B.E. DEGREE END SEMESTER EXAMINATIONS, NOV / DEC 2011

Electrical and Electronics Engineering

Third semester

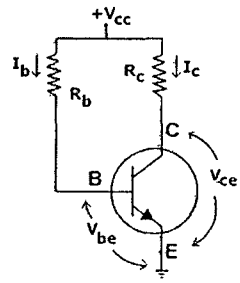
EC 9215 –ELECTRONIC DEVICES AND CIRCUITS (REGULATION – 2008)

Time: 3 hr **Max. Marks: 100**

Answer ALL Questions

Part – A (10 x 2 = 20 Marks)

1. Define diffusion capacitance and depletion layer capacitance.
2. What is avalanche breakdown?
3. Define base width modulation in transistor.
4. Write four differences between BJT and FET devices.
5. What is the effect of bypass capacitor and coupling capacitor in transistor amplifier?
6. The below collector-to-base bias has β =100. Analyze the circuit to determine I_B, I_C and V_{CE}. (R_B = 270kΩ, R_C= 2.2kΩ and V_{CC}= 18V).



7. Derive a Q factor of a capacitor.
8. What is the relationship between common mode gain and differential mode gain for differential amplifier?
9. Write Barkhausan Criterian for oscillation.
10. What is negative feedback? Mention advantages of negative feedback.

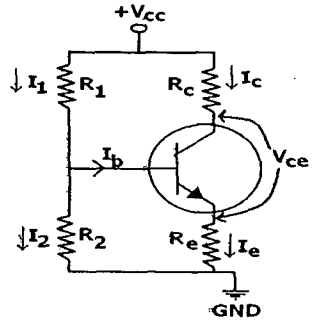
Part – B (5 x 16 = 80 Marks)

11. Discuss the action of a PN junction diode under forward and reverse biased conditions and hence draw the volt-amp characteristics of the diode. (16)
12. a) (i) Mention three terminal of transistor. Explain the basic operation of PNP transistor. (8)
    (ii) Explain in detail about the common base configuration characteristics. (8)

    (Or)

    b) Explain the operation of D-MOSFET and EN-MOSFET with neat diagram. Draw the drain and transfer characteristics of above two. (16)
13. a) (i) Explain the operation of emitter follower with neat diagram. (8)

(ii) Determine the value of voltage and currents for the voltage divider bias configuration. (R1= 4 kΩ, R2 = 2kΩ, Vcc= +15V, Rc = 3 kΩ, R_E= 1kΩ, β= 100). (8)



(Or)

(b) Discuss in detail about the A.C analysis of common emitter amplifier and derive its Input impedance, Output impedance, current gain and voltage gain using r_e model. (16)

14. (a) Derive gain, centre frequency, effective quality factor, and bandwidth of single tuned amplifier. Explain its neutralization technique. (16)

(Or)

(b) Find operating point values, differential gain, common mode gain, CMRR, output if Vs1= 50 mV at 5 kHz and Vs2 = 30mV at 5 KHz for the differential amplifier. Assume the transistor h_{ie} = 1 kΩ. (Vcc = 12V, V_{EE} = -12V, Rc = 10kΩ, R_E = 2.7 kΩ, β = 100, R_s = 500Ω) (16)

15. (a) (i) Explain various types of negative feedback amplifiers and derive its input impedance, output impedance and gain with feedback. (12)

(ii) In Hartley oscillator, the value of capacitor in the tuned circuit is 500 pF and the two sections have inductances of 38 μH &12 μH. Find frequency of oscillation and feedback factor. (4)

(Or)

(b) (i) Explain how the RC phase shift oscillator produces oscillation and derive its frequency of oscillation and feedback. (12)

(ii) A crystal has L = 2H, C = 0.01 pF and R = 2 kΩ. find its frequency of oscillation and Q factor. (4)