B.E. Electronics & Telecommunication / Communication Engineering Fourth Semester
ET 404 - Analog Circuits

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Notes : 1. All questions carry equal marks.
2. Illustrate your answers wherever necessary with the help of neat sketches.

1. a) Explain the effect of negative feedback on gain and bandwidth of amplifier state its advantage & disadvantage. **8**

b) The overall gain of the two-stage amplifier is 200 with negative f/b of 20% applied only to the second stage. Assuming that the first stage has negligible distortion and that the second stage has a gain of 300 and 10% distortion without f/b.
Find :
i) The distortion of 2nd stage with f/b
ii) The gain of the first stage **8**

OR

2. a) What are the different topologies of Negative feedback system. Explain each with i/p and o/p resistance. **8**

b) The current series f/b type of transistor has the following parameters
$R_1 = 20\,k\Omega$, $R_2 = 20\,k\Omega$, $h_{ie} = 2\,k\Omega$, $R_L = 1\,k\Omega$, $R_e = 100\,\Omega$ and $h_{fe} = 80$
Calculate A, β, R_{if}, A_f, and loop gain in dB. **8**

3. a) Draw a multi-stage C-E amplifier cascaded at high frequency. **4**

b) Explain the distortions in amplifier. **4**

c) Determine the i/p impedance, o/p impedance voltage gain and current gain for CE amplifier as shown. **8**
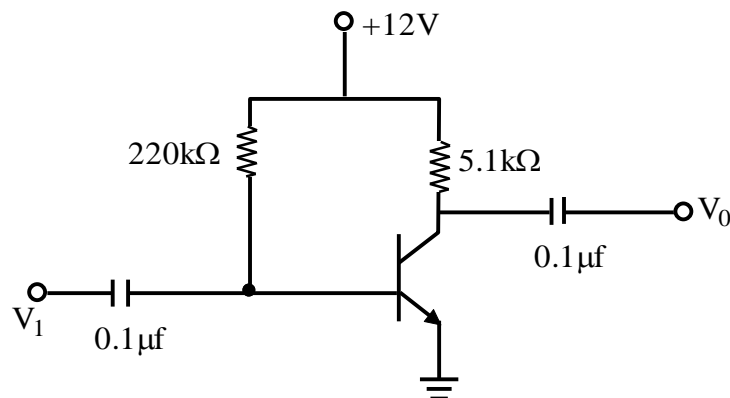
OR

4. a) Draw and explain cascaded amplifier. Derive the equation for overall voltage gain. **10**

b)   Draw and explain two stage R-C coupled C-E amplifier stage.   **6**

5. a)   Explain mono-stable Multivibrator with suitable circuit diagram and waveform. List applications of monostable multivibrant.   **10**

b)   Determine the period and freq. of oscillations for an astable Multivibrator with $R_1 = 2\,k\Omega,\ R_2 = 10\,k\Omega,\ C_1 = 0.01\,\mu f$ and $C_2 = 0.05\,\mu f$ **6**

OR

6. a)   Write short notes on :   **10**

     i)   Voltage time base ckt.

     ii)   Current time base ckt.

b)   Explain the concept of UJT as relaxation oscillator.   **6**

7. a)   Define and explain the following terms -   **8**
     i)   Differential gain   ii)   Common mode gain
     iii)   CMRR   iv)   Bandwidth

b)   A differential amplifier has gain of 80 dB and CMRR 95 dB. If $V_1 = 2\,\mu V$ and $V_2 = 1.6\,\mu V$. Calculate the differential and common mode O/P values.   **8**

OR

8. a)   Draw and explain Wilson current source circuit.   **8**

b)   For a dual i/p, unbalanced o/p, differential amplifier,   **8**
     $V_{CC} = 10V,\ V_{EE} = -10V,\ R_C = 4.7\,k\Omega,\ R_E = 6.8\,k\Omega$ and $R_S = 50\,\Omega$
     Determine :
     i) I_{CQ} and V_{CEQ}
     ii)   Voltage gain
     iii)   I/P & O/P resistance.

9. a)   Explain concept of damper diode.   **4**

b)   Explain the capacitively loaded transistor switch with suitable waveform.   **8**

c)   Explain the concept of comparator.   **4**

OR

10.   Write short notes :   **16**
     i)   The transistor clipper.
     ii)   A clapping circuit theorem.
     iii)   Diode clipper.

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