

Code: AE-06/ AC-04/ AT-04

Subject: SIGNALS & SYSTEMS

JUNE 2007

Time: 3 Hours

Max. Marks: 100

NOTE: There are 9 Questions in all.

- Question 1 is compulsory and carries 20 marks. Answer to Q. 1. must be written in the space provided for it in the answer book supplied and nowhere else.
- Out of the remaining EIGHT Questions answer any FIVE Questions. Each question carries 16 marks.
- Any required data not explicitly given, may be suitably assumed and stated.

Q.1 Choose the correct or best alternative in the following: (2x10)

a. Let $u[n]$ be a unit step sequence. The sequence $u[N-n]$ can be described as

(A) $x[n] = \begin{cases} 1 & n < N \\ 0 & \text{otherwise} \end{cases}$

(B) $x[n] = \begin{cases} 1 & n \leq N \\ 0 & \text{otherwise} \end{cases}$

(C) $x[n] = \begin{cases} 1 & n > N \\ 0 & \text{otherwise} \end{cases}$

(D) $x[n] = \begin{cases} 1 & n \geq N \\ 0 & \text{otherwise} \end{cases}$

b. A continuous-time periodic signal $x(t)$, having a period T, is convolved with itself. The resulting signal is

(A) not periodic

(B) periodic having a period T

(C) periodic having a period 2T

(D) periodic having a period T/2

c. If the Fourier series coefficients of a signal are periodic then the signal must be

(A) continuous-time, periodic

(B) discrete-time, periodic

(C) continuous-time, nonperiodic

(D) discrete-time, nonperiodic

d. The Fourier transform of a signal $x(t) = e^{2t}u(-t)$ is given by

(A) $\frac{1}{2-j\omega}$

(B) $\frac{2}{1-j\omega}$

(C) $\frac{1}{j2-\omega}$

(D) $\frac{2}{j2-\omega}$

e. For the function $H(j\omega) = \frac{1}{2 + 2j\omega + (j\omega)^2}$, maximum value of group delay is

(A) 1

(B) 1/2

(C) 2

(D) 3

f. A continuous-time signal $x(t)$ is sampled using an impulse train. In terms of $X(j\omega)$, the Fourier transform of $x(t)$, the spectrum of the sampled signal can be expressed as

