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[5459]-132

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

ELECTRONIC DEVICES AND CIRCUITS

(2015 PATTERN)

Time : Two Hours

Maximum Marks : 50

N.B. :— (i) Neat diagrams must be drawn wherever necessary.

(ii) Figures to the right indicate full marks.

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

(iv) Assume suitable data, if necessary.

1. (a) Draw and explain the V-I characteristics of N-channel JFET. [6]

(b) Explain the following non-ideal characteristics of MOSFET : [6]

(1) Finite output resistance

(2) Body effect

(3) Breakdown effects.

P.T.O.

Or

2. (a) For the circuit diagram shown in Fig. 1. Calculate I_D , V_{DS} , R_S . Assume : [6]

$$I_{DSS} = 8 \text{ mA}$$

$$V_P = -4 \text{ V}$$

$$V_{GS} = -2 \text{ V.}$$

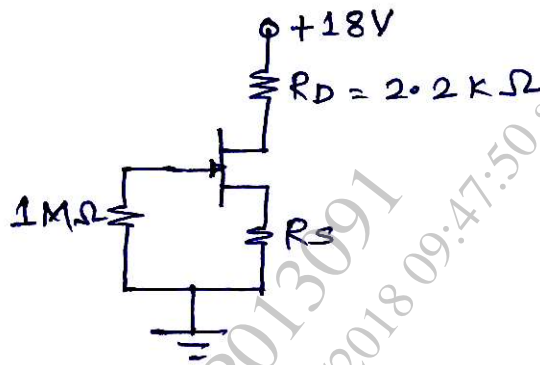


Fig. 1

- (b) Write a short note on constant source Biasing circuit using MOSFET. [6]
3. (a) Write a short note on MOSFET scaling. [6]
- (b) Explain the MOSFET as switch In VLSI. [6]

Or

4. (a) For the circuit diagram shown in Fig. 2, calculate A_V , R_i , R_o . The MOSFET parameters are $V_T = 1.5 \text{ V}$, $K_n = 0.8 \text{ mA/V}^2$, $\lambda = 0.01 \text{ V}^{-1}$. [6]

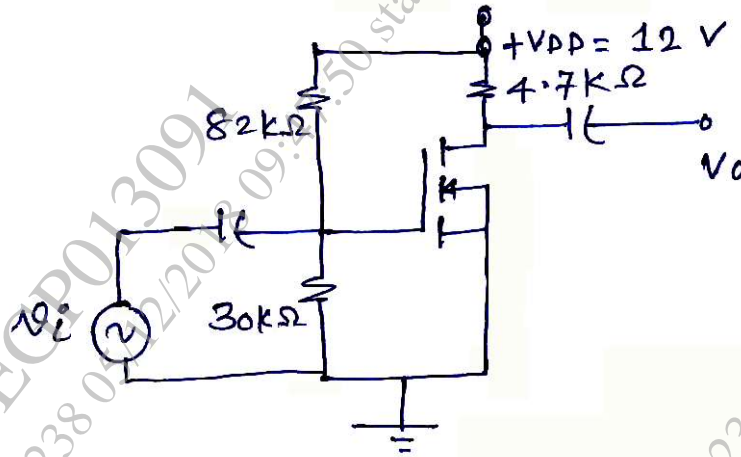


Fig. 2

- (b) Explain the MOSFET as current sink and source circuit in VLSI. [6]
5. (a) Draw and explain four basic types of Amplifier. [8]
- (b) An Amplifier has a midband gain of 100 and a bandwidth of 200 kHz : [5]
- (i) If 5% 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. [5]
- Or
6. (a) Draw and explain Hartley oscillator using FET. [7]
- (b) In a Colpitt's oscillator using FET $C_1 = 100 \text{ PF}$, $C_2 = 10,000 \text{ PF}$. If the frequency of oscillator is vary between 950 kHz and 2000 kHz. Determine the range of inductor values. [6]

7. (a) Explain the working of Buck type switching regulator with a neat diagram and necessary waveform. State its advantages. [8]
- (b) Determine the range over which the output voltage can be varied in LM317 voltage regulator if values of $R_1 = 240 \Omega$ and R_2 is taken as $5 \text{ k}\Omega$ potentiometer. Assume $I_{\text{adj}} = 100 \mu\text{A}$. Draw the typical connection diagram. [5]

Or

8. (a) Draw and explain block diagram of adjustable positive three-terminal voltage regulator. [8]
- (b) Design an adjustable voltage regulator using LM317 for output voltage 1.25 V to 15 V and draw necessary connection diagram. (Assume $R_1 = 240 \Omega$, $I_{\text{adjustable}} = 100 \mu\text{A}$). [5]