UNIT-1
Q1. Draw the RC high pass circuit and explain its working with step voltage input.
Q2. A symmetrical square wave whose peak-peak amplitude is 2V and whose average value is zero is applied to an RC integrating circuit. The time constant is half the period of the square wave. Find the peak-peak value of the output signal.
Q3. Write a short note on RC low pass circuit. Draw the output if a step is applied.
Q4. A pulse is applied to a low-pass RC circuit. Prove by direct integration that the area under the pulse is same as the area under the output waveform across the capacitor. Explain the result.
Q5. Write a short note on High pass RC circuit as a differentiator. OR Explain how high pass RC circuit works as differentiator.
Q6. Draw the different output wave forms of a RC high pass circuit when it is applied with different inputs like a) step-voltage input, b) pulse input, c) square wave input. Explain the same.
Q7. What is the ratio of the rise time if the three sections in cascade to the rise time of single section of low pass RC circuit.
Q8. A square wave of 5V amplitude with an ON time of 1msec and an OFF time of 3msec is applied to a high pass RC circuit with RC circuit with R=2K and C= 0.1µF. Sketch the steady state output waveform showing all details.
Q9. Explain the operation of a RC high pass circuit when exponential input is applied.
Q10. An ideal 1µsec pulse is fed to a low pass RC circuit. Calculate and plot the output waveform under the following conditions: The upper 3dB frequency is i) 10MHz, ii) 1MHz, iii) 0.1MHz.
Q11. Explain RLC ringing circuit.
Q12. Explain the double differentiator with the help of neat sketches.
Q13. A limited ramp is applied to an RC differentiator. What is the peak of the output waveform for i) T=RC ii) T=0.2RC iii) T= 5RC.
Q14. Write short notes on RC low pass circuit.
Q15. A symmetrical square wave whose peak-peak amplitude is 2V and whose average value is zero is applied to an RC integrating circuit. The time constant is equal to half-period of the square wave, find the peak-peak value of the output signal.
Q16. Describe the relationship between risetime and RC time constant of a low pass RC circuit.
Q17. A symmetrical square wave of 10V peak to peak is applied to RC low pass circuit. Draw the output waveform and find its tilt.
Q18. Draw the ringing circuit and explain its operation.
Q19. A ramp input is applied to low pass RC circuit. Draw the response of it and explain its operation.
Q20. Why attenuator is used in CRO probe?
Q21. A symmetrical square wave of ±5V and frequency of 1KHz applied to a high pass RC circuit having R=10KΩ, C= 0.05µF. Draw the corresponding output waveform and find its percentage tilt.
Q22. A rectangular pulse is applied to a RL circuit, draw its response and explain its operation.
Q23. Prove that an RC circuit behaves as a reasonably good integrator if RC > 15T, where T is the period of an input \( E_m \sin \omega t \).
Q24. Draw the RC double differentiator circuit and explain its working.
Q25. What is meant by linear wave shaping.
Q26. In an RC low pass circuit $R=2 \, \text{k}\Omega$ and $C=1\mu\text{F}$, a square wave with half period of $5\mu\text{sec}$, is applied as input to this circuit. Determine the o/p waveform.
Q27. Derive the expression for the response of RC low pass circuit to which ramp i/p is applied.

UNIT-2
Q1. Give the series clipper circuits and explain their operation with the help of transfer characteristics.
Q2. For the circuit shown, sketch the i/p and o/p waveforms if $R=1\, \text{k}\Omega$
   $V_R = 10\, \text{V}$, $V_i = 20\, \text{Sin } \omega t$, $R_f = 100\, \Omega$, $R_r = \infty$, $V_f = 0$

Q3. Draw the circuit diagram of slicer circuit using zener diodes and explain its operation with the help of its transfer characteristics.
Q4. For the circuit, if $R=1\, \text{k}\Omega$, $V_{R1} = 7\, \text{V}$, $V_{R2} = 10\, \text{V}$, $R_f = 0\, \Omega$, $R_r = \infty$, a) Sketch the transfer characteristic  b) if $V_i = 20\, \text{Sin } \omega t$, sketch the i/p and o/p waveforms.

Q5. Draw the circuit diagram of negative peak clamper circuit and explain its operation.
Q6. For the circuit shown, an i/p voltage $V_i$ linearly varies from 0 to 150V is applied. Sketch the o/p voltage $V_o$. Assume ideal diodes.

Q7. Explain the transfer characteristics of emitter coupled clipper and derive necessary equations.
Q8. Draw the circuit diagram of positive peak clamper circuit and explain its operation.
Q9. Design a clipping circuit with ideal components, which can give the waveform shown in the figure for a sinusoidal input.

![Waveform Diagram]

Q10. State and prove clamping circuit theorem.

Q11. For the clamping circuit and i/p waveform shown, calculate and plot to scale the steady state o/p.

![Clamping Circuit Diagram]

Q12. Draw the diode comparator circuit and explain its operation when ramp i/p signal is applied.

Q13. Explain the operation of two level slicer.

Q14. For the circuit shown, \( V_i \) is a sinusoidal voltage of peak 100 volts. Assume ideal diodes. Sketch one cycle of o/p voltage. Determine the maximum diode current.

![Comparator Circuit Diagram]

Q15. Draw the negative peak clamper circuit and explain its operation.

Q16. For the circuit shown below, a sinusoidal voltage of peak 75V is applied. Assume ideal diodes. Obtain the o/p waveforms.

![Negative Peak Clamper Circuit Diagram]
Q17. Draw the circuit diagram of positive clamper circuit. Explain its operation with suitable waveforms.

Q18. Classify different types of clipper circuits. Explain their operation with circuit diagram and its transfer characteristics.

Q19. What is DC restorer circuit? Explain its operation.

Q20. Draw the emitter coupled clipper circuit and its transfer characteristic and explain its operation.

Q21. Draw the response of the positive clamping circuit when a square wave is applied under steady state conditions and explain its operation.

Q22. The i/p voltage \( V_i \) is applied to two level clipper shown in the circuit below. Obtain the o/p voltage \( V_o \).

Q23. Write short notes on non-linear wave shaping.

Q24. \( T=1000\mu \text{sec}, V=10\text{V} \) and duty cycle = 0.2.
   i) Sketch waveform with voltage levels at steady state  ii) Forward and reverse direction tilt  iii) \( A_f/A_r \)

Q25. For the circuit, if \( R=1\text{K}\Omega, V_{R1} = 6\text{V}, V_{R2} = 2\text{V}, R_f = 0 \text{\Omega}, R_r = \infty \), a) Sketch the transfer characteristic b) sketch the o/p waveform.
Q26. Explain negative peak clipper with and without reference voltage.
Q27. Explain the response of the clamping circuit when a square wave i/p is applied under steady state conditions.
Q28. Explain the effect of diode characteristics on clamping voltage.