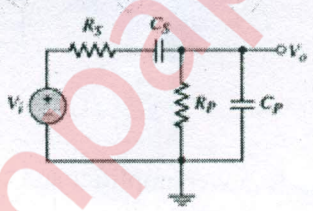
S.E./ELX/Sem-IV/CBCGS/R-19/'c' Scheme/Sub:- EDC-II
S.H. 2024
Date:- 04/12/2024
GP. Code:- 10066737

[Time : 3 Hours] [Total Marks:80]

N.B.: (1) Question No 1 is Compulsory.
(2) Attempt any three questions out of the remaining five.
(3) All questions carry equal marks.
(4) Assume suitable data, if required and state it clearly.

1. Attempt **any FOUR** [20]
   - a Draw block diagram of negative feedback amplifier and derive equation for gain.
   - b Compare RC phase shift oscillator and Wien bridge oscillator.
   - c Draw and explain different types of differential amplifier configurations.
   - d Explain how power amplifier is different from voltage amplifier
   - e What are the different types of power amplifiers along with their power efficiency.

2 a Determine the corner frequencies and bandwidth of a passive circuit containing two capacitors. Consider the circuit shown in Figure 7.10 with parameters $R_S = 1\text{k}\Omega, R_P = 10\text{k}\Omega, C_S = 1\mu\text{F}$, and $C_P = 3\text{pF}$ [10]



b Write a short note on FET Cascode amplifier (CS-CG). [10]

3 a Explain voltage series negative feedback amplifier with help of block diagram and derive expression for Rif, Rof and Af. [10]

b Write a short note on Crystal oscillator. Describe its advantages, disadvantages and applications. [10]

4 a What are the different methods to improve CMRR. Explain any one. [10]

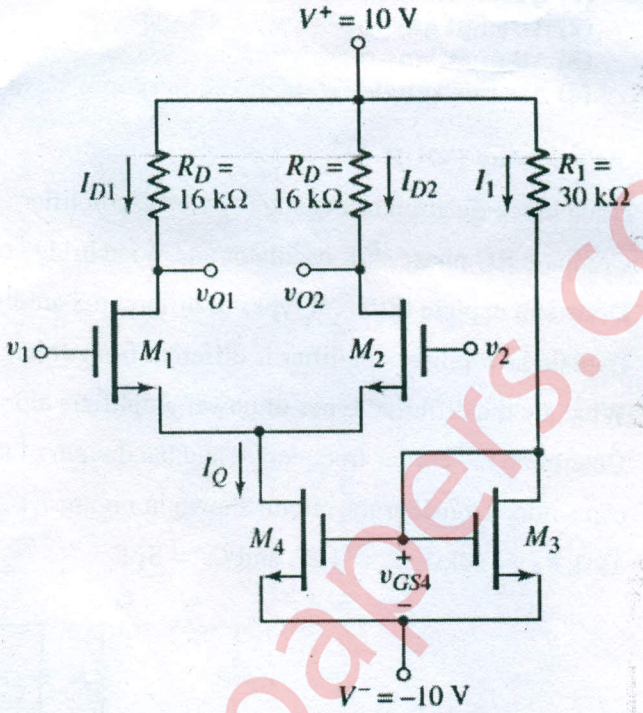
b Draw and explain transformer coupled Class-A Power amplifier and derive the maximum power conversion efficiency for the same. [10]

5 a Explain Miller's theorem with respect to capacitance. Derive the necessary expressions. [10]

b Explain what is a multistage amplifier? Explain the different types of coupling methods. [10]

6 a Consider a MOSFET differential amp with the configuration as shown in the figure. Assume $K_{n1} = 1\ \text{mA/V}^2, I_Q = 0.587\ \text{mA}$ and $\lambda = 0.01\ \text{V}^{-1}$ for M_4. [10]

Determine the output resistance of current source, differential-mode voltage gain, common-mode voltage gain and CMRR for the differential amplifier.



b Explain Class-B power amplifier and crossover distortion. Drive expression for its efficiency. **[10]**

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