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[5057]-2043

S.E. (Electronics/E&TC) (First Semester)

EXAMINATION, 2016

ELECTRONIC DEVICES AND CIRCUITS

(2015 PATTERN)

Time : Two Hours

Maximum Marks : 50

N.B. :— (i) Answer Q. 1 or Q. 2, Q. 3 or Q. 4, Q. 5 or Q. 6 and Q. 7 or Q. 8.

(ii) Neat diagrams must be drawn wherever necessary.

(iii) Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.

(iv) Assume necessary data wherever required.

1. (a) Draw and explain the construction and working of N-channel JFET. [6]
- (b) Explain the following non-ideal V-I characteristics of MOSFET : [6]
 - (i) Finite output resistance
 - (ii) Subthreshold conduction
 - (iii) Breakdown effects.

P.T.O.

Or

2. (a) Determine the operating point (I_{DQ} , V_{DSQ}) of the JFET circuit as shown in figure (1). Calculate R_S . [6]

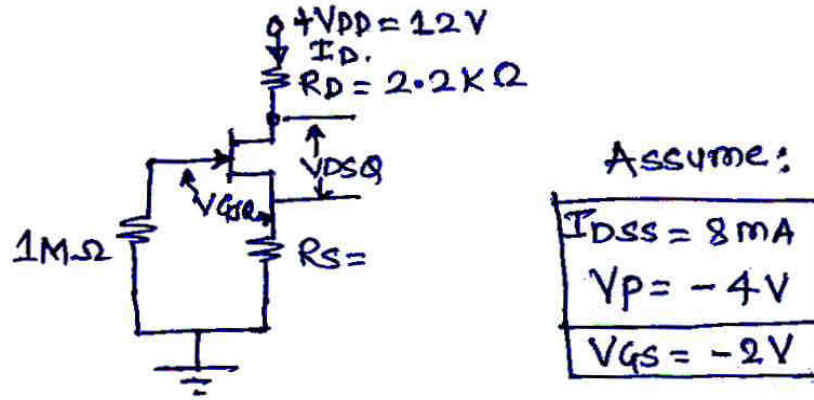


Fig. 1

- (b) Draw the constructional diagram of N channel E-MOSFET and give drain and transfer characteristics for the same with necessary parameters. [6]
3. (a) For the circuit diagram shown in Fig. 2, determine the g_m , A_v , R_i , R_o . [8]

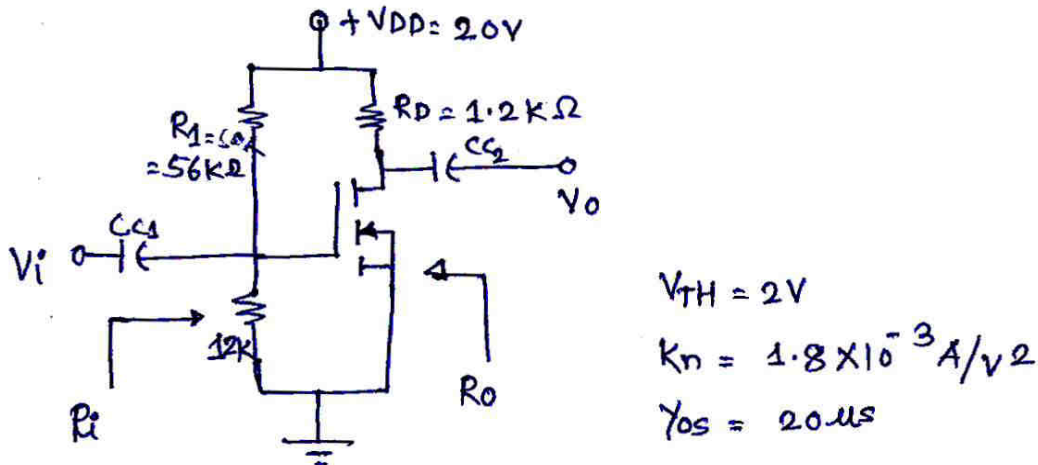


Fig. 2

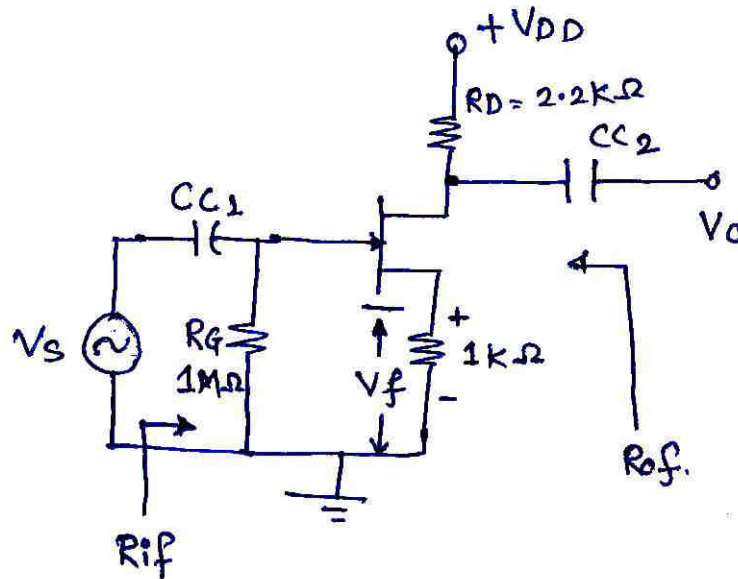
- (b) Write short note on constant current source using MOSFET. [4]

Or

4. (a) Explain the BiCMOS technology with suitable diagram. [6]
(b) Explain how MOSFET can be used as Active resistor in VLSI circuits. [6]
5. (a) Draw the different types of feedback topologies and compare their input and output impedances. [8]
(b) Give the Barkhausen criterion and draw any LC oscillator circuit. [5]

Or

6. (a) For the circuit diagram shown in Fig. 3, determine the G_{mf} , A_{vf} , R_{if} , R_{of} . [8]



Assume : $g_m = 1.6 \text{ mA/V}$
 $r_d = 25 \text{ k}\Omega$

Fig. 3

- (b) Differentiate RC and LC oscillator and draw RC phase shift oscillator using FET. [5]

7. (a) Draw and explain block diagram of adjustable positive three terminal voltage regulator. [8]
- (b) Compare linear regulator and SMPS. [5]

Or

8. (a) Explain SMPS using suitable block diagram. [7]
- (b) Design an adjustable voltage regulator using LM317 for output voltage 5-15 volts and draw necessary connection diagram. (Assume $R_1 = 240 \, \Omega$ and $I_{\text{adjustable}} = 100 \, \mu\text{A}$). [6]