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S.E. (E&TC/Electronics) (First Semester) EXAMINATION, 2019

ELECTRONIC DEVICES AND CIRCUITS

(2015 PATTERN)

Time : Two Hours

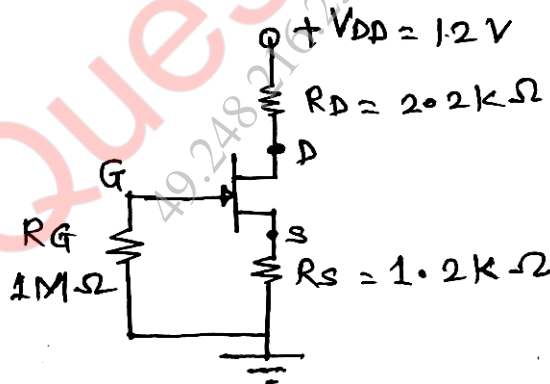
Maximum Marks : 50

Instructions to the candidates:

- 1) Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8.
- 2) Neat diagram must be drawn wherever necessary.
- 3) Use of logarithm tables, Slide rule, Mollier charts, electronic pocket calculator and steam table is allowed.
- 4) Assume suitable data, if necessary.

Q-1 (A) Draw & explain the Drain as well as Transfer characteristics of E-MOSFET. (07)

(B) For the circuit shown in figure 1. Calculate I_{DQ} , V_{DSQ} and V_D . (06)



Assume:
 $V_p = 4V$
 $I_{DSS} = 8mA$
 $V_{GS} = -1.8V$

Fig. 1

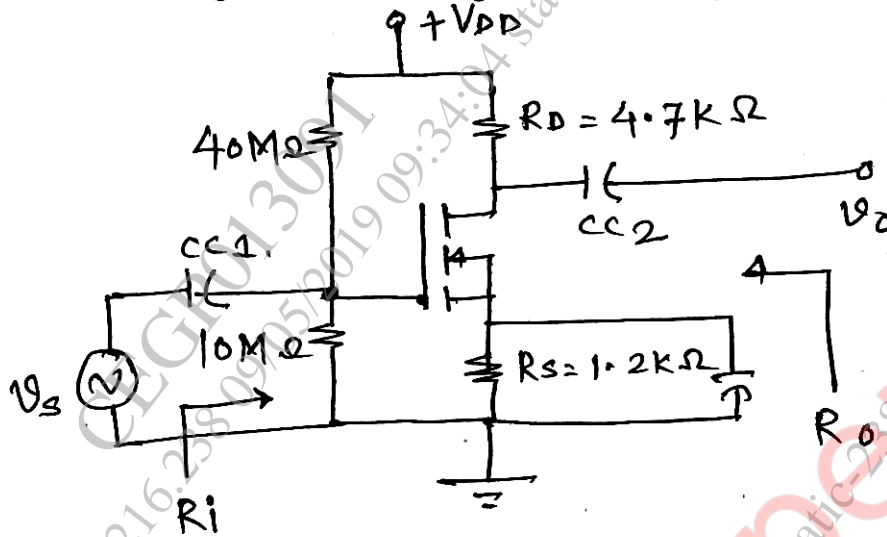
OR

Q-2 (A) Draw the common source E- MOSFET amplifier & explain its modes of operation in detail.

(07)

P.T.O.

(B) For the circuit diagram shown in the figure 2 calculate A_v , R_i and R_o . (06)



Assume : $K_n = 0.4 \text{ MA/V}^2$, $V_T = 3\text{V}$, $V_{GS} = 4.66 \text{ V}$, $r_o = 40\text{k}\Omega$

Fig. 2

Q-3 (A) Explain the different scaling models and factors of MOSFET. (06)

(B) Draw and explain CMOS inverter amplifier with Active load. (06)

OR

Q-4 (A) Write short note on Bi-CMOS technology. (06)

(B) Explain the concept of current mirror circuit using MOSFET. (06)

Q-5 (A) Draw the different types of basic Amplifiers and compare them with the help of input resistance and output resistance. (07)

(B) Draw circuit diagram of colpitts oscillator and calculate the operating frequency, if $C_1=C_2= 500\text{pF}$ and $L= 1\text{mH}$. (06)

OR

Q-6 (A) State Barkhausen criteria. (02)

(B) Draw circuit diagram of RC phase shift oscillator and calculate the operating frequency, if $R= 10\text{K}\Omega$ and $C=5\text{nF}$. (05)

(C) Compare different types of feedback topologies with respect to different parameters. (06)

Q-7 (A) Draw the detailed block diagram of SMPS and explain its operation. (08)

(B) Calculate minimum and maximum range of variable resistance R_2 for an adjustable Voltage regulator using LM 317 to get the output voltage from 5 volt to 10 volt if $R_1=240$ and $I_{adj.}=100\mu A$. (04)

OR

Q-8 (A) Give the specifications of the IC LM 317 regulator. (03)

(B) Write a short note on current boosting in three terminal voltage regulators. (05)

(C) Compare linear voltage Regulator and SMPS. (04)