**Code No. PC406EC**

**METHODIST COLLEGE OF ENGINEERING & TECHNOLOGY**

**(An Autonomous Institution)**

**B.E. (ECE) IV-Semester (AICTE) Regular Examination, AUGUST-2023**

**Subject: ANALOG ELECTRONIC CIRCUITS**

**Time:3 hours Max.Marks:60**

**Note: Missing data, if any, maybe suitably assumed.**

**PART-A**

**Answer All the questions. (10X2M=20M)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Q.No.** | **Questions** | **Marks** | **CO** | **BTL** |
| **1. a** | Find  of BJT at room temperature, for the given collector current of 1.3 mA. | **2** | **1** | **1** |
| **b** | Define  and write the relation between them | **2** | **1** | **1** |
| **c** | What is the purpose of a Coupling network? List the various types of coupling schemes used in amplifiers. | **2** | **2** | **1** |
| **d** | Find the overall bandwidth of of a cascaded amplifier consisting of 3 stages each having upper cut-off frequency of 10KHz. | **2** | **2** | **1** |
| **e** | Calculate the closed loop gain of an amplifier having its open loop gain = 200 with 5% of negative feedback applied back to input. | **2** | **3** | **2** |
| **f** | Sketch the equivalent circuit of the transconductance amplifier | **2** | **3** | **2** |
| **g** | A crystal has L= 0.33H, C= 0.06pf, C’ = 1 pf amd R = 5.5K. Compute the parallel resonant and series resonant frequencies. | **2** | **4** | **2** |
| **h** | Explain Barkhausen Criterion for Oscillators? | **2** | **4** | **1** |
| **i**  **j** | For class-B power amplifier providing 22V peak signal to 8Ω load with power supply Vcc = 25V. Determine (i) Input power (ii) Output power  What is Cross over distortion? How it is minimized? | **2**  **2** | **5**  **5** | **2**  **2** |

**PART-B**

**Answer Any Five questions**. **(5X8M=40M)**

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| --- | --- | --- | --- | --- | --- |
| **Q.No.** |  | **Questions** | **Marks** | **CO** | **BTL** |
| **2.** | **a** | State and Prove Miller Theorem | **4** | **1** | **2** |
| **b** | Obtain the expression for CE short circuit Current Gain. | **4** | **1** | **3** |
| **3.** |  | Explain the significance of Darlington pair and analyze for its Current Gain, Input impedance and Output impedance. | **8** | **2** | **4** |
|  |  |  |  |  |
| **4.** | **a** | Discuss with relevant derivations the effect of negative feedback on  and of Transresistance amplifier. | **5** | **3** | **3** |
| **b** | Justify that negative feedback stabilizes gain of an amplifier | **3** | **3** | **3** |
| **5.** |  | Explain working of RC phase shift Oscillator and derive the expressions for frequency of oscillations and condition for sustained oscillations. | **8** | **4** | **4** |
|  |  |  |  |  |
| **6.** | **a** | Obtain the maximum theoretical efficiency of Transformer coupled Class A power amplifier. | **4** | **5** | **3** |
| **b** | For a power amplifier with D2 = 0.1, D3 = 0.05, D4= =0.02, I1= 2A, RL = 15. Compute i) Total harmonic distortion ii) Total output power iii) Fundamental component of power | **4** | **5** | **2** |
| **7.** | **a** | Derive the expressions for Hybrid- π input conductance and feedback conductance  in terms of Transistor h-parameters | **4** | **1** | **2** |
| **b** | Obtain the expression for voltage gain of a Transformer coupled BJT amplifier in mid frequency region. | **4** | **2** | **4** |
| **8.** | **a** | Draw the block diagram of a feedback amplifier and explain the functionality of each block. | **4** | **3** | **2** |
| **b** | Explain the working of Transistorized Series Regulator | **4** | **4** | **2** |
| **9.** | **a** | Explain about class-B complementary symmetry power amplifier. | **4** | **5** | **3** |
| **b** | Explain working and obtain frequency of oscillations for Hartley oscillator. | **4** | **3** | **3** |

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