P-5386

[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 : $R_1 = 10$ MΩ, $R_2 = 3.6$ MΩ, $R_D = 10$K, Kn = 0.5 mA/V2, $V_{TN} = 1.5$ V. **[5]**
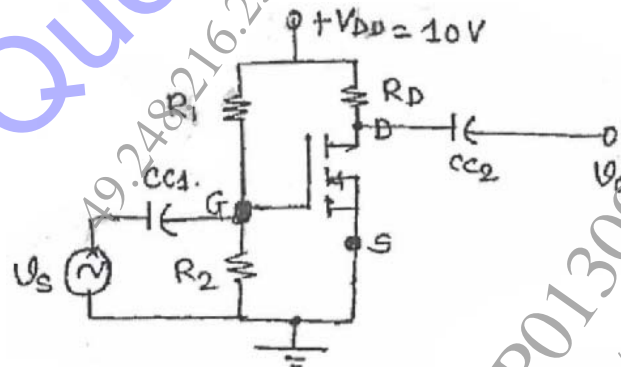

Figure [1]

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 MΩ, R_D = 3 KΩ, R_2 = 18 MΩ, V_{TN} = 3 V, R_S = 0.82 KΩ, Kn = 0.12 mA/V2, V_{GS} = 10.48 V. **[5]**
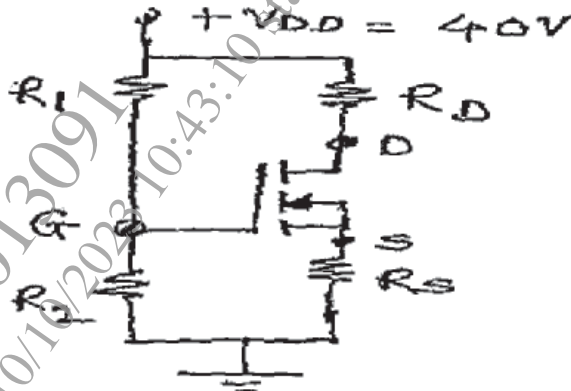

Figure [2]

Q3) a) Explain advantages of negative feedback in amplifiers. **[5]**

b) Explain effect of negative feedback on : **[5]**

   i) Input impedance

   ii) Output impedance

   iii) Gain

   iv) Bandwidth

   v) Gain stability

c) Identify topology of feedback and determine AVf, Rif, Rof for the amplifier shown in Figure [3]. For the MOSFET gm = 2mA/V, rd = 40 K. **[5]**
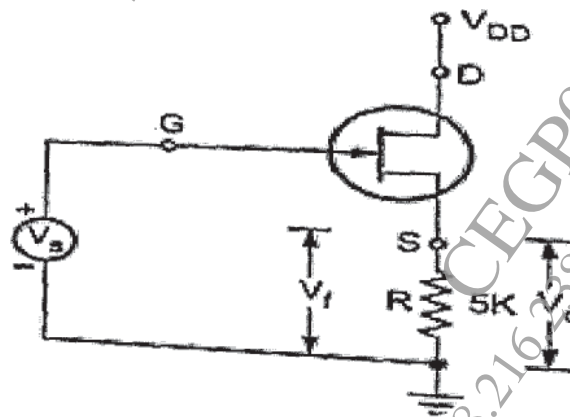

Figure [3]

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 Rif and Rof. **[5]**

   c) Compare different types of feedback topologies with respect to different parameter. **[5]**

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