

Time: 3 hours

Max. Marks: 75

Answer any five questions
All questions carry equal marks

- 1.a) Compare linear wave shaping with non-linear wave shaping.
b) A symmetrical square wave of peak-to-peak amplitude 'V' and frequency 'f' is applied to a high pass circuit. Show that the percentage tilt is given by

$$P = \frac{1 - e^{-1/2RCf}}{1 + e^{-1/2RCf}} \times 100\% \quad [7+8]$$

- 2.a) Explain the response of the clamping circuit when a square wave input is applied under steady state conditions.
b) Explain the effect of diode characteristics on clamping voltage. [8+7]

3. Write short notes on:

- a) Diode switching times
b) Switching characteristics of transistors
c) FET as a switch. [4+7+4]

4. What is a monostable multivibrator? Explain with the help of a neat circuit diagram the principle of operation of a monostable multivibrator, and derive an expression for pulse width. Draw the wave forms at collector and base of both transistors. [15]

- 5.a) Why the time base generators are called sweep circuits? Write the differences between the voltage and current time base generators?

- b) With neat sketches and necessary expressions, explain the transistor Miller time-base generator. [9+6]

- 6.a) With the help of a neat diagram, explain the working of four-diode sampling gate. Derive expressions for its gain(A) and V_{min} .

- b) Explain the application of sampling gate in a sampling scope. [10+5]

- 7.a) With the help of a neat circuit diagram and waveforms explain synchronization of a sweep generator with pulse signals.

- b) Compare sine-wave synchronization with pulse synchronization. [8+7]

- 8.a) Realize a three-input NAND gate using Transistor Transistor Logic. Explain its operation with Totem-pole load.

- b) With reference to logic gates, explain the terms:

(i) Fan-out, (ii) Noise Margin, (iii) Propagation Delay, (iv) Figure of Merit.

[7+8]

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