

ET 404 - Analog Circuits

P. Pages : 2

Time : Three Hours



GUG/S/18/3897

Max. Marks : 80

- Notes :
1. All questions carry marks as indicated.
 2. Due credit will be given to neatness and adequate dimensions.
 3. Assume suitable data wherever necessary.

1. a) Derive the input and output resistance of voltage shunt feed back Amplifier. 8
- b) Compare voltage series, current series, voltage shunt and current shunt feedback on the basis of following parameters. 8
 - i) Gain
 - ii) Input resistance
 - iii) O/P resistance
 - iv) Bandwidth
 - v) Noise
 - vi) Harmonic distortion

OR

2. a) An amplifier has mid-band voltage gain ($A_{v \text{ mid}}$) of 1000 with $f_L = 50 \text{ Hz}$ and $f_H = 50 \text{ kHz}$, If 5% feedback is applied then calculate gain f_L and f_H with feedback. 8
- b) Explain methodology of feedback Amplifier analysis in details. 8
3. a) Explain the operation of two – stage RC coupled amplifier with its frequency response. 8
- b) What is cascade amplifier. Explain the effect of coupling, and bypass capacitors on frequency response of cascaded amplifier. 8

OR

4. a) For cascaded amplifier prove that 8

$$\left| \frac{A_{v \text{ low}}}{A_{v \text{ mid}}} \right| = \frac{1}{\sqrt{2}}$$
- b) Explain frequency response of cascaded amplifier in details. 8
5. a) Draw the circuit diagram of one shot multivibrators using NPN transistor. And explain its operation with neat waveform also explain why it is called as one shot multivibrator. 8
- b) Derive the expression for frequency of oscillation in UJT time base generator and list the factor affecting sweep frequency. 8

OR

6. a) Calculate the time period of quasistable state t_1 , t_2 , T and frequency of oscillation if $R_1 = 1 \text{ k}\Omega$, $R_2 = 20 \text{ k}\Omega$ and $C_1 = 0.01 \mu\text{F}$, $C_2 = 0.06 \mu\text{F}$. Draw the waveform at the output. 8
- b) Explain the operation of Bootstrap circuit with neat waveform. 8
7. a) Derive the AC analysis parameters of Dual input balanced output differential amplifier. 8

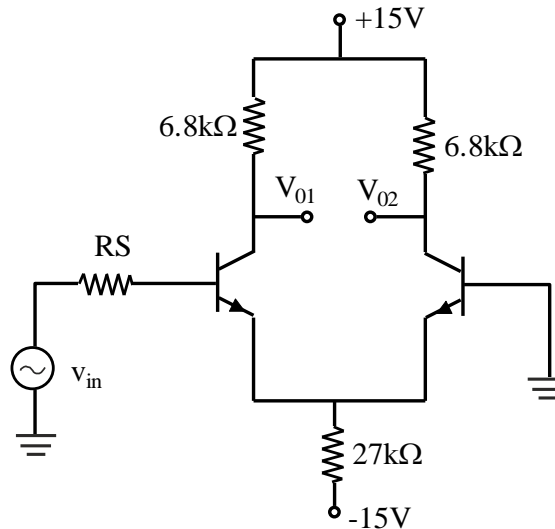
- b) Explain Transfer characteristics of differential amplifier. 8

OR

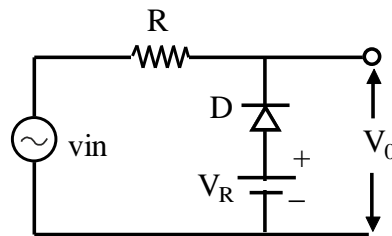
8. a) Derive CMRR. Explain constant current bias method to improve CMRR. 8

- b) For the differential amplifier shown in following fig. Determine. 8

- i) The voltages at the collector of each transistor.
 ii) The differential voltage gain Assume $V_{BE} = 0.7V$, $h_{fe} = 100$, $h_{ie} = 3.9k\Omega$ and the source resistance as $1k\Omega$.



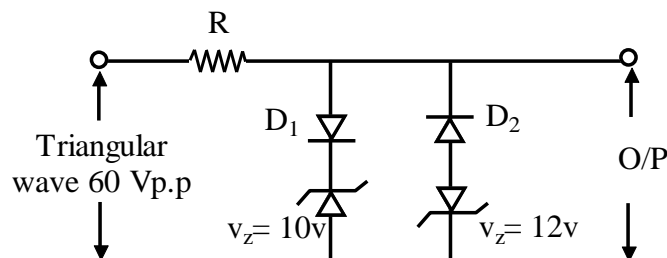
9. a) Identify the circuit and write working of the same with input and output waveform. 8



- b) Explain damping – circuit theorem. 8

OR

10. a) Identify the circuit and write working of the same with input and output waveform. 8



- b) What is clamper. Explain the operation of negative clamper with its input, output waveform. 8
