Total Scores
Checker

华中科技大学 20xx－20xx 学年第一学期

Signals and Systems

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No.	1.	2.	3.	4.	5.	6.	7.	Total Scores
Points	20.	10.	10.	10.	20.	14.	16.	100
Scores								

(1) For a LTI system, when the input signal $x[n]$ is equal to the unit impulse signal $\delta[n]$ with no initial system state, the output of the system is _____

(2) In a discrete-time LTI system, the relationship between the transfer function $H(z)$ and the unit impulse response $h[n]$ is_____

(3) The N-point DFT requires _____ complex multiplications. In contrast, the FFT algorithm requires _____complex multiplications.

(4) $x(t)=\sin(\frac{1}{7}\pi t)$ ， sampling time T=3 Then the discrete-time signal $x[n]$ =_____, the fundamental period of $x[n]$ is____.[3]

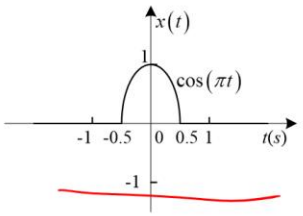
(5) The Fourier transform $X(\omega)$ of the periodic signal $x(t)=\sum_{k=-\infty}^{\infty}\delta(t-k)$ is ____.

(6) If the Fourier transform of a continuous-time signal x(t) is

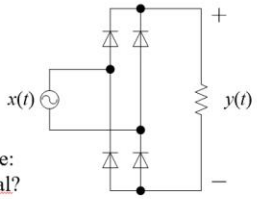
$X(\omega)=\begin{cases}10, |\omega| <= 3\text{rad/s}, \\ 0, |\omega| >= 3\text{rad/s}\end{cases}$, then the Nyquist frequency for sampling the signal $f(t)=x(t)\cos 2t$ is _____

Scores	Grader

Compute the Fourier transform of the signal in the Figure



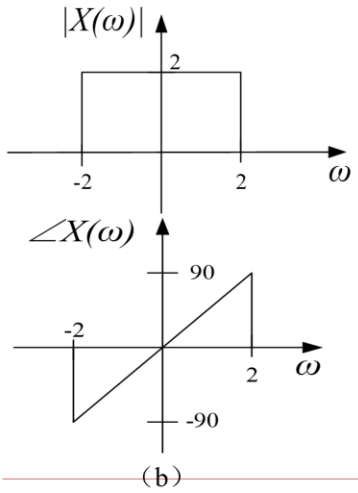
Scores	Grader



$x(t)=\cos(5t)$. Determine:

1. Causal or noncausal?
2. Linear or nonlinear?
3. Time invariant or time varying?
4. Has memory or is memoryless?
5. Compute the **trigonometric Fourier series** of $y(t)$.
6. Plot the line **spectra** of $y(t)$.

For the Fourier transforms ω is given in Figure, what characteristics does $x(t)$ have (i.e., real-valued, complex-valued)? Calculate $x(0)$.



(b)

For the Fourier transforms ω is given in Figure, what characteristics does $x(t)$ have (i.e., real-valued, complex-valued, even, odd)? Calculate $x(0)$.