Chandigarh College of Engineering and Technology (Degree Wing), Sector 26,Chandigarh

Department of Electronics and Communication Engineering

B.E.(ECE) 3rd Semester

EC307: Electronics Devices and Circuits

Tutorial 4; Date of Submission: 30/9/2024 (before 11.30 AM)

NOTE: 1. Answer all the questions **in your own handwriting**.

2. Assume appropriate **data (with justification)**, wherever necessary

3. Draw appropriate **diagram(s) to support your answers**, wherever necessary.

Q1. What do you understand by the **frequency response**? With the help of neat **diagram** explain the frequency response of a **single stage CE amplifier** by mentioning **different regions** of operation. Also explain **upper and lower cut off frequencies**? Comment on the **reasons** for different **values/variations** of **amplifier gain for different regions** of operation.

Q2(a). What is the **formula** for calculating the **voltage gain at lower and higher frequencies region?** Explain the concept of **3dB / half power frequencies.**

Q2(b). If the **mid band gain** of an amplifier is **100**, and if the **half power frequencies** are **fL= 45Hz** and **fH = 12kHz**, calculate the **amplifier gain** at the frequencies of **20Hz and 20kHz.**

Q3(a). With the help of **neat diagram** and **mathematical expression** explain the working of following amplifiers:

(i). **Darlington pair**. (ii). **Cascode connection**.

Q3(b). Solve a numerical of each.

Q4 (a). With the help of suitable diagram explain the concept of **Feedback Amplifier**. Also derive the **expression** for **Avf** in terms of **Av** for a **negative Feedback Amplifier.**

Q4 (b). For a **positive Feedback Amplifier** with **Vs = 10 V, β = 0.1, Av = 5;** Find the values of **V0 and Avf**. Also calculate the new value of **Avf** and change in the magnitude of **V0 for β = 0.2.**

Q5(a). The **input power** of a device is **10,000 W** at a **voltage** of **1,000 V**. The **output power** is **500W** and the **output impedance is 20Ω:**

(i). Find the **power gain in decibels**.

(ii). Find **voltage gain in decibels**.

5(b). The **upper and lower 3dB frequencies** of a single stage amplifier is **15kHz and 50 Hz** respectively. With the help of a graph, find the **frequency range** over which the **voltage gain is:**

(i). down by less than 1.5dB of its midband value.

(ii). down by less than 3dB of its midband value.