

Name: \_\_\_\_\_ Hall Ticket No. 

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**Answer All Questions. All Questions Carry Equal Marks. Time: 20 Min. Marks: 10.****I Choose the correct alternative:**

1. Number of levels available for quantizing  $x(n)$  is [      ]  
 A.  $2^{b+1}$                       B.  $2^b$                       C.  $2^{b-1}$                       D.  $2^{1-b}$
2. 2's complement of  $(0.875)_{10}$  is [      ]  
 A. 1.111                      B. 1.001                      C. 1.101                      D. 1.100
3. What is the range of truncation quantization for fixed point arithmetic [      ]  
 A.  $0 < e < -2^{-b}$                       B.  $-2^{-b} < e < -2^b$                       C.  $-2^b < e < 0$                       D.  $-2^{-b} < e < 0$
4. The desired frequency response of an FIR filter can be represented by the Fourier series  $H_d(e^{j\omega}) =$  [      ]  
 A.  $\sum_{n=-\infty}^{\infty} h(n)e^{-j\omega n}$                       B.  $\sum_{n=-\infty}^{\infty} h(n)e^{j\omega n}$   
 C.  $\sum_{n=0}^{\infty} h(n)e^{-j\omega n}$                       D.  $\sum_{n=-\infty}^{\infty} h(n)e^{-j\omega n}$
5. Spectrum of rectangular window is represented as  $W_R(e^{j\omega}) =$  [      ]  
 A.  $\frac{\sin W}{\sin W/2}$                       B.  $\frac{\sin W/2}{\sin WN/2}$                       C.  $\frac{\sin WN/2}{\sin W}$                       D.  $\frac{\sin WN/2}{\sin W/2}$
6. Which of the window is the best window in digital filter design [      ]  
 A. Rectangular Window                      B. Triangle Window  
 C. Kaiser Window                      D. Blackman Window
7. A decimator uses a filter called [      ]  
 A. Low pass Filter                      B. High pass Filter                      C. Bandpass Filter                      D. Anti-aliasing Filter
8. In Chebyshev approximation, at the cutoff frequency, the normalized magnitude response has a value of [      ]  
 A.  $\frac{1}{\sqrt{1-\epsilon^2}}$                       B.  $\frac{1}{\sqrt{1+\epsilon^2}}$                       C.  $1+\epsilon^2$                       D.  $1-\epsilon^2$
9. The Sampling rate of a discrete time signal can be increased by a factor  $L$  by placing \_\_\_\_\_ equally spaced zeros between each pair of samples [      ]  
 A.  $L-1$                       B.  $L$                       C.  $L+1$                       D.  $1/L$
10. The width of the main lobe in window spectrum of FIR filter can be reduced by [      ]  
 A. Decreasing the amplitude of window sequence  
 B. Increasing the amplitude of window sequence  
 C. Decreasing the length of window sequence  
 D. Increasing the length of window sequence.

**II Fill in the blanks**

11. What are the methods used to prevent over flow \_\_\_\_\_ .
12. What are the advantages of floating point arithmetic\_\_\_\_\_.
13. IIR digital filters have the transfer function of the form  $H(z)=$  \_\_\_\_\_
14. SNR for the quantization effect in DFT is\_\_\_\_\_.
15. The rectangular window sequence  $W_R(n)=$ \_\_\_\_\_.
16. Triangular window has a transition width \_\_\_\_\_ that of rectangular window.
17. IIR filter are of recursive type, where the present output sample depends on the \_\_\_\_\_.
18. The poles of the Butterworth transfer function symmetrically lies on an unit circle in s-lane with angular spacing of \_\_\_\_\_.
19. Interpolator requires a filter to remove\_\_\_\_\_
20. A sampling rate converter by I/D uses the interpolator first to preserve the \_\_\_\_\_ of the signal.

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**I Choose the correct alternative:**

- The desired frequency response of an FIR filter can be represented by the Fourier series  $H_d(e^{j\omega}) =$  [      ]  
 A.  $\sum_{n=-\infty}^{\infty} hd(n)e^{-j\omega n}$  B.  $\sum_{n=-\infty}^{\infty} hd(n)e^{j\omega n}$   
 C.  $\sum_{n=0}^{\infty} hd(n)e^{-j\omega n}$  D.  $\sum_{n=-\infty}^{\infty} hd(n)e^{-j\omega n}$
- Spectrum of rectangular window is represented as  $W_R(e^{j\omega}) =$  [      ]  
 A.  $\frac{\sin W}{\sin W/2}$  B.  $\frac{\sin W/2}{\sin WN/2}$  C.  $\frac{\sin WN/2}{\sin W}$  D.  $\frac{\sin WN/2}{\sin W/2}$
- Which of the window is the best window in digital filter design [      ]  
 A. Rectangular Window B. Triangle Window  
 C. Kaiser Window D. Blackman Window
- A decimator uses a filter called [      ]  
 A. Low pass Filter B. High pass Filter C. Bandpass Filter D. Anti-aliasing Filter
- In Chebyshev approximation, at the cutoff frequency, the normalized magnitude response has a value of [      ]  
 A.  $\frac{1}{\sqrt{1-\epsilon^2}}$  B.  $\frac{1}{\sqrt{1+\epsilon^2}}$  C.  $1+\epsilon^2$  D.  $1-\epsilon^2$
- The Sampling rate of a discrete time signal can be increased by a factor L by placing \_\_\_\_\_ equally spaced zeros between each pair of samples [      ]  
 A. L-1 B. L C. L+1 D. 1/L
- The width of the main lobe in window spectrum of FIR filter can be reduced by [      ]  
 A. Decreasing the amplitude of window sequence  
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 C. Decreasing the length of window sequence  
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- Number of levels available for quantizing  $x(n)$  is [      ]  
 A.  $2^{b+1}$  B.  $2^b$  C.  $2^{b-1}$  D.  $2^{1-b}$
- 2's complement of  $(0.875)_{10}$  is [      ]  
 A. 1.111 B. 1.001 C. 1.101 D. 1.100
- What is the range of truncation quantization for fixed point arithmetic [      ]  
 A.  $0 < e < -2^{-b}$  B.  $-2^{-b} < e < -2^b$  C.  $-2^b < e < 0$  D.  $-2^{-b} < e < 0$

**II Fill in the blanks**

11. SNR for the quantization effect in DFT is\_\_\_\_\_.
12. The rectangular window sequence  $W_R(n)$ =\_\_\_\_\_.
13. Triangular window has a transition width \_\_\_\_\_ that of rectangular window.
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20. IIR digital filters have the transfer function of the form  $H(z)$ = \_\_\_\_\_

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