

B.E. DEGREE END SEMESTER EXAMINATIONS, NOV / DEC 2012
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 transition capacitance of a diode.
2. Differentiate avalanche and zener breakdown.
3. In order to operate transistor in the active region what kind of biasing is given to the junction?
4. For NPN transistor $I_E = 12\text{mA}$ and $\beta = 140$. Determine the value of α , I_B and I_C .
5. What are the requirements for biasing the circuits?
6. Draw the small signal model of common collector amplifier.
7. What happens to the circuit above and below resonance?
8. What is neutralization?
9. What are the conditions for sustained oscillator?
10. Write the effects of negative feedback.

Part – B (5 x 16 = 80 Marks)

11. Derive the expression for common mode and differential mode analysis of differential amplifier. (16)
12. a) i) Explain the basic principle of laser diode with its neat diagram. (8)
ii) Describe how zener diode acts as a voltage regulator. (8)
(Or)
b) Derive diode current equation of drift and diffusion current. (16)
13. a) i) Explain input and output characteristics of common emitter configuration. (8)
ii) Write the operation of NPN transistor with its neat diagram. (8)
(Or)
b) i) Sketch and explain the drain-characteristics and transfer- characteristics of p-channel JFET. (8)
ii) Explain construction of p- channel JFET. Give its symbol? (8)
14. a) i) Discuss how the CE amplifier producing 180° phase shift. (6)
ii) Draw the a.c equivalent of common emitter amplifier and find R_i , R_o , A_v and A_i .
[$V_{cc} = 30\text{V}$, $R_1 = 20\text{ k}\Omega$, $R_2 = 10\text{ k}\Omega$, $R_c = 5\text{ k}\Omega$, $R_E = 1\text{ k}\Omega$, $R_L = 10\text{ k}\Omega$ and $\beta = 100$] (10)
(Or)
b) i) Draw the small signal model of JFET and derive the input impedance, output impedance and gain of common source amplifier. (10)
ii) Find collector current and collector to emitter voltage for voltage divider bias circuit.
[$V_{cc} = 15\text{V}$, $R_1 = 22\text{ k}\Omega$, $R_2 = 4.7\text{ k}\Omega$, $R_c = 1.5\text{ k}\Omega$, $R_E = 680\Omega$ and $\beta = 150$] (6)
15. a) Write the operation of wein bridge oscillator and derive the feedback factor. (16)
(Or)
b) i) Derive the general expression for LC oscillator. (10)
ii) A transistor RC phase shift oscillator has a frequency of 100 kHz. If $R = 10\text{ k}\Omega$ find C and gain for sustained oscillations. (6)