

Total No. of Questions—8]

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

ELECTRONIC DEVICES AND CIRCUITS

(2012 PATTERN)

Time : Two Hours

Maximum Marks : 50

N.B. :— (i) Answer Q. No. 1 or Q. No. 2, Q. No. 3 or Q. No. 4,

Q. No. 5 or Q. No. 6, Q. No. 7 or Q. No. 8.

(ii) Neat diagrams must be drawn wherever necessary.

(iii) Figures to the right indicate full marks.

(iv) Use of scientific calculator is allowed.

(v) Assume suitable data, if necessary.

1. (a) List the causes of instability in BJT and hence define any two stability factors. [6]

(b) Determine d.c. operating point parameters for the circuit as shown in Fig. 1. Assume $V_{BE} = 0.3 \text{ V}$, $I_{CEO} = 0$, $\beta_{dc} = 55$. [6]

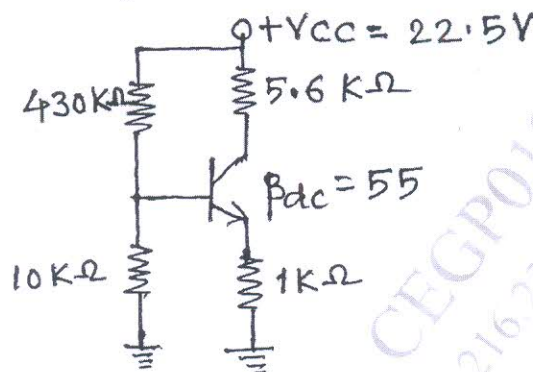


Fig. 1

P.T.O.

Or

2. (a) Compare various configurations of BJT amplifier on the basis of input impedance and their applications. [6]
- (b) Determine A_v , R_i , R_o for the circuit as shown in Fig. 2. Assume $h_{re} = h_{oe} = 0$, $R_1 = 5 \text{ k}\Omega$, $R_2 = 500 \Omega$, $R_C = 1 \text{ k}\Omega$ and $R_E = 100 \Omega$. $V_{CC} = 10 \text{ V}$, $h_{fe} = 100$ and $h_{ie} = 1.1 \text{ k}\Omega$. [6]

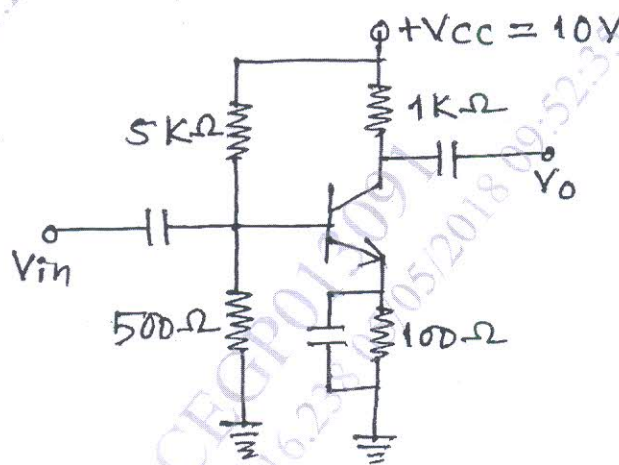


Fig. 2

3. (a) State Barkhausen criterion for sustained oscillations. Draw ckt. diagram of Hartely oscillator and hence determine the oscillation freq. of the oscillator for $L_1 = L_2 = 1 \mu\text{H}$ and $C = 100 \text{ nF}$. [6]
- (b) Draw frequency response curve of RC-coupled CE amplifier. Explain the effect of bypass and inter-electrode capacitance on cutoff frequencies. [6]

Or

4. (a) Explain any *three* advantages of feedback amplifier with suitable justification. [6]
- (b) A step response of C.E. amplifier gives tilt (p) of 2% and rise time (tr) of 20 μ s. Tilt of 2% is observed at 400 Hz. Therefore, determine lower cutoff frequency higher cutoff frequency and bandwidth. [6]
5. (a) Compare Class A and Class B amplifier based on their collector efficiency, distortion and operating point. [6]
- (b) Draw and explain series fed Class A amplifier with input and output waveforms. [7]

Or

6. (a) Draw and explain push-pull amplifier with neat waveforms. [7]
- (b) For a Class B amplifier following parameters are observed :
 $I_{d.c.} = 1.75$ A, $V_{o(p-p)} = 44$ V
The amplifier has $R_L = 8 \Omega$ and $V_{CC} = 25$ V.
Determine $P_{ind.c.}$, $P_{outa.c.}$ and efficiency. [6]
7. (a) List various non-ideal characteristics of E-MOSFET. Explain any *two* non-ideal characteristics. [8]
- (b) Draw and explain E-MOSFET construction. [5]

Or

8. (a) Determine operating (2) point of the given ckt. as shown in Fig. 3. Give parameters are $V_T = 1.5 \text{ V}$, $K = 0.8 \text{ mA/V}^2$. [6]

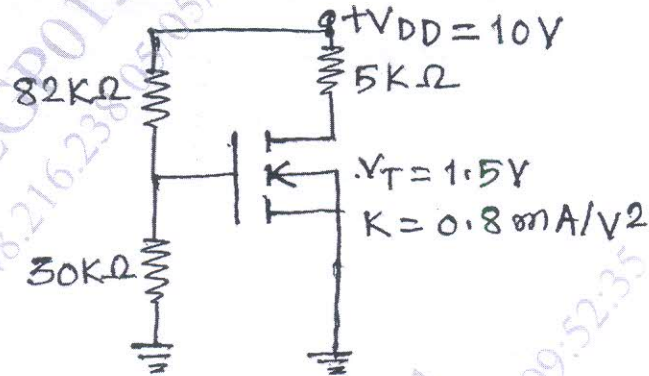


Fig. 3

- (b) Explain constant current source biasing in E-MOSFET based circuit using suitable diagram. [7]