Sample Questions Computer Engineering

**Subject Name: Digital Signal and Image Processing Semester: VI**

Multiple Choice Questions

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|  | **Choose the correct option for following questions. All the Questions**  **carry equal marks** |
| 1. | If x(n) is a discrete-time signal, then the value of x(n) at non integer value of  ‘n’ is: |
| Option A: | Zero |
| Option B: | Positive |
| Option C: | Negative |
| Option D: | Not defined |
| Answer | Not defined |
| 2. | The function given by the equation x(n)=1, for n=0; and x(n) =0, for n ≠ 0 is |
| Option A: | Step function |
| Option B: | Ramp function |
| Option C: | Triangular function |
| Option D: | Impulse function |
| Answer | Impulse function |
| 3. | Which of the following should be done in order to convert a continuous-time signal to a  discrete-time signal? |
| Option A: | Sampling |
| Option B: | Differentiating |
| Option C: | Integrating |
| Option D: | None of the mentioned |
| Answer | Sampling |
| 4. | What is output signal when a signal x(t)=cos (2\*pi\*40\*t) is sampled with a  sampling frequency of 20Hz? |
| Option A: | cos(pi\*n) |
| Option B: | cos(2\*pi\*n) |
| Option C: | cos(4\*pi\*n) |
| Option D: | cos(8\*pi\*n) |
| Answer | cos(4\*pi\*n) |
| 5. | Which of the following is true regarding the number of computations requires  to compute an N-point DFT? |
| Option A: | N2 complex multiplications and N(N-1) complex additions |
| Option B: | N2 complex additions and N(N-1) complex multiplications |
| Option C: | N2 complex multiplications and N(N+1) complex additions |
| Option D: | N2 complex additions and N(N+1) complex multiplications |
| Answer | N2 complex multiplications and N(N-1) complex additions |
| 6. | What is the DFT of the four point sequence x(n)={0,1,2,3}? |
| Option A: | {6,-2+2j-2,-2-2j} |
| Option B: | {6,-2-2j,2,-2+2j} |
| Option C: | {6,-2+2j,-2,-2-2j} |
| Option D: | {6,-2-2j,-2,-2+2j} |

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| Answer | {6,-2+2j,-2,-2-2j} |
| 7. | What is the order of the four operations that are needed to be done on h(k) in order to convolute x(k) and h(k)?  Step-1:Folding  Step-2:Multiplication with x(k) Step-3:Shifting  Step-4:Summation |
| Option A: | 1-2-3-4 |
| Option B: | 1-2-4-3 |
| Option C: | 2-1-3-4 |
| Option D: | 1-3-2-4 |
| Answer | 1-3-2-4 |
| 8. | An LTI system is said to be causal if and only if? |
| Option A: | Impulse response is non-zero for positive values of n |
| Option B: | Impulse response is zero for positive values of n |
| Option C: | Impulse response is nonzero for negative values of n |
| Option D: | Impulse response is zero for negative values of n |
| Answer | Impulse response is zero for negative values of n |
| 9. | If x(n)=(0,0,1,1,1,1,1,0) then x(3n+1) is? |
| Option A: | (0,1,0,0,0,0,0,0) |
| Option B: | (0,0,1,1,1,1,0,0) |
| Option C: | (1,1,0,0,0,0,0,0) |
| Option D: | None of the mentioned |
| Answer | (0,1,0,0,0,0,0,0) |
| 10. | Which function has a provision of determining the similarity between the  signal and its delayed version? |
| Option A: | Auto-correlation Function |
| Option B: | Cross-correlation Function |
| Option C: | Convolution Function |
| Option D: | DFT function |
| Answer | Auto-correlation Function |
| **11.** | Which property is exhibited by the auto-correlation function of a complex  valued signal? |
| Option A: | Commutative property |
| Option B: | Distributive property |
| Option C: | Conjugate property |
| Option D: | Associative property |
| Answer | Conjugate property |
| **12.** | In 4-neighbours of a pixel p, how far are each of the neighbours located from  p? |
| Option A: | one pixel apart |
| Option B: | four pixels apart |
| Option C: | alternating pixels |
| Option D: | none of the Mentioned |
| Answer | one pixel apart |
| **13.** | What is the technique for a gray-level transformation function called, if the transformation would be to produce an image of higher contrast than the original by darkening the levels below some gray-level m and brightening the  levels above m in the original image. |
| Option A: | Contouring |
| Option B: | Contrast stretching |

