

R09

Code: 9A04301

B.Tech II Year I Semester (R09) Supplementary Examinations June 2017

ELECTRONIC DEVICES & CIRCUITS

(Common to EIE, E.Con.E, ECE, ECC, CSS, IT, CSE, EEE & MCT)

Time: 3 hours

Max. Marks: 70

Answer any FIVE questions

All questions carry equal marks

- 1 (a) Draw the energy band diagram of p-n diode for no bias, forward bias and reverse bias and explain.
(b) Determine the values of forward current in case of a p-n junction diode, with $I_0 = 10$ micro amperes. $V_F = 0.8V$ at $T = 300^{\circ}K$. Assume silicon diode.
- 2 (a) Derive the expression for ripple factor in a full wave rectifier using an inductor filter.
(b) Compare the performance of series inductor, L-Section and π - Section filters.
(c) In a full wave rectifier using an LC filter, $L = 10$ H, $C = 100\mu F$ and $R_L = 500 \Omega$. Calculate I_{dc} , V_{dc} , for an input $v = 30\sin(100\pi t)$.
- 3 (a) What are the different configurations of BJT? Explain.
(b) Calculate the values of I_E , β_{dc} and α_{dc} for a transistor with $I_C = 13\mu A$, $I_B = 200mA$, $I_{CBO} = 6\mu A$. Also determine the new level of I_C which will result from reducing I_B to $100mA$.
- 4 (a) What is the temperature compensation? Explain any temperature compensation methods using active components.
(b) Find the value of thermal resistance required for the Ge transistor for self bias circuit with the collector current of $1.5mA$ at $25^{\circ}C$ and it increases by $0.131mA$ over a temperature range of 25 to $75^{\circ}C$ in order for the circuit to be thermally stable. Assume $V_{cc} = 30$ V and $R_c = 2.0K$ and $R_e = 4.7K$.
- 5 (a) Explain the common gate configuration of JFET with its low frequency AC equivalent circuit.
(b) The pinch off voltage of n-channel JFET is -4 V and drain current at $V_{GS} = 0$ V is 6 mA. What is $V_{DS(minimum)}$ for pinch off region? Find I_D at $V_{GS} = -1.5$ V in pinch off region.
- 6 (a) Draw the circuit diagram of n-channel JFET CD amplifier with external load R_L and derive the expressions for voltage gain A_v .
(b) In a common source configuration of n-channel JFET, the resistance in the drain terminal is $2.0 K\Omega$, $V_{DD} = 12V$, $V_{GS} = -2V$, $I_{DS} = 8$ mA. Find out I_D corresponding to pinch-off voltage, $V_p = -6$ V. Also find V_{DS} .
- 7 (a) What are the advantages of h-parameters over z-parameters and Y-parameters?
(b) Draw the CE transistor circuit and its hybrid model with necessary equations.
(c) Give the standard values of h-parameters in CE configuration.
- 8 (a) Explain the construction and characteristics of UJT.
(b) Compare Tunnel diode and normal PN junction diode.
