Program: BE Electronics Engineering

Curriculum Scheme: Revised 2016

Examination: Final Year Semester VII

Course Code: ELX703 and Course Name: Digital Signal Processing

Time: 1 hour Max. Marks: 50

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Note to the students:- All the Questions are compulsory and carry equal marks .

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| Q1.  | What is the folding frequency for the aliased version of x(n) with sampling rate F? |
| Option A: | F/D |
| Option B: | F/4D |
| Option C: | F/2 |
| Option D:  | F/2D |
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| Q2. | In FIR filter, which among the following parameter remains unaffected by the quantization effect? |
| Option A: | Magnitude Response |
| Option B: | Phase characteristic |
| Option C: | Both Magnitude and Phase characteristic |
| Option D: | Magnitude Response or Phase response |
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| Q3. | How is/are the round-off errors reduced in the digital FIR filter? |
| Option A: | By representation of all products with double-length registers |
| Option B: | By rounding the results after acquiring the final sum |
| Option C: | Both a and b |
| Option D: | By avoiding double-length registers |
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| Q4. | What is the range in which the quantization errors due to rounding off are uniformly distributed as random variables if Δ=2-b? |
| Option A: | (0, Δ) |
| Option B: | (-Δ,0) |
| Option C: | (-Δ/2,Δ/2) |
| Option D: | (-Δ/2,-Δ/2) |
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| Q5. | Granular noise occurs when |
| Option A: | Step size is too small |
| Option B: | Step size is too large |
| Option C: | There is interference from the adjacent channel |
| Option D:  | Bandwidth is too large |
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| Q6. | The speech signal is obtained after |
| Option A: | D/A conversion |
| Option B: | A/D conversion |
| Option C: | Modulation |
| Option D:  | Quantization |
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| Q7.  | What happens after the signal is passed through the analog to digital converter in a DSP? |
| Option A: | Changed back to analog |
| Option B: | Stored in a RAM |
| Option C: | Amplified |
| Option D:  | Attenuated |
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| Q8.  | Consider the assertions (steps) given below. Which among the following is a correct sequence of designing steps for the sampling rate converters?A. Computation of decimation/interpolation factor for each stage.B. Clarification of anti-aliasing / anti-imaging filter requirements.C. Designing of filter at each stage.D. Calculation of optimum stages of decimation/ interpolation yielding maximum efficient implementation. |
| Option A: | A, B, C, D |
| Option B: | C, A, D, B |
| Option C: | D, A, B, C |
| Option D:  | B, D, A, C |
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| Q9. | In DSP Processor, what kind of queuing is undertaken/executed through instruction register and instruction cache? |
| Option A: | Implicate |
| Option B: | Explicate |
| Option C: | Complicate |
| Option D:  | serial |
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| Q10.  | In CPU structure, where is one of the operands provided by an accumulator in order to store the result? |
| Option A: | Control Unit |
| Option B: | Arithmetic Logic Unit |
| Option C: | Memory Unit |
| Option D:  | Output Unit |
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| Q11.  | For a complex valued sequence, x(n), the direct computation of its N-point DFT involves ------- complex multiplication. |
| Option A: | N2 |
| Option B: | N(N – 1 ) |
| Option C: | 4N2 |
| Option D:  | 2N2 |
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| Q12.  | In Radix 2, DIF-FFT, the sequence of X(k) at the output of the butterfly diagram for N = 8, is – |
| Option A: | X(0), X(1), X(2), X(3), X(4), X(5), X(6), X(7) |
| Option B: | X(0), X(4), X(2), X(6), X(1), X(5), X(3), X(7) |
| Option C: | X(0), X(2), X(4), X(6), X(1), X(3), X(5), X(7) |
