(Pages : 3)

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Reg. No. : .....

Name : .....

Third Semester B.Tech. Degree Examination, March 2019
(2013 Scheme)
13.305 : ELECTRONIC CIRCUITS (T)

Time : 3 Hours

Max. Marks : 100

PART – A

Answer **all** the questions. **Each** question carries **2** marks. **(10×2=20 Marks)**

1. Why is the operating point selected at the centre of the active region ?
2. How are amplifiers classified according to the transistor configuration ?
3. Give the relationship between rise time and bandwidth.
4. Define CMRR.
5. Write the Barkhausen Criteria for Oscillation.
6. Define Transconductance.
7. What is meant by stagger tuning ?
8. What is expression for frequency of oscillation for RC Phase Shift oscillator ?
9. What is Regulator and what are the types of Regulator ?
10. What is meant by Bootstrap circuit ?

P.T.O.

PART – B

Answer **any one full** question from **each** Module. **Each full** question carries **20** marks. **(4×20=80 Marks)**

Module – I

11. a) Discuss the frequency response characteristics of RC coupled amplifiers. Derive general expression for gain at low, middle and high frequencies. **12**

    b) A single stage amplifier has a gain of 60. The collector Load R_c = 500 Ω and the input impedance is 1 kΩ, calculate the overall voltage gain when two stages are cascaded through R-C coupling. **8**

12. a) Derive the CE short circuit current gain using hybrid -π model. **12**

    b) A BJT has h_{ie} = 6 kΩ and h_{fe} = 224 at I_c = 1 mA with f_T = 80 MHz and $C_{b'c}$= 12 pF. Determine (i) g_m (ii) $R_{b'e}$ (iii) $R_{bb'}$ and (iv) $C_{b'e}$ at room temperature and collector current of 1 mA. **8**

Module – II

13. a) Explain in detail the transfer characteristics of differential amplifier. Explain the methods used to improve CMRR. **12**

    b) Calculate the drain current and source to drain voltage of a common source circuit. The device parameters are R_1 = 50 kΩ, R_2 = 50 kΩ, V_T = – 0.8 V and K_p = 0.2 mA/V^2. **8**

14. a) Draw a common gate MOSFET amplifier and derive expression for voltage gain, current gain, input and output impedance using small signal equivalent circuit. **14**

    b) For a common source MOSFET amplifier, the following parameters and circuit components are given. V_{GS} = 4.66 V, K_n = 0.4 mA/V^2, V_T =3 V I_D = 1.11 mA, R_0 = 40 kΩ. **6**

Module – III

15. a) Draw the small signal equivalent circuit of a series feedback amplifier and derive the expression for input resistance, output resistance and voltage gain with feedback. **12**

    b) A Colpitt's oscillator is designed with C_1 = 100 pF and C_2 = 7500 pF. The inductance is variable. Determine the range of inductance values, if the frequency of oscillations is to vary between 950 kHz and 2050 kHz. **8**

16. Draw the circuit of a Wein bridge oscillator and explain its working. Derive the expression for frequency of oscillation and condition for oscillation. **20**

Module – IV

17. a) Draw the circuit of Class A power Amplifier and explain its operation. Derive the expression for efficiency of Class A power Amplifier. **12**

    b) Determine the Overall efficiency of Class B power Amplifier when $V_{cc} = 20V$ and $V_{cemin} = 2.5V$. **4**

    c) Explain harmonic Distortion in Power Amplifier. **4**

18. a) With relevant sketches explain the working of Current sweep circuits. **10**

    b) A half wave rectifier has a load resistance of 3.5 kΩ. If the diode and secondary of the transformer have a total resistance of 800 Ω and the input voltage has an ac signal of 240 V (peak value). Determine (i) Peak, average and RMS values of current flowing (ii) DC power output (iii) AC power input (iv) Rectification efficiency and (v) Ripple factor. **10**