



SIDDHARTH GROUP OF INSTITUTIONS :: PUTTUR
Siddharth Nagar, Narayanavanam Road – 517583

QUESTION BANK (DESCRIPTIVE)

Subject with Code : PULSE & DIGITAL CIRCUITS (16EC410) **Course & Branch:** B.Tech – ECE

Year & Sem: II-B.Tech & II-Sem

Regulation: R16

UNIT-I

LINEAR AND NON LINEAR WAVE SHAPING

1. (a) Show that a high pass circuit with a small time constant acts as differentiator [6M]
(b) A 10v step is switched on to a 50k Ω resistor in series with a 500pf capacitor. Calculate the rise time of the capacitor voltage, the time for the capacitor to charge 63.2% of its maximum voltage, and the time for the capacitor to be completely charged [6M]
2. (a) Design high pass RC circuit for sinusoidal input. [6M]
(b) Define clamper. With the help of neat circuit diagrams and output waveforms, Explain the working of positive peak and negative peak clamping circuits [6M]
3. Derive an expression for the output voltage levels under steady state conditions of a high pass circuit excited by a pulse input [12M]
4. Describe about attenuators and derive the condition for perfect compensation of an attenuator
5. a) Prove that a low pass circuit acts as an integrator. [6M]
b) Design high pass RC circuit for sinusoidal input [6M]
6. a) Discuss the function of series diode and shunt diode clipping circuits? How can the clipping level shifted to reference voltage? Explain? [6M]
b) A pulse generator with an output resistance $R_s=500\Omega$ is connected to an oscilloscope with an input capacitance of $C_i=30\text{pf}$. Determine the fastest rise time that can be displayed. [6M]
7. Discuss about attenuators and derive the condition for perfect compensation of an attenuator [12M]
8. a) With the help of a neat circuit diagram, explain the working of a two-level diode clipper. [6M]
b) State and prove clamping circuit theorem. [6M]
9. a) Write about synchronized clamping? Draw the circuit and explain its operation. [6M]
b) Discuss the effect of diode characteristics on clamping circuits [6M]
10. Classify different types of clipper circuits. Give their circuit and explain their operation. [12M]

UNIT-II**SWITCHING CHARACTERISTICS AND MULTIVIBRATORS**

1. a) Elaborate about piece-wise linear approximation for a semiconductor diode characteristics. [6M]
b) Explain the working of transistor as a switch and draw the output characteristics [6M]
2. a) Briefly explain the design of transistor switch. [6M]
b) Write about the storage and transition times of the diode as a switch. [6M]
3. Write short notes on [12M]
(a) Diode switching times (b) Transistor switching times.
4. a) Define about storage time and delay time [6M]
b) Describe about diode forward recovery time and reverse recovery time. [6M]
5. Discuss the operation of collector coupled monostable multivibrator with its output waveforms. [12M]
6. a) With a neat diagram, explain the operation of fixed bias bistable multivibrator. [6M]
b) Design self bias bistable multivibrator with neat sketch. [6M]
7. Describe with neat circuit diagram and waveform of collector coupled astable multivibrator. [12M]
8. Discuss about the Schmitt trigger circuit with neat diagram. [12M]
9. Design a bistable multivibrator with $h_{fe}(\min)$ equal to 20 and $V_{cc}=V_{BB}=10V$. Assume silicon transistors are used. [12M]
10. a) Write about the operation of diode as a switch. [6M]
b) Describe about diode forward recovery time and reverse recovery time [6M]

UNIT – III
TIME BASE GENERATORS

1. a) Explain the basic principles of Miller and Bootstrap time-base generators. [6M]
b) Give the comparison of both Miller and Bootstrap generation methods. [6M]
2. With the help of neat circuit diagram and waveforms explain transistor miller time base generator. [12M]
3. a) Explain the working of Transistor Miller sweep circuit. [6M]
b) What are its advantages miller over Bootstrap sweep circuits? [6M]
4. Briefly explain the working of a transistor bootstrap time base generator. [12M]
5. Derive the following expressions for [12M]
a) Sweep speed error b) Displacement error c) Transmission error
6. With the help of a neat circuit diagram, explain the working of a simple current sweep. [12M]
7. a) What are the techniques used to improve the Linearity of current sweeps? [6M]
b) Discuss about Transistor Current Time Base Generator. [6M]
8. Find the component values of a bootstrap sweep generator, Given $V_{CC} = 18 \text{ V}$, $I_{C(\text{sat})} = 2 \text{ mA}$ and $h_{fe}(\text{min}) = 30$. [12M]
9. Explain in brief about the Bootstrap sweep circuit? [12M]
10. Write about the operation of miller sweep circuit? [12M]

UNIT – IV**SAMPLING GATES**

1. a) Explain about unidirectional diode sampling gate. [6M]
b) Write advantages and Disadvantages of sampling gate [6M]
2. a) Sketch the circuit of simple diode bidirectional gate and describe its function. [6M]
b) Derive the expressions for the gain and control voltages? [6M]
3. With the help of neat diagram explain the working of bidirectional sampling gate using transistors? [12M]
4. a) With the help of neat diagram explain the working of a four diode sampling gate. [6M]
b) Derive expressions for its gain (A) and V_{min} . [6M]
5. With the help of neat diagram explain the working of a six diode gate? [12M]
6. a) Draw and explain the reduction of pedestal in a gate circuit [6M]
b) Give a brief review about applications of the sampling gate? [6M]
7. a) Discuss the function of a sampling gate used in Sampling Scopes. [6M]
b) Explain how sampling gate is used in chopping amplifiers. [6M]
7. a) Compare unidirectional and bidirectional sampling gates. [6M]
b) Why the sampling gates are called linear gates? [6M]
10. a) Give a brief review about applications of the sampling gate? [6M]
b) Illustrate the principle of sampling gates with series and parallel switches and compare them. [6M]

UNIT – V
SYNCHRONIZATION AND FREQUENCY DIVISION

1. (a) Compare sine wave synchronization with pulse synchronization. [6M]
(b) Explain the frequency division with respect to a sweep circuit. [6M]
2. Explain the method of pulse synchronization of relaxation devices with example. [12M]
3. List out the factors which influence the stability of a relaxation divider, with the help of neat waveforms. [12M]
4. With the help of neat diagrams and waveforms explain the use of monostable relaxation circuit as frequency divider. [12M]
5. (a) Explain the synchronization of sweep circuit with symmetric signals. [6M]
(b) How a sine wave frequency division is done with a sweep circuit? [6M]
6. (a) Construct a neat diagram of OR, AND & NOT gates using diodes. [6M]
(b) Explain the concepts of Open collector. [6M]
7. a) Explain the operation of AND, OR & NOT gates using transistors. [6M]
b) Explain the concepts of Tristate outputs [6M]
8. Describe about CMOS NAND and NOR gate with neat circuit diagram. [12M]
9. a) Write short notes on CMOS logic. [6M]
b) Discuss about CMOS inverter. [6M]
10. With the help of neat circuit diagram and truth table explain the working of [12M]
(i) DTL NAND gate (ii) RTL NAND gate.
11. With reference to logic gates explain the terms: [12M]
(i) Fan out (ii) Noise margin (iii) Propagation delay (iv) Figure of Merit