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[24]

Sardar Patel University

M.Sc (Electronics & Communication) (Semester I) (CBCS) EXAMINATION - 2016

Wednesday, 26th October 2016

10:00 AM to 01:00 PM

PS01CELC03

Signal and System

Note: The figures to the right indicate maximum marks.

Total mark: 70

Q-1

Multiple Choice Question

[08]

- 1) What is the fundamental period of the periodic signal $x(n) = \cos(0.002\pi n)$?
(a) 1000 (b) 100
(c) 0.001 (d) 0.01
- 2) If signal takes on all possible values on a finite or an infinite range, it is said to be _____ signal.
(a) Continuous value (b) Multidimensional
(c) Discrete value (d) none
- 3) A system which illustrate the multiplication of two signal sequences to form another sequences is called as _____.
(a) Signal multiplier (b) adder
(c) constant multiplier (d) Unit delay element
- 4) Z-Transform of unit impulse signal is _____.
(a) 1 (b) $\frac{1}{1-az^{-1}}$
(c) $\frac{z^{-1}}{1-az^{-1}}$ (d) $\frac{az^{-1}}{1-az^{-1}}$
- 5) The average power of the unit step signal is _____.
(a) Infinite (b) 0.5
(c) Finite (d) 1
- 6) Twiddle factor for N-point DFT $W_N =$ _____.
(a) $e^{j2\pi/N}$ (b) $e^{-j2\pi/N}$
(c) $e^{-j2\pi kn/N}$ (d) $e^{j2\pi kn/N}$
- 7) Input signal $x(n)$ is transformed by the system in to a signal $y(n)$ is called as _____.
(a) Continuous time signal (b) Discrete time signal
(c) time limited signal (d) none
- 8) _____ System is known as memory less system.
(a) Static (b) Dynamic
(c) Both A and B (d) None of above

- Q-2** **Answer the following short questions [Any Seven]** **[14]**
- (1) Write the properties of Continuous time sinusoidal signal.
 - (2) Explain the basic block diagram of digital signal processing.
 - (3) Explain periodic signal and aperiodic signal.
 - (4) Explain energy signal and power signal.
 - (5) Explain multi-channel signal and multi dimension signal.
 - (6) Explain symmetric and antisymmetric signals.
 - (7) Explain the following properties of DFT.
(i) Circular time shift (ii) Circular frequency shift
 - (8) Determine the z – transform and ROC of the finite duration sequence

$$x(n) = \{2, 3, 5, 7, 9\}$$

- (9) Write the twiddle factor matrix for 8– point DFT.
- Q-3** (a) State the sampling theorem and explain the sampling of an analog signal. **[06]**
- Q-3** (b) Explain the classification of signal in detail. **[06]**

OR

- Q-3** (b) Give the concept of frequency in continuous time and discrete time signal in detail. **[06]**
- Q-4** (a) Explain in detail interconnection of Discrete time systems. **[06]**
- Q-4** (b) Explain the classification of the discrete time system **[06]**

OR

- Q-4** (b) Determine the convolution of the following sequences. **[06]**
- $$x(n) = \{1, 2, 1, -1\} \quad h(n) = \{1, 2, 3, 1\}$$

- Q.5** (a) Derive the power density spectrum for periodic continuous signal. **[06]**

- Q.5** (b) Determine the z – transform and ROC. **[06]**
- $$(i) x(n) = a^n (\cos \omega_0 n) u(n) \quad (ii) x(n) = \left(\frac{1}{2}\right)^n u(n) + \left(\frac{1}{3}\right)^n u(n)$$

OR

- Q.5** (b) Enlist different properties of the z transform and explain any three of them. **[06]**
- Q.6** (a) Derive the energy density spectrum for periodic continuous signal. **[06]**
- Q.6** (b) Explain Fourier series for discrete time periodic signals in detail. **[06]**

OR

- Q.6** (b) Write the circular shift property of DFT and obtain the circular convolution of the sequences $x_1(n) = \{2, 1, 2, 1\}$ and $x_2(n) = \{1, 2, 3, 4\}$ **[06]**