

NADAR SARASWATHI COLLEGE OF ENGINEERING AND TECHNOLOGY, THENI.

Course/Branch : B.E / ECE	Year / Semester : III / V	Format No.	NAC/TLP-07a.13
Subject Code : EC8553	Subject Name : Discrete Time Signal Processing	Rev. No.	02
Unit No : 4	Unit Name : Finite Word Length Effects	Date	30.09.2020

OBJECTIVE TYPE QUESTION BANK

S. No	Objective Questions (MCQ /True or False / Fill up with Choices)	BTL
1.	<p>The basic task of the A/D converter is to convert a discrete set of digital code words into a continuous range of input amplitudes.</p> <p>a) True b) False</p> <p>Answer: b</p> <p>Explanation: The basic task of the A/D converter is to convert a continuous range of input amplitude into a discrete set of digital code words. This conversion involves the processes of Quantization and Coding.</p>	L2
2.	<p>What is the type of quantizer, if a Zero is assigned a quantization level?</p> <p>a) Midrise type b) Mid tread type c) Mistreat type d) None of the mentioned</p> <p>Answer: b</p> <p>Explanation: If a zero is assigned a quantization level, the quantizer is of the mid treat type.</p>	L2
3.	<p>What is the type of quantizer, if a Zero is assigned a decision level?</p> <p>a) Midrise type b) Mid tread type c) Mistreat type d) None of the mentioned</p> <p>Answer: a</p> <p>Explanation: If a zero is assigned a decision level, the quantizer is of the midrise type.</p>	L4
4.	<p>If the dynamic range of the signal is smaller than the range of quantizer, the samples that</p>	L5

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	<p>exceed the quantizer are clipped, resulting in large quantization error.</p> <p>a) True</p> <p>b) False</p> <p>Answer: b</p> <p>Explanation: If the dynamic range of the signal, defined as $x_{max}-x_{min}$, is larger than the range of the quantizer, the samples that exceed the quantizer range are clipped, resulting in a large (greater than $\Delta/2$) quantization error.</p>	
5.	<p>What is the fixed range of the quantization error $e_q(n)$?</p> <p>a) $-\Delta/6 < e_q(n) \leq \Delta/6$</p> <p>b) $-\Delta/4 < e_q(n) \leq \Delta/4$</p> <p>c) $-\Delta/2 < e_q(n) \leq \Delta/2$</p> <p>d) $-\Delta/16 < e_q(n) \leq \Delta/16$</p> <p>Answer: c</p> <p>Explanation: The quantization error $e_q(n)$ is always in the range $-\Delta/2 < e_q(n) \leq \Delta/2$, where Δ is quantizer step size.</p>	L1
6.	<p>The roots of the polynomial $H(z)$ are identical to the roots of the polynomial $H(z-1)$.</p> <p>a) True</p> <p>b) False</p> <p>Answer: a</p>	L1
7.	<p>What is the term used to describe the range of an A/D converter for uni-polar signals?</p> <p>a) Full scale</p> <p>b) FSR</p> <p>c) Full-scale region</p> <p>d) FSS</p> <p>Answer: a</p>	L2

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	Explanation: The term Full scale (FS) is used for uni-polar signals.	
8.	<p>What is the term used to describe the range of an A/D converter for bipolar signals?</p> <p>a) Full scale b) FSR c) Full-scale region d) FS</p> <p>Answer: b</p> <p>Explanation: The term Full-scale range (FSR) is used to describe the range of an A/D converter for bipolar signals (i.e., signals with both positive and negative amplitudes).</p>	L1
9.	<p>What is the step size or the resolution of an A/D converter?</p> <p>a) $\Delta = (R)/2(b+1)$ b) $\Delta = (R)/2(b-1)$ c) $\Delta = (R)/3(b+1)$ d) $\Delta = (R)/2$</p> <p>Answer: a</p>	L1
10.	<p>In the practical A/D converters, if the first transition may not occur at exactly + 1/2 LSB, then such kind of error is known as _____</p> <p>a) Scale-factor error b) Offset error c) Linearity error d) All of the mentioned</p> <p>Answer: b</p>	L3
11.	<p>In a D/A converter, the usual way to solve the glitch is to use deglitcher. How is the Deglitcher designed?</p> <p>a) By using a low pass filter b) By using a S/H circuit c) Both a& b d) None of the mentioned</p>	L2

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	Answer: b	
12.	<p>In the cascaded form of realisation, the polynomials are factored into</p> <p>a. a product of 1st-order and 2nd-order polynomials</p> <p>b. a product of 2nd-order and 3rd-order polynomials</p> <p>c. a sum of 1st-order and 2nd-order polynomials</p> <p>d. a sum of 2nd-order and 3rd-order polynomials</p> <p>ANSWER: a product of 1st-order and 2nd-order polynomials</p>	L3
13.	<p>Parallel form of realisation is done in</p> <p>a. High speed filtering applications</p> <p>b. Low speed filtering applications</p> <p>c. Both a and b</p> <p>d. None of the above</p> <p>ANSWER: A</p>	L1
14.	<p>To change the sampling rate for better efficiency in two or multiple stages, The decimation and interpolation factors must be _____ unity.</p> <p>a. Less than</p> <p>b. Equal to</p> <p>c. Greater than</p> <p>d. None of the above</p> <p>ANSWER: Greater than</p>	L1
15.	<p>The effects caused due to finite word lengths are</p> <p>1) Coefficient quantization error</p> <p>2) Adder overflow limit cycle</p> <p>3) Round off noise</p>	L2

