Total No. of Questions—**8** [Total No. of Printed Pages—**3**

Seat No.	

[5668]-132

S.E. (E & TC/Electronics) (I Sem.) EXAMINATION, 2019
ELECTRONIC DEVICES AND CIRCUITS
(2015 PATTERN)

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

N.B. **:—** (*i*) Answer Q. No. **1** *or* **2**, Q. No. **3** *or* **4**, Q. No. **5** or **6**, Q. No. **7** or **8**.
(*ii*) Neat diagrams must be drawn wherever necessary.
(*iii*) Use of logarithmic tables, slide rule, electronic pocket calculator is allowed.
(*iv*) Assume suitable data, if necessary.

1. (A) Explain the following non-ideal characteristics of E-MOSFET. [6]

(*i*) Finite output resistance
(*ii*) Subthreshold conduction.

(B) For the single stage JFET amplifier if R_G = 1 MΩ, R_D = 2.2 kΩ, R_S = 1 kΩ, I_{DSS} = 8mA, V_P = 4V. Draw the necessary circuit diagram and calculate I_{DQ} and V_{DSQ} for V_{GS} = –2V. [7]

Or

2. (A) For the circuit diagram shown in Fig. 1. Calcualte R*i*, R*o* and AV. Assume the device parameters : g_m = 3.5 mA/V and y_{os} = 20 uS . [6]

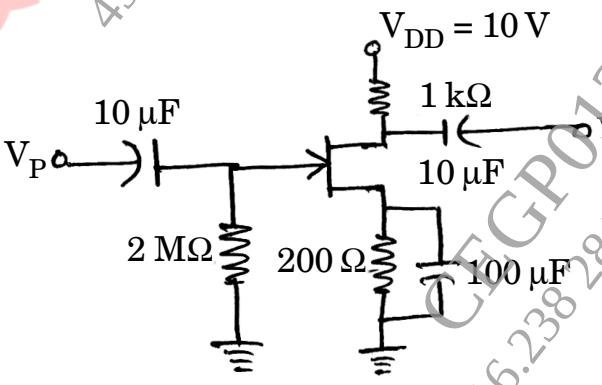


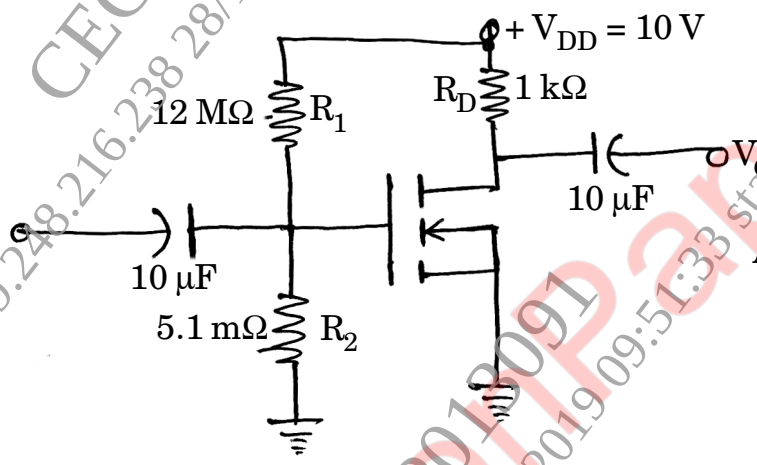
Fig. 1

P.T.O.

(B) Explain the short working of N-Channel E-MOSFET with drain and transfer characteristics. [7]

3. (A) Explain Bi-CMOS inverter withcircuit diagram and give the advantages of Bi-CMOS technique. [6]

(B) For the circuit diagram shown in Fig. 2. Calculate A*v*, R*i*, R*o* : [6]



Assume

K_n = 1.5 mA/V^2

V_{th} = 1.5 V

X = 0

Fig. 2

Or

4. (A) Explain the concept of MOSFET scaling and small geometry effect in VLSI design technology. [6]

(B) Explain MOSFET as constant current source with neat circuit diagram. [6]

5. (A) Draw block diagram of different feedback topologies and compare R*i* and R*o*. [8]

(B) Draw and design Hartley oscillator for *fo* = 1000 kHz. Assume L1 = L2 = L and C = 0.1 uF. [5]

Or

6. (A) Explain advantages and disadvantages of feedback amplifier. [6]

(B) For voltage amplifier open loop voltage gain is 75, input resistance is 100 kΩ, output resistance is 6.8 kΩ. If this amplifier is connected with negative feedback then gain decreases by 20%. Calculate β, A_{vf}, R_{if} and R_{of}. [7]

7. (A) Explain the concept of current boosting with neat circuit diagram in three terminal voltage regulator. [6]

(B) Explain any *three* specifications of LM317 adjustable voltage regulator. [3]

(C) Write a short note on low drop out voltage regulator. [4]

Or

8. (A) Draw the circuit diagram of step up SMPS and explain its operation. [6]

(B) Calculate range of the R2 resistance for the output voltage 0 – 20 V. Assume R1 = 276 Ω and I adjust is 100 uA. Draw typical connection diagram using adjustable voltage regulator. [7]