

[Total No. of Questions - 9] [Total No. of Printed Pages - 3]  
(2064)

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**B. Tech 4th Semester Examination**  
**Pulse Shaping & Wave Generation (N.S.)**  
**EC-224**

**Time : 3 Hours**

**Max. Marks : 100**

*The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.*

**Note :** Attempt five questions in all, selecting one question each from section A, B, C & D. Section E is compulsory.

**SECTION - A**

1. (a) What is low pass R-C circuit? Draw input-output characteristics and derive an expression for output voltage for square wave input to low pass RC circuit. (10)
- (b) Describe the basic principle of bootstrap time base generator and explain it's working in details. (10)
2. (a) Describe and compare the working of Miller and Bootstrap time-base generators. (10)
- (b) Describe the working of RLC circuit and show its behavior towards step input. (10)

**SECTION - B**

3. (a) What is the principle of sampling gates? Explain the operation of unidirectional diode gate. (10)
- (b) A 100V peak square wave with an average value of 0V and a period of 20ms is to be negatively clamped at 25V. Draw the input and output waveforms and necessary circuit diagram. (10)

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4. (a) Explain the operation of Bidirectional sampling gates. Discuss the applications of sampling gates. (10)
- (b) Discuss transfer characteristics of clampers and clippers. (10)

### SECTION - C

5. (a) A discrete time signal  $x(n)$  is applied to discrete time LTI system with unit impulse response  $h(n)$ . Find the response  $y(n)$  if given that  
i.  $x(n)=2^n \cdot u(n)$       ii.  $h(n) = u(n)$  (10)
- (b) Describe the meaning of causality and stability. What are the conditions for causality and stability? Derive the appropriate expressions. (10)
6. (a) Which of the following impulse response corresponds to stable LTI system.  
(i)  $h_1(t) = e^{-(1-2j)t} u(t)$       (ii)  $h_2(t) = e^{-t} \cos(2t)u(t)$  (10)
- (b) Derive the expression for convolution integral. Describe the use of convolution integral. (10)

### SECTION - D

7. (a) Discuss the properties of Laplace transform. What are its applications? Explain the basic method for synthesis of a network. (10)
- (b) Find the Z transform of the signal  $x(n)$ . Also plot its ROC.  
 $x(n) = 7(1/3)^n u(n) - 6(1/2)^n u(n)$  (10)
8. (a) For the Laplace transform of  

$$x(n) = \begin{cases} e^{-t} \sin 2t & t \geq 0 \\ 0 & t \leq 0 \end{cases}$$
Indicate the location of poles and its region of convergence. (12)

- (b) Discuss and explain properties of Z transform and their significance (8)

**SECTION - E**

9. (a) What is the difference between clipping and clamping?  
(b) Define storage and transition time of diode.  
(c) What is wired logic?  
(d) What do you mean by impulse response of a system?  
(e) "Clipping circuit is to suppress amplitude variations in the input signal voltage". Is the statement correct? Explain.  
(f) What are the disadvantages of RL linear wave shaping circuit compared to RC circuit?  
(g) What is the use of the concept of poles and zeroes in Z transform?  
(h) How sampling gates are different from logic gates.  
(i) Explain ringing circuits.  
(j) What are the basic classifications of a signal?  
(2×10=20)