of a coil. (7)
- 5
 - a) Draw the circuit of BJT differential amplifier with an active load (4)
 - b) Explain the operation of above circuit (10)
- 6
 - a) Define unity gain frequency (f_T) of MOSFET and derive its equation. (7)
 - b) Calculate f_T for n-channel MOSFET with capacitances $C_{gs} = 24.7 \text{ fF}$, $C_{gd} = 1.72 \text{ fF}$, $L = 1.0 \mu\text{m}$, and $W = 10 \mu\text{m}$. Assume operation at $100 \mu\text{A}$ and that $R_n = 160 \mu\text{A/V}^2$. (7)
- 7
 - a) List the differences between class A and class B power amplifiers. (7)
 - b) Draw the circuit diagram of series fed class A power amplifier using BJT and explain its operation (7)

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