| Option D: | X(0), X(2), X(1), X(3), X(4), X(6), X(5), X(7) |
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| Q13. | If x(n) = {1 2 3 4}, & X(k) = {10, -2 + j2, -2, -2 - j2}. obtain DFT of {4 1 2 3}. |
| Option A: | {10, -2 - j2, 2, -2 + j2} |
| Option B: | {-2 - j2, -2, -2 + j2, 10} |
| Option C: | {-2 + j2, -2, -2 - j2, 10} |
| Option D:  | {10, 2 + j2, 2, 2 - j2} |
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| Q14.  | In overlap save method, with M = 3, if y1(n) = {4, 1, 6, 6, 1, 4, 2, 6}, y2(n) = {4, 6, 4, -3, -6, -4, -1, 0} & y3(n) = {3, -2, 0, 0, 0, 0, 0, 0}, then y(n) = ? |
| Option A: | 6, 6, 1, 4, 2, 6, 4, -3, -6, -4, -1, 0, 0, 0, 0, 0, 0, 0} |
| Option B: | {4, 1, 6, 6, 1, 4, 2, 6, 4, -3, -6, -4, -1, 0, 0, 0, 0, 0} |
| Option C: | {6, 6, 1, 4, 6, 12, -3, -6, -4, 2, -2, 0, 0, 0, 0, 0, 0, 0} |
| Option D:  | {4, 1. 6, 6, 1, 4, 2, 6, 4, 6, 4, -3, -6, -4, -1, 3, 2, 0} |
|  |  |
| Q15. | Let x(n) = {p, q, r, s} and its DFT, X(k) = {P, Q, R, S}. Then DFT of the sequence { p, q, r, s, p, q, r, s} = ? |
| Option A: | {P, Q, R, S, P, Q, R, S} |
| Option B: | {2P, 0, 2Q, 0, 2R, 0, 2S, 0} |
| Option C: | {2P, 2Q, 2R, 2S, 2P, 2Q, 2R, 2S} |
| Option D:  | {0, 2P, 0, 2Q, 0, 2R, 0, 2S} |
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| Q16.  | What is the transformation for s-domain to z-domain in BLT? |
| Option A: | $$\frac{T}{2}\left[\frac{1+ Z^{-1}}{1- Z^{-1}}\right]$$ |
| Option B: | $$\frac{T}{2}\left[\frac{1- Z^{-1}}{1+ Z^{-1}}\right]$$ |
| Option C: | $$\frac{2}{T}\left[\frac{1+ Z^{-1}}{1- Z^{-1}}\right]$$ |
| Option D:  | $$\frac{2}{T}\left[\frac{1- Z^{-1}}{1+ Z^{-1}}\right]$$ |
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| Q17. | If ⍵p > ⍵s then it is which type of filter? |
| Option A: | Low Pass |
| Option B: | High Pass |
| Option C: | Band Pass |
| Option D: | Band Reject |
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| Q18. | One of the disadvantages of BLT method is, |
| Option A: | Many to one mapping |
| Option B: | Warping Effect |
| Option C: | Aliasing |
| Option D:  | Suitable for Low pass filter designing only. |
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| Q19.  | What is the order of Ideal filter? |
| Option A: | Infinite |
| Option B: | Zero |
| Option C: | 1 |
| Option D:  | Cannot be determined |
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| Q20. | In bilinear transformation, the left-half s-plane is mapped to which of the following in the z-domain? |
| Option A: | Entirely outside the unit circle |z|=1 |
| Option B: | Partially outside the unit circle |z|=1 |
| Option C: | Partially inside the unit circle |z|=1 |
| Option D: | Entirely inside the unit circle |z|=1 |
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| Q21. | Which window has maximum stopband attenuation As? |
| Option A: | Bartlett Window |
| Option B: | Blackman Window |
| Option C: | Rectangular Window |
| Option D:  | Hamming Window |
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| Q22.  | For maximum phase FIR filter all zeros should lie \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. |
| Option A: | Inside the unit circle |
| Option B: | On the unit circle |
| Option C: | Outside the unit circle |
| Option D:  | Inside & Outside of the unit circle |
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| Q23. | The anti-symmetric condition with N even is not used in the design of which of the following linear-phase FIR filter? |
| Option A: | Low pass |
| Option B: | High pass |
| Option C: | Band pass |
| Option D:  | Bans stop |
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| Q24.  | What is the transition width of Ideal filter? |
| Option A: | Infinite |
| Option B: | Zero |
| Option C: | 1 |
| Option D:  | Cannot be determined |
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| Q25. | If H(z) is the z-transform of the impulse response of an FIR filter, then for linear phase filter which of the following relation is true? |
| Option A: | H(z) = $\pm $ z(N-1).H(z-1) |
| Option B: | H(z) = $\pm $ z(N+1).H(z-1) |
| Option C: | H(z) = $\pm $ z-(N-1).H(z-1) |
| Option D:  | H(z) = $\pm $ z(N-1).H(z-2) |