Total No. of Questions—8]   [Total No. of Printed Pages—4

Seat No.	

[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.

Or

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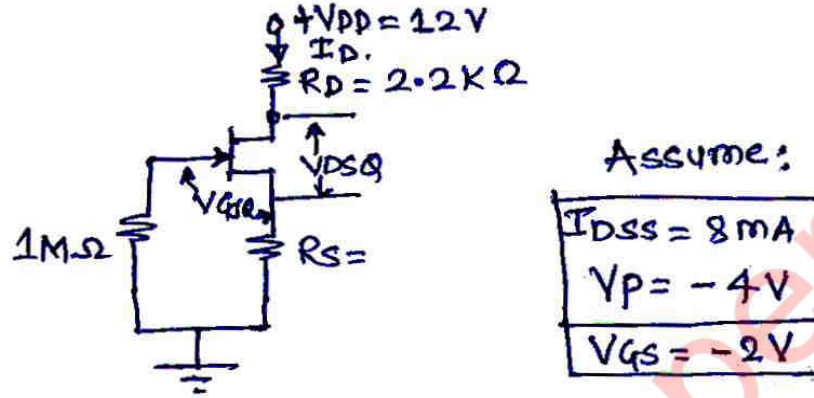

Fig. 1

(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]
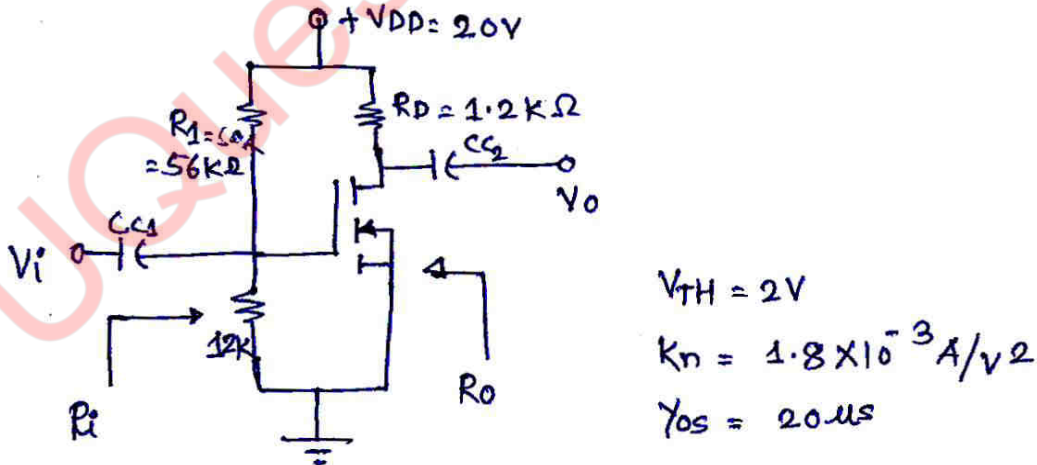

Fig. 2

(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]
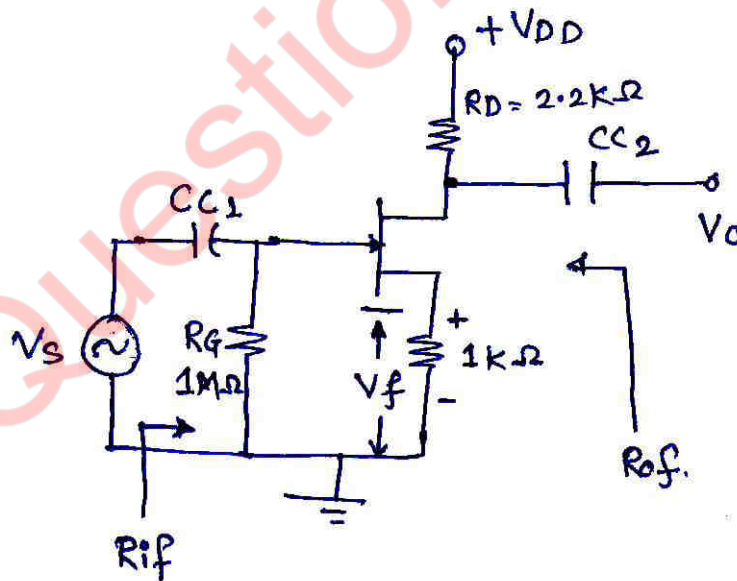
Assume : g_m = 1.6 mA/V

r_d = 25 kΩ

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 $I_{adjustable} = 100 \ \mu A$).   [6]