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| Option C: | Mask processing |
| Option D: | Point processing |
| Answer | Contrast stretching |
| **14.** | What does the bilinear Interpolation do for gray-level assignment? |
| Option A: | Assign gray level to the new pixel using its right neighbor |
| Option B: | Assign gray level to the new pixel using its left neighbor |
| Option C: | Assign gray level to the new pixel using its four nearest neighbors |
| Option D: | Assign gray level to the new pixel using its eight nearest neighbours |
| Answer | Assign gray level to the new pixel using its four nearest neighbors |
| **12** | For pixels p(x, y), q(s, t), the Euclidean distance between p and q is defined  as: |
| Option A: | D(p, q) = [(x – s)2 + (y – t)2]1/2 |
| Option B: | D(p, q) = |x – s| + |y – t| |
| Option C: | D(p, q) = max (|x – s| + |y – t|) |
| Option D: | None of the mentioned |
| Answer | D(p, q) = [(x – s)2 + (y – t)2]1/2 |
| **16.** | Highlighting the contribution made to total image by specific bits instead of  highlighting intensity-level changes is called as: |
| Option A: | Bit-plane slicing |
| Option B: | Intensity Highlighting |
| Option C: | Byte-Slicing |
| Option D: | None of the Mentioned |
| Answer | Bit-plane slicing |
| **17.** | Which of the following in an image can be removed by using smoothing  filter? |
| Option A: | Sharp transitions of brightness levels |
| Option B: | Sharp transitions of gray levels |
| Option C: | Smooth transitions of gray levels |
| Option D: | Smooth transitions of brightness levels |
| Answer | Sharp transitions of gray levels |
| **18.** | What is the full form of JPEG? |
| Option A: | Joint Photographs Expansion Group |
| Option B: | Joint Photographic Expansion Group |
| Option C: | Joint Photographic Experts Group |
| Option D: | Joint Photographic Expanded Group |
| Answer | Joint Photographic Experts Group |
| **19.** | Which of the following is the first fundamental step in image processing? |
| Option A: | Filtration |
| Option B: | Image Restoration |
| Option C: | Image Enhancement |
| Option D: | Image Acquisition |
| Answer | Image Acquisition |
| **20.** | What is the name of the tool that helps in zooming, shrinking, rotating, etc.? |
| Option A: | Filters |
| Option B: | Interpolation |
| Option C: | Sampling |
| Option D: | None of the above |
| Answer | Interpolation |
| **21.** | Intensity levels in 8-bit image are: . |
| Option A: | 0—255 |
| Option B: | 0—1024 |

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| Option C: | 0—128 |
| Option D: | 0--64 |
| Answer | 0—255 |
| **22.** | The number of grey values are integer powers of: . |
| Option A: | 3 |
| Option B: | 4 |
| Option C: | 8 |
| Option D: | 2 |
| Answer | 2 |
| **23.** | The Overlap Save and Overlap Add methods are used to compute DFT of . |
| Option A: | Short date sequence |
| Option B: | Moderate data sequence |
| Option C: | Big sample value sequence |
| Option D: | Long date sequence. |
| Answer | Long data sequence. |
| **24.** | D.I.T. is . |
| Option A: | Dissemination In Task. |
| Option B: | Degradation In Time. |
| Option C: | Dissemination In Time. |
| Option D: | Disadvantage in Time. |
| Answer | Dissemination In Time. |
| **25.** | In FFT, how many complex multiplications are required to compute X(k)? |
| Option A: | N(N+1) |
| Option B: | N(N-1)/2 |
| Option C: | N2/2 |
| Option D: | N(N+1)/2 |
| Answer | N(N+1)/2 |
| **26.** | If x(n) and X(k) are an N-point DFT pair, then X(k+N)=? |
| Option A: | X(-k) |
| Option B: | -X(k) |
| Option C: | -X(-k) |
| Option D: | X(k) |
| Answer | X(k) |
| **27.** | What is the name of process used to correct the power-law response  phenomena? |
| Option A: | Beta correction |
| Option B: | Alpha correction |
| Option C: | Gamma correction |
| Option D: | Pie correction |
| Answer | Gamma correction |
| **28.** | Which of the following make an image difficult to enhance? |
| Option A: | Narrow range of intensity levels |
| Option B: | High noise |
| Option C: | Dynamic range of intensity levels |
| Option D: | All of the mentioned above |
| Answer | All of the mentioned above |
| **29.** | The circular convolution of two sequences in time domain is equivalent  to . |
| Option A: | Square of multiplication of DFTs of two sequences |
| Option B: | Difference of DFTs of two sequences |
| Option C: | Summation of DFTs of two sequences |

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| Option D: | Multiplication of DFTs of two sequences |
| Answer | Multiplication of DFTs of two sequences |
| **30.** | To convert a continuous sensed data into Digital form, which of the following  is required? |
| Option A: | Sampling |
| Option B: | Quantization |
| Option C: | Both Sampling and Quantization |
| Option D: | Neither Sampling nor Quantization |
| Answer | Both Sampling and Quantization |
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Descriptive Questions

