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Question Paper Code : 80331

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016.

Third Semester

Electrical and Electronics Engineering

EC 6202 — ELECTRONIC DEVICES AND CIRCUITS

(Common to Electronics and Instrumentation Engineering, Instrumentation and Control Engineering, Robotics and Automation Engineering and Second Semester Biomedical Engineering, Medical Electronics)

(Regulations 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. State few applications of zener diode.
2. A silicon diode has a saturation current 7.5 μA at room temperature 300k. Find the saturation current at 400k.
3. Define Early effect.
4. Determine the base current for the CE transistor circuit if Ic = 80 mA and β = 170.
5. State Miller's Theorem.
6. Draw the hybrid small signal model of CB configuration.
7. CMRR of an amplifier is 100 dB, calculate common mode gain, if the differential gain is 1000.
8. Define conversion efficiency of power amplifier.
9. Differentiate oscillator and amplifier.
10. State the Barkhausen criterion for an oscillator.

PART B — (5 × 13 = 65 marks)

11. (a) Derive the expression of the Space charge or Transition capacitance of PN diode under reverse bias with a neat diagram. (13)

Or

(b) Explain the operation of a Half wave rectifier and derive its various parameters. (13)

12. (a) Draw and explain the working of SCR and its V-I characteristics. (13)

Or

(b) Describe the operation of UJT as a relaxation oscillator and derive its frequency of oscillation. (13)

13. (a) Determine the input impedance, output impedance, voltage gain and current gain of CE amplifier using hybrid model.

Or

(b) Explain the Common Drain MOSFET amplifier and derive its input impedance, output impedance and voltage gain. (13)

14. (a) Explain the common mode and differential mode analysis of differential amplifier and derive its CMRR. (13)

Or

(b) What is Neutralization? Explain any two methods of Neutralization. (13)

15. (a) Briefly explain Voltage – series feedback amplifier with neat diagram and derive an expression for input and output resistance. (13)

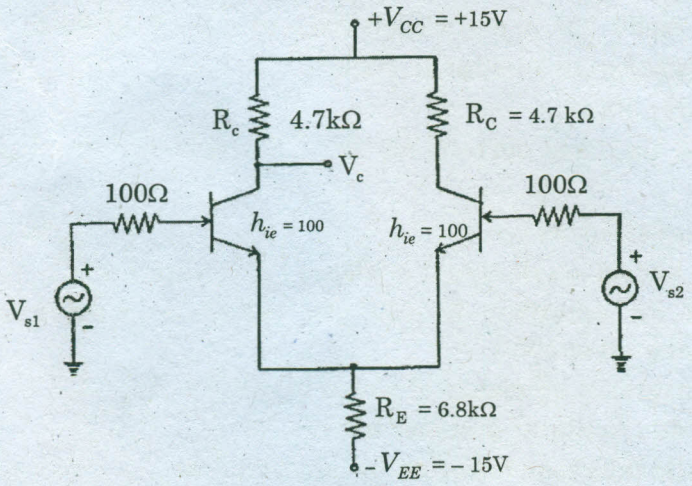
Or

(b) With neat diagram explain Wien - Bridge Oscillator and derive an expression for frequency of oscillation. (13)

PART C — (1 × 15 = 15 marks)

16. (a) (i) Design a RC phase shift oscillator to generate 5 kHz sine wave with 20 V peak to peak amplitude. Assume hfe = β = 150, C =1.5nF, hre =1.2 kΩ. (5)

(ii) Evaluate the (1) operating point (2) differential gain (3) common mode gain (4) CMRR and (5) output voltage if V_{S1} = 70 mV peak to peak at 1 kHz and V_{S2} = 40 mV peak to peak at 1 kHz of dual input balanced output differential Amplifier, $h_{ie} = 2.8K\Omega$. (10)



Or

(b) Evaluate the A_i, A_v, R_i, R_o, A_{is}, A_{vs} of a single stage CE amplifier with $R_s = 1k\Omega$, $R_1 = 22k\Omega$, $R_2 = 10\,k\Omega$, $R_C = 2k\Omega$, $R_L = 2k\Omega$, $h_{fe} = 50$, hie = $1.1k\Omega$, $h_{oe} = 25\mu\,A/V$ and $h_{re} = 2.5*10-4$. (15)