

B. Tech. Sem -III (E & TC Engg.) (2014 COURSE) (CBCS) :

SUMMER - 2019

SUBJECT: ELECTRONIC DEVICES AND APPLICATIONS

Day: Saturday
Date: 11/05/2019

Time: 02.30 PM TO 05.30 PM
Max Marks. 60

S-2019-2588

N.B.:

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Assume suitable data, if necessary.

Q.1 Design an emitter current bias circuit using silicon transistor with $\beta_{(typ)} = 60$. (10)
Supply $V_{CC} = 30V$ the desired bias conditions are $V_{CEQ} = 10V$ and $I_{CQ} = 1mA$.
Determine the values for R_C , R_E , R_1 and R_2 . Also calculate maximum and minimum levels of V_{CE} for $\beta = 40$ and $\beta = 80$.

OR

Q.1 Derive the equation for stability factors of fixed bias circuit, collector to base bias circuit and emitter current bias circuit. (10)

Q.2 A common emitter amplifier circuit uses a transistor with $h_{fe} = 50$, $h_{ie} = 1 k\Omega$, $h_{oe} = 10^{-6} S$, $R_C = 3.9 k\Omega$, $R_E = 4.7 k\Omega$, $R_1 = 68 k\Omega$, $R_2 = 56 k\Omega$, $R_L = 82 k\Omega$. calculate A_V , A_I , A_P , Z_i & Z_o . (10)

OR

Q.2 Derive the expressions for A_V , A_I , A_P , Z_i , & Z_o and A_P for common base amplifier. (10)

Q.3 Design gate bias circuit to have $I_D (\max) = 3mA$, $V_{DS} (\min) = 10V$, given $V_{DD} = 25V$, $V_{GS} (\text{off}) = -6V$. (10)

OR

Q.3 Design and explain output characteristics of N-Channel and P-Channel JFET. Define the terms g_m , r_d and μ . (10)

Q.4 Determine I_{DQ} and V_{DSQ} for voltage divider bias circuit for n-channel MOSFET given $R_1 = 90 k$, $R_2 = 45 k\Omega$, $R_D = 5 k\Omega$, and $R_S = 2 k\Omega$. $V_T = 1V$, $k'(W/L) = 2mA/V^2$. (10)

OR

Q.4 Explain with constructional diagram, the difference between D-MOSFET and E-MOSFET. (10)

Q.5 Determine a suitable value of R_1 for the negative shunt clipper where input is $\pm 8V$, $V_o (\min) = 7V$, $I_L = 5mA$. (10)

OR

Q.5 Explain the working of voltage quadrupler circuit and state its applications. (10)

Q.6 Determine suitable value of series resistor for a white LED with supply voltage = 12V. Calculate power dissipation across the LED. (given $V_{LED} = 3.4 V$). (10)

OR

Q.6 Draw and explain the construction and working of optocoupler. Also state its application. (10)

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