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| Gray Levels | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| No. of Pixels belongs to  gray level | 200 | 170 | 130 | 60 | 60 | 80 | 140 | 160 |

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| A particular digital image with eight quantization level has the following histogram perform histogram equalization. Give new equalized histogram. | | | | | | | | | | |
| Perform the histogram stretching so that the new image have dynamic range [ 0 -7 ]. | | | | | | | | | | |
|  | Gray Levels | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |  |
| No. of Pixels belongs to  gray level | 100 | 90 | 85 | 70 | 0 | 0 | 0 | 0 |
| Explain the procedure of Zooming an image using replication and interpolation with suitable  example. | | | | | | | | | | |
| Find the convolution of the following sequences i) x(n)=u(n), h(n)=u(n-3)  ii) x(n)={1,2,-1,1}, h(n)={1,0,1,1} | | | | | | | | | | |
| For a periodic signal v(t) = 30sin(2\*pi\*100t) + 10cos(2\*pi\*300t) + 6 sin(2\*pi\*500t),  find the fundamental frequency in rad/s and Nyquist sampling rate. Obtain the discrete signal x(n). | | | | | | | | | | |
| Determine the response of the relaxed system characterized by the impulse response  h[n]= 0.5n u(n) and input x[n]=2 n u(n). | | | | | | | | | | |
| If x(n) = {1,2,3,4} and h(n) = {1,2,3,2}   1. Find Circular Convolution using DFT and IDFT? 2. Find Linear Convolution using Circular Convolution using DFT and IDFT? | | | | | | | | | | |
| Find the output y(n) of a filter whose impulse response is h(n) = {1, 1, 1} and input signal  x(n) = {3, -1, 0, 1, 3, 2, 0, 1, 2, 1} using overlap save method? | | | | | | | | | | |
| Obtain the convolution for two D.T. sequences x(n) = u(n) and y(n) = (0.5)n u(n). | | | | | | | | | | |
| Two discrete time systems are connected in cascade h1(n) = (0.5)n u(n) and h2(n) = (0.25)n u(n). Determine unit sample response of cascade. | | | | | | | | | | |

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| The Impulse response of DT- LTI system h(n) = n (1/2)n u(n). Determine whether the system is stable and casual? | | | | | | | | | | | |
| A system has unit impulse response h(n) = (1/3)n+1 u(n+1).Find the response for unit step input? | | | | | | | | | | | |
| Find the output y(n) of a filter whose impulse response is h(n) = {1, 1, 1} and input signal x(n) = {3, -1, 0, 1, 3, 2, 0, 1, 2, 1} using overlap save method? | | | | | | | | | | | |
| Perform bit plane slicing and obtain all bit planes of following image | | | | | | | | | | | |
|  | **7** | | **3** | | **5** | **4** | |  | | | |
| **6** | | **2** | | **4** | **3** | |
| **5** | | **7** | | **6** | **0** | |
| **6** | | **7** | | **4** | **3** | |
| Show that a high pass filter can be obtained as High Pass = Original – Low Pass | | | | | | | | | | | |
| What is zero padding? What are its uses? | | | | | | | | | | | |
| List and explain any four properties of DFT. | | | | | | | | | | | |
| How many multiplications and additions are required to compute N point DFT using Radix-2 FFT? | | | | | | | | | | | |
| Explain the procedure of neighborhood processing technique? | | | | | | | | | | | |
| Distinguish between linear convolution and circular convolution of two sequences. | | | | | | | | | | | |
| Let x(n) = cos(n.π/2) u(n). Find D.F.T. of x(n). | | | | | | | | | | | |
| Compare the high pass and low pass filtering in spatial domain. | | | | | | | | | | | |
| What are different applicators of DSP? | | | | | | | | | | | |
| Distinguish between Discrete Signal and Analog signals. | | | | | | | | | | | |
| What are different signals used for analysis of discrete time signals? | | | | | | | | | | | |
| Obtain the autocorrelation of sequence x(n) = an u(n) , 0 < a < 1 | | | | | | | | | | | |
| Find the signal energy of (1/2)*n u*(*n*)? | | | | | | | | | | | |
| Obtain the digital negative of the 8 bpp image | | | | | | | | | | | |
|  | | 23 | | 206 | | | 244 | | 72 | 130 |  |
| 163 | | 79 | | | 47 | | 69 | 122 |
| 201 | | 247 | | | 100 | | 80 | 39 |
| 48 | | 77 | | | 111 | | 211 | 121 |
| What effect would set to zero the higher-order bit planes have on the histogram of an image in general? | | | | | | | | | | | |
| The impulse response of a LTI system is h(n)={1,2,1,1}. What is the response of  the signal to the input x(n)={1,2,3,4}? | | | | | | | | | | | |