

Code: R7100207

R07

B. Tech I Year (R07) Supplementary Examinations, May 2012

BASIC ELECTRONIC DEVICES & CIRCUITS

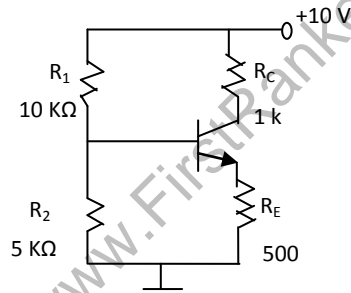
(Electrical & Electronics Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE questions
All questions carry equal marks

- 1 (a) Derive the expression for the deflection in an electrostatic deflection system. Hence obtain the expression for electrostatic deflection sensitivity.
(b) Two parallel plates of a capacitor are separated by 4 cms. An electron is at rest initially at the bottom plate. Voltage is applied between the plates, which increases linearly from 0 V to 8 V in 0.1 msec.
- 2 (a) Draw the energy band diagram of a PN junction diode for no bias, forward bias and reverse bias. Explain.
(b) A PN junction diode has a reverse saturation current of 30 A at a temperature of 125⁰ C. At the same temperature find the dynamic resistance for 0.2 V bias in forward and reverse bias.
- 3 (a) Explain full-wave rectifier and derive all parameters.
(b) Draw the circuit diagram of a FWR using center tapped transformer to obtain an output DC voltage of 18 V at 200 mA and VDC no load equals 20 V. Find the transformer ratings.
- 4 (a) Give the comparisons between CB, CE, CC configurations.
(b) For a small signal JFET $i_D = f(V_{GS}, V_{DS})$. Obtain expressions for i_D and hence define g_m , r_d and μ .
(c) Draw UJT emitter characteristics and mention various regions.
- 5 (a) Define stability factor. Derive expressions for various stability factors.
(b) For the circuit shown, determine the value of I_C and V_{CE} . Assume $V_{BE} = 0.7$ V and $h_{fe} = 100$



- 6 (a) Draw the h-parameter circuit and its equivalent circuit in CE configuration.
(b) With small signal equivalent circuit of a Emitter follower, derive its input impedance, voltage gain and output impedance.
- 7 (a) Draw the block diagram of a feedback amplifier and derive the closed loop transfer function.
(b) Derive the expressions for A_v , Z_i , Z_o and A_i of a voltage shunt feedback amplifier.
- 8 (a) Classify different type of oscillators based on frequency range.
(b) What are the factors that affect the frequency stability of an oscillator? How frequency stability can be improved in oscillators?
(c) Find C and h_{fe} of a transistor to provide f_o of 50 kHz of a RC transistorized phase shift oscillator. Given $R_1 = 22$ K, $R_2 = 68$ K, $R_C = 20$ K, $R = 6.8$ K.