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	<p>4) Limit cycles</p> <p>a. 1, 2 and 3 are correct</p> <p>b. 1 and 3 are correct</p> <p>c. 1 and 4 are correct</p> <p>d. All the four are correct</p> <p>ANSWER: All the four are correct</p>	
16.	<p>What is the peak side lobe (in dB) for a Hanning window?</p> <p>a) -13</p> <p>b) -27</p> <p>c) -32</p> <p>d) -58</p> <p>Answer: c</p> <p>Explanation: The peak side lobe in the case of Hanning window has a value of -32dB.</p>	L3
17.	<p>The error in the filter output that results from rounding or truncating calculations within the filter is called</p> <p>a. Coefficient quantization error</p> <p>b. Adder overflow limit cycle</p> <p>c. Round off noise</p> <p>d. Limit cycles</p> <p>ANSWER: Round off noise</p>	L1
18.	<p>In Gibb's phenomenon, the ringing effect is predominantly present near the _____ .</p> <p>a. bandgap</p> <p>b. bandedge</p> <p>c. bandwidth</p>	L5

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	d. bandshell ANSWER: bandedge	
19.	<p>Consider the assertions (steps) given below. Which among the following is a correct sequence of designing steps for the sampling rate converters?</p> <p>A. Computation of decimation/interpolation factor for each stage.</p> <p>B. Clarification of anti-aliasing / anti-imaging filter requirements.</p> <p>C. Designing of filter at each stage.</p> <p>D. Calculation of optimum stages of decimation/ interpolation yielding maximum efficient implementation.</p> <p>a. A, B, C, D b. C, A, D, B c. D, A, B, C d. B, D, A, C</p> <p>ANSWER: B, D, A, C</p>	L1
20.	<p>The finite word length effects are due to</p> <p>a. quantization of input b. quantization of coefficients c. quantization of product d. all of the above</p> <p>answer d</p>	L1
21.	<p>With n bit binary the possible binary codes are</p> <p>e. 2^{n-1} f. 2^{n+1} g. 2^n h. $2^{n/2}$</p> <p>Answer c</p>	L2
22.	<p>How is the sampling rate conversion achieved by factor I/D?</p> <p>a. By increase in the sampling rate with (I)</p> <p>b. By filtering the sequence to remove unwanted images of spectra of original signal</p> <p>c. By decimation of filtered signal with factor D</p> <p>d. All of the above</p> <p>ANSWER: All of the above</p>	L3
23.	<p>Which of the following is true in fixed point binary representation</p> <p>a. only positive number can be represented b. integers cannot be represented c. the position of binary point is fixed</p>	L1

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	<p>d. none of the above</p> <p>ANSWER: c</p>	
24.	<p>Which of the following is false in sign magnitude format of fixed point representation</p> <p>a. the negative of a given number differs only in sign bit</p> <p>b. the fractions cannot be represented</p> <p>c. the position of binary point is fixed</p> <p>d. the msd is sign bit</p> <p>Answer b</p>	L5
25.	<p>Which of the following is true in 2 complement format of fixed point representation</p> <p>a. single representation for zero</p> <p>b. the range of positive and negative numbers are same</p> <p>c. addition of two complement number will never generate carry</p> <p>d. none of the above</p> <p>answer A</p>	L1
26.	<p>In cascade form of realization, how many bits should be used to represent the FIR filter coefficients in order to avoid the quantization effect on filter coefficients?</p> <p>a. 5 to 10</p> <p>b. 12 to 14</p> <p>c. 20 to 24</p> <p>d. 28 to 40</p> <p>ANSWER: 12 to 14</p>	L1
27.	<p>which of the following is true in floating point representation</p> <p>a. the position of binary point movable</p> <p>b. the bits allotted for mantissa and exponent of fixed</p> <p>c. the MSD is signed bit.</p> <p>d. all of the above</p> <p>ANSWER d</p>	L2
28.	<p>Which of the following is true with respect to rounding error</p> <p>a. rounding error of a positive number is always negative</p>	L3

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	<p>b. rounding error of a negative number is always positive</p> <p>c. rounding errors same in all the three formats of fixed point representation</p> <p>d. none of the above</p> <p>answer c</p>	
29.	<p>Which of the following is false with respect to Limit cycle in the recursive system</p> <p>e. limit cycles are due to product quantization</p> <p>f. during limit cycle the output does finite or oscillate between finite values</p> <p>g. limit cycle exists even if the input is very much larger than the dead band</p> <p>h. during limit cycle the output is finite even if the input is 0</p> <p>Answer c</p>	L1



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