

[6186]-512

S.E. (Electronics/E&TC)

ELECTRONIC CIRCUITS

(2019 Pattern) (Semester - III) (204181)

Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates:

- 1) Answer Q.1 or Q.2, Q.3 or Q.4.
- 2) Figures to the right indicate full marks.
- 3) Draw neat diagram wherever necessary.
- 4) Assume suitable data, if necessary.

Q1) a) Draw & Explain drain characteristics of N-EMOSFET. Write drain current equation for the respective region? [5]

b) Explain any two non-ideal current voltage characteristics of MOSFET transistor. [5]

c) For the circuit diagram shown in Figure [1], calculate V_{DS} , I_D & V_{GS} .

Assume : $R_1 = 10 \text{ M}\Omega$, $R_2 = 3.6 \text{ M}\Omega$, $R_D = 10\text{K}$, $K_n = 0.5 \text{ mA/V}^2$, $V_{TN} = 1.5 \text{ V}$. [5]

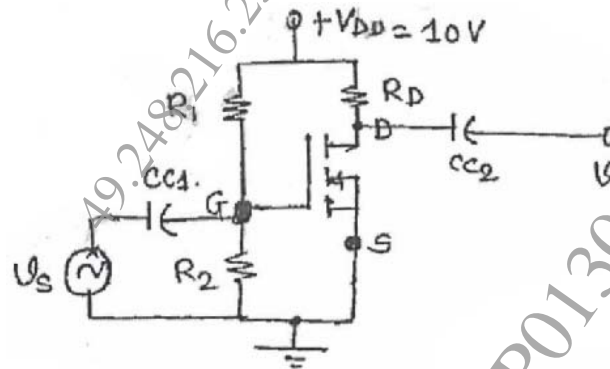


Figure [1]

OR

Q2) a) Draw the common source E-MOSFET amplifier and explain frequency response with diagram. [5]

b) Explain construction and working of N-Type Enhancement MOSFET in details. [5]

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- c) For the circuit shown in Figure [2]. Calculate I_{DQ} , V_{DSQ} and V_D . Assume : $R_1 = 22 \text{ M}\Omega$, $R_D = 3 \text{ K}\Omega$, $R_2 = 18 \text{ M}\Omega$, $V_{TN} = 3 \text{ V}$, $R_S = 0.82 \text{ K}\Omega$, $K_n = 0.12 \text{ mA/V}^2$, $V_{GS} = 10.48 \text{ V}$. [5]

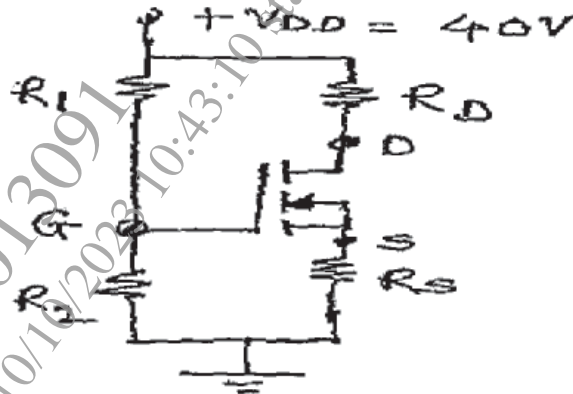


Figure [2]

- Q3) a) Explain advantages of negative feedback in amplifiers. [5]
- b) Explain effect of negative feedback on : [5]
- Input impedance
 - Output impedance
 - Gain
 - Bandwidth
 - Gain stability
- c) Identify topology of feedback and determine AV_f , R_{if} , R_{of} for the amplifier shown in Figure [3]. For the MOSFET $g_m = 2 \text{ mA/V}$, $r_d = 40 \text{ K}$. [5]

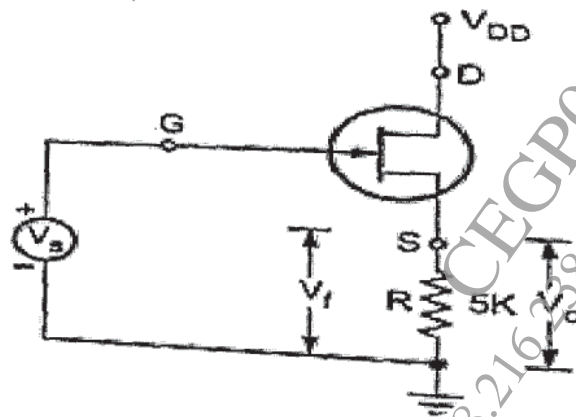


Figure [3]

OR

- Q4)** a) Explain Barkhausen Criteria for sustained oscillations and draw the circuit diagram of RC phase shift oscillator. [5]
- b) Draw the block diagram of Current Series topology and write the equation for R_{if} and R_{of} . [5]
- c) Compare different types of feedback topologies with respect to different parameter. [5]

