

Seat No.	
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[5252]-532

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

EXAMINATION, 2017

ELECTRONIC DEVICES AND CIRCUITS

(2015 PATTERN)

Time : Two Hours

Maximum Marks : 50

- N.B. :—** (i) Solve Q. No. 1 or Q. No. 2, Q. No. 3 or Q. No. 4, Q. No. 5 or Q. No. 6 and Q. No. 7 or Q. No. 8.
- (ii) Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables are allowed.
- (iii) Assume suitable data, if necessary.
- (iv) Neat diagrams must be drawn wherever necessary.
- (v) Figures to the right indicate full marks.

1. (a) Define the following terms w.r.t. JFET : [6]
- (i) Pinch-off voltage ( $V_P$ )
- (ii) Cut-off voltage ( $V_{GS(OFF)}$ )
- (iii) Forward Transconductance ( $g_m$ )
- (b) Calculate  $I_D$  and  $V_{DS}$  for the circuit shown in Fig. 1. MOSFET parameters are  $V_T = 1$  V,  $K = 0.1$  mA/V<sup>2</sup>. [6]

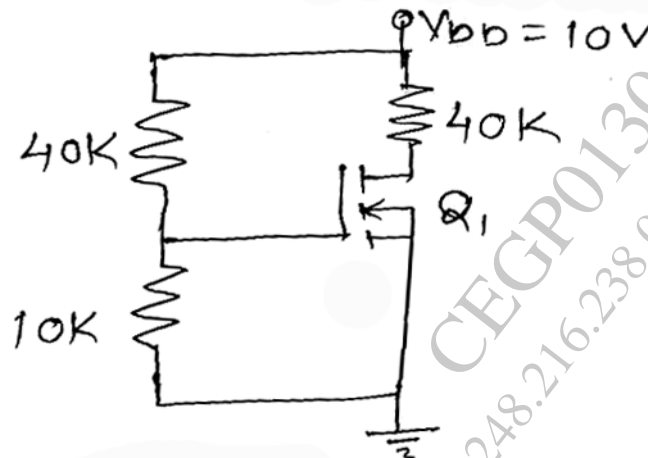


Fig. 1

Or

2. (a) Draw and explain frequency response of JFET CS amplifier. [6]  
(b) Explain the following non-ideal I-V characteristics of MOSFET : [6]  
(i) Body effect  
(ii) Sub-threshold conduction  
(iii) Breakdown effects.
3. (a) Draw and explain high frequency equivalent circuit of MOSFET. [6]  
(b) Explain working of MOSFET as a diode. [6]

Or

4. (a) Explain working of MOSFET as a switch in VLSI circuits. [6]  
(b) Determine the small signal voltage gain, input and output resistance of a CS amplifier shown in Fig. 2. MOSFET parameters are  $V_T = 1.5 \text{ V}$ ,  $K_n = 0.8 \text{ mA/V}^2$ ,  $\lambda = 0.01 \text{ V}^{-1}$ . [6]

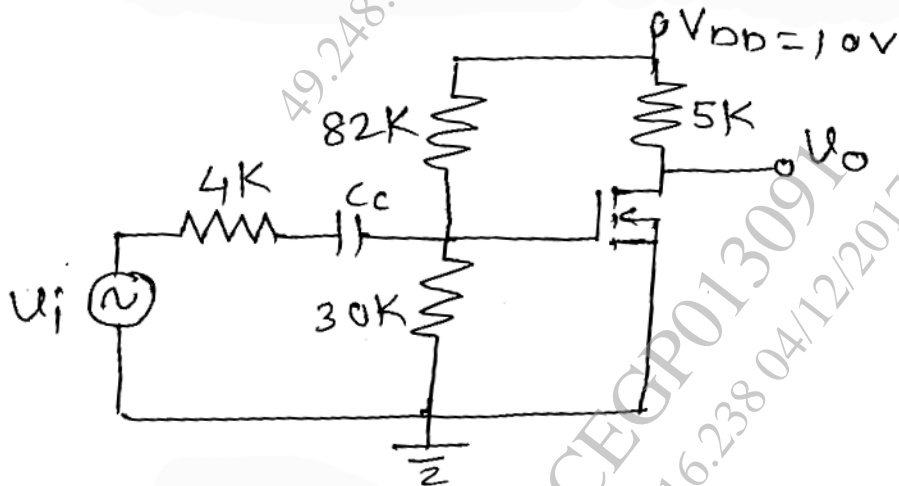


Fig. 2

5. (a) Draw and explain RC phase shift oscillator using FET. State its advantages. [7]
- (b) An amplifier has a midband gain of 125 and bandwidth of 250 kHz. [6]
- (i) If 4% negative feedback is introduced, find the new bandwidth and gain
- (ii) If the bandwidth is to be restricted to 1 MHz, find the feedback ratio.

*Or*

6. (a) Explain the effect of negative feedback on : [8]
- (i) Gain stability
- (ii) Amplitude distortion
- (iii) Frequency distortion
- (iv) Noise.
- (b) In a Colpitt's oscillator using FET,  $C_1 = 100 \text{ pF}$ ,  $C_2 = 7500 \text{ pF}$ . If the frequency of oscillations is to vary between 950 kHz and 2050 kHz, determine the range of inductor values. [5]
7. (a) Draw and explain principle of current boosting in 3-terminal adjustable voltage regulator. [7]
- (b) Determine the range over which the output voltage can be varied in LM 317 voltage regulator if value of  $R_1 = 240 \Omega$  and  $R_2$  is taken as  $4.7 \Omega$  potentiometer. Assume  $I_{\text{adj}} = 100 \mu\text{A}$ . [6]

*Or*

8. (a) Compare between linear power supply and switch made power supply. [6]
- (b) Write short note on 'Low Dropout Voltage Regulator'. [7]