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

Seat No.	

[5352]-532

S.E. (E & TC/Electronics) (I Semester) EXAMINATION, 2018

ELECTRONIC DEVICES AND CIRCUITS

(2015 PATTERN)

Time : Two Hours **Maximum Marks : 50**

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

(*ii*) Neat diagram must be drawn wherever necessary.

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

(*iv*) Assume suitable data, if necessary.

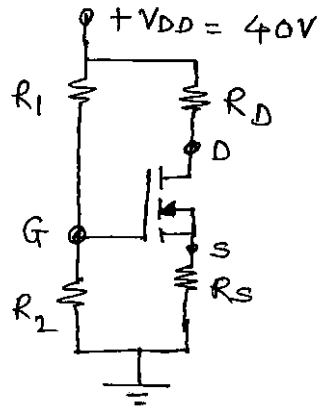
1. (*a*) Explain the following terms with respect to JFET : [6]

(*i*) Pinch off voltage (Vp)

(*ii*) Cut-off voltage (V_{GS}(off))

(*iii*) Forward transconductor (g_m).

(*b*) For the circuit shown in figure 1. Calculate I_{DQ}, V_{DSQ} and V_D. [6]



Assume :

R_1 = 22 MΩ, R_D = 3 kΩ

R_2 = 18 MΩ, V_{TN} = 3 V, R_S = 0.82 kΩ

K_n = 0.12 mA/V^2

V_{GS} = 10.48 V

(Figure 1)

P.T.O.

Or

2. (*a*) Draw and explain the small signal mode of the JFET. [6]

(*b*) Explain the following non-ideal voltage current characteristics of EMOSFET :

(*i*) Finite output resistance

(*ii*) Body effect

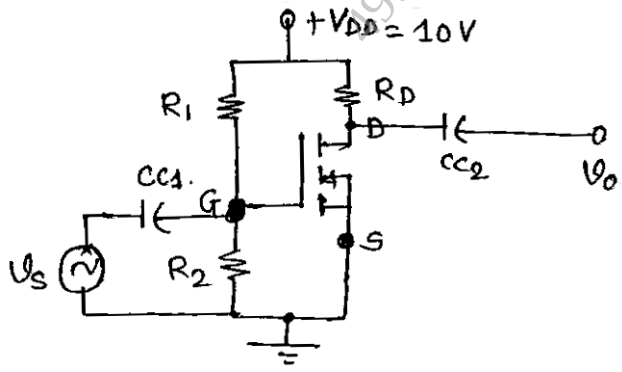
(*iii*) Subthreshold conduction. [6]

3. (*a*) Draw the common source E-MOSFET amplifier and explain its modes of operation in detail. [7]

(*b*) Draw and explain the working of MOSFET as current sink and source. [6]

Or

4. (*a*) For the circuit diagram shown in figure 2, calculate Av, Ri and Ro. [7]



(Figure 2)

Assume :

R_1 = 10 MΩ

R_2 = 3.6 MΩ

K_n = 0.5 mA/V^2

λ = 0.01 V^{-1}

V_{TN} = 1.5 V

(*b*) Write a short note on "MOSFET as Active resistor." [6]

5. (*a*) What is the effect of negative feedback on the following parameters : [8]

(1) Gain stability

(2) Bandwidth

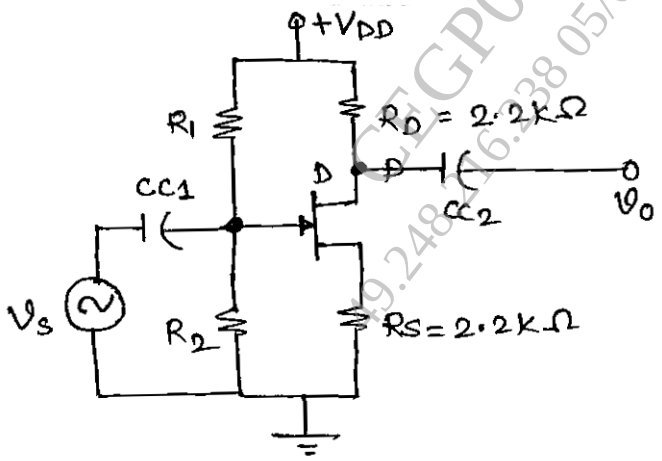
(3) Input impedance

(4) Out impedance.

(*b*) Draw and explain the Hartley oscillator. Give equation for frequency of oscillation. [5]

Or

6. (*a*) For the circuit diagram shown in figures, calculate the β, Rif, Rof and Gmf. [8]



(Figure 3)

Assume :

R_1 = 10 MΩ

R_2 = 1 MΩ

R_D = 2.2 kΩ

R_S = 2.2 kΩ

Y_{OS} = 20 μs

g_m = 2.4 MA/V

(*b*) State Barkhausen criteria and draw RC phase shift oscillator. [5]

7. (*a*) Draw and explain the internal block diagram of negative three terminal adjustable Voltage regulators. [8]

(*b*) Write a short note on Boost SMPS. [4]

Or

8. (*a*) Draw the detailed block diagram of SMPS and explain its operation. [8]

(*b*) Design and adjustable voltage regulator using LM 317 for output voltage from 10 to 20 V and draw the typical connection diagram. Assume : R_1 = 240 Ω and Iadj. 100 μA. [4]