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Question Paper Code: 46424

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2020

Sixth Semester

Electrical and Electronics Engineering

14UEC624 - APPLIED DIGITAL SIGNAL PROCESSING

(Regulation 2014)

(Common to EIE and ICE branches)

Duration: 1.15 hrs

Maximum: 30 Marks

PART A - (6 x 1 = 6 Marks)

(Answer any six of the following questions)

1. The system $y(t) = 3x(t) + 5$ is a _____ system.
(a) Non-linear (b) Dynamic (c) Non-Causal (d) unstable
2. Integration of step signal results in _____ signal.
(a) ramp (b) delta (c) Sinusoidal (d) triangular
3. The LTIDT system with system function $h(n) = a^n u(n)$ is stable, only if
(a) $a > 1$ (b) $1/a < \infty$ (c) $a < \infty$ (d) $a < 1$
4. Convolution in time domain is equal to _____ in frequency domain.
(a) addition (b) multiplication (c) compression (d) expansion
5. The phase factors are multiplied before the add and subtract operations in
(a) DIT Radix 2 FFT (b) DIF Radix 2 FFT
(c) Inverse DFT (d) Both (a) and (c)
6. Compute the $X(0)$ of the sequence $x(n) = \{1, 0, 1, 0, 1, 0, 1, 0\}$
(a) 8 (b) 4 (c) 2 (d) 1

7. The condition for linear phase characteristic in FIR filter is, the impulse $h(n)=$ _____ where N is the duration of the sequence.
- (a) $h(n+N-1)$ (b) $h(N+1-n)$ (c) $h(N-1-n)$ (d) $h(n-N-1)$
8. When $s=$ _____ LPF is converted to HPF in analog domain.
- (a) $\frac{s}{\Omega_c}$ (b) $\frac{\Omega_c}{s}$ (c) $s\Omega_c$ (d) s^2
9. The pipeline depth of TMS320C50 is
- (a) 6 (b) 4 (c) 2 (d) 0
10. The function of wait-state generator is
- (a) To insert wait-state in internal and external bus cycles
 (b) To insert wait-state in data memory cycles
 (c) To insert wait-state in program memory cycles
 (d) To insert wait-state in external bus cycles

PART – B (3 x 8= 24 Marks)

(Answer any three of the following questions)

11. Show that unit impulse response can be used to obtain the response for any input for an LTI system. Also, determine whether the following systems are linear, time-invariant and causal.
- (i) $y(t) = x(t/3)$
 (ii) $y(n) = x(-n)$
 (iii) $y(t) = x(t^2)$
 (iv) $y(n) = x^2(2n)$ (8)
12. Using residue method find the inverse Z transform of
 $X(z) = [1 + 3z^{-1}] / [(1 + 3z^{-1} + 2z^{-2})], |z| > 2.$ (8)
13. Evaluate 8-point DFT of the following sequence using DIT-FFT
 $x[n]=\{ 2, 1, 2, 1, 1, 2, 1, 2\}.$ (8)
14. Design a digital low-pass Butterworth IIR filter using bilinear z-transform with a 3dB cut-off frequency of 2kHz and minimum attenuation of 30dB at 4.25kHz for a sampling rate of 10kHz. (8)
15. With a neat block diagram explain in detail about the architecture of TMS320C50. (8)

