UNIT – I

General Amplifier Characteristics I & II

1. Describe black box representation of an amplifier. Also explain how an amplifier may be thought of as an energy conversion circuit ?
2. Write the expression for current gain, voltage gain and power gain.
3. Discuss effect of amplifier input resistance on overall voltage gain and hence discuss experimental method for determining input resistance of an amplifier. Ideally what should be the input resistance of an amplifier.
4. Draw equivalent circuit for amplifier output with load resistance. Derive expression showing variation of voltage gain with load resistance. Draw the graph of A_v vs. $log\left(\frac{R_o}{R_o'}\right)$ideally what should be the output resistance of an amplifier.
5. What should be the value of load resistance when maximum power are required ?which device is used for this purpose?
6. What is conversion efficiency? State the factors on which maximum theoretical conversion efficiency depend upon.
7. With necessary figure give the classification of amplifier according to the period of conduction of current through active device.
8. What is harmonic distortion ?Discuss three point method of calculating harmonic distortion.
9. What is harmonic distortion ? Discuss five point method of calculating harmonic distortion.
10. Draw the block diagram of distortion analyzer. With necessary figure explain working of wien bridge.
11. Write a short note on intermodulation distortion.
12. Write a short note on frequency distortion and phase distortion.
13. Define number of bels and number of decibels. State relation between these two. Discuss necessity of such units.
14. Write expression of decibels in terms of power. Hence obtain it in terms of voltage, current and resistance.
15. Explain zero decibel reference level.
16. Explain use of voltmeter as a decibel meter.
17. Explain range correction factor. Make a table showing correction to dB scale for various AC volt range.
18. Explain impedance correction factor. Write expression of true dB.
19. Write a note on frequency response curve and bandwidth of an amplifier.

UNIT – III

Chapter: Circuit Analysis and Design:

Q: Simplify Boolean equation: $Y = (\overline{A} + \overline{B})\ (A + B)$

Q: Simplify Boolean equation: $Y = \overline{A}\ \overline{B}\ \overline{C} + \overline{A}\ B\ \overline{C} + A\ \overline{B}\ \overline{C} + A\ B\ \overline{C}$

Q: Suppose a four variable truth table has a high output for the following input conditions:

0111, 1100, 1101, 1111, 1110, 1001, 1011, 1010.

Draw the Karnaugh map. Simplify it. Write corresponding simplified SOP equation. Design simplified NAND-NAND.

Q: Suppose for input condition 1001, the output is high and that is don't care for all inputs from 1010 to 1111. Draw a Karnaugh map. Write a simplified Boolean equation and design corresponding simplified logic circuit.

Q: Suppose a high output is for an input of 0000, low outputs for 0001 to 1001, and don't cares for 1010 to 1111.

Q: A truth table has low outputs for the inputs from 0000 to 0110, a high output for 0111, low outputs for 1000 to 1001, and don't cares for 1010 to 1111. Design the simplest logic circuit.

Q: Suppose the output for 0000 to 0011 is high, 0100 to 1001 is low, and from 1010 to 1111 is high. Design the SOP and POS circuits.

Q: Suppose output is high for input conditions:

0110, 1100, 1101, 1111, 1110, 1000, 1001, 1011, 1010. With Karnaugh map simplification, design SOP and POS circuits.

Q: Write a note on two-input Ex-OR gate.

Q: Draw circuit diagram of three input, four input, five input and six input Ex-OR gates.

UNIT - IV

Chapter: Resonance

Q: Define Q factor. Derive Q factor for the inductor and capacitor.

Q: Explain series resonance circuit. Derive expression for resonant frequency f_r. Show that E_L and E_C are equal in magnitude and opposite in direction at the time series resonance. Explain how the circuit work as a voltage amplifier.

Q: Derive the equation for impedance of the series resonant circuit from small deviations from the resonant frequency.

Q: Derive Band width of the series resonant circuit.

Q: Explain the parallel or antiresonance circuit. Derive expression for the antiresonant frequency f_{ar}. Obtain the equation for impedance

$$R_{ar} = L / CR$$

Q: Discuss currents in antiresonance circuit and obtain, $\frac{I_C}{I_L} = \sqrt{1 - \frac{1}{Q^2}}$