No: Date:

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REG NO: 18PWCSE1658

SECTION: B

DEPARTMENT: DCSE

SEMESTER: 5th

SUBJECT: DSP

No: Date:

(Question 1)

(1)

Continuous	Discrete
1. For every fixed value of frequency, $x_a(t)$ is periodic. It can be shown using elementary trignometry. $x_a(t+T_p) = x_a(t)$ $T_p = \frac{1}{F}$ is period of sinusoidal signal.	A discrete time sinusiod is periodic only if its frequency is a rational number. $x(n) = A\cos(\omega n + \theta)$
(2) continuous time sinusoidal signal with distinct frequencies are themselves distinct.	Discrete time signal sinusoids whose frequencies are seperated by an integer multiple of 2π are identical. $\frac{\omega}{\pi}$ is a rational number then the signal will be periodic.
(3) Increasing the frequency F results in an increase in the rate of oscillation of the signal in the sense that more periods are included in a given interval.	DTS sinusoids are not always periodic.

No: Date:

(2)(i) $U = 4$, $T = 4$

$$x(t) = 3\sin(400\pi t + \theta) + 2\sin(200\pi t + \theta)$$

$$f = 2(f_{max})\pi t$$
$$= 2(200)\pi t$$

$$f_{max} = 200\,Hz$$
$$f_s = 400\,Hz$$

Nyquist theorem

$$f_s \geq 2f_{max}$$

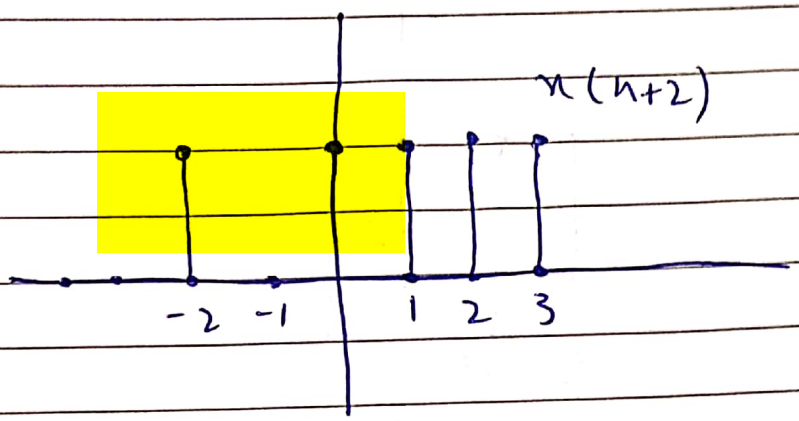
$$400 \geq 2(200)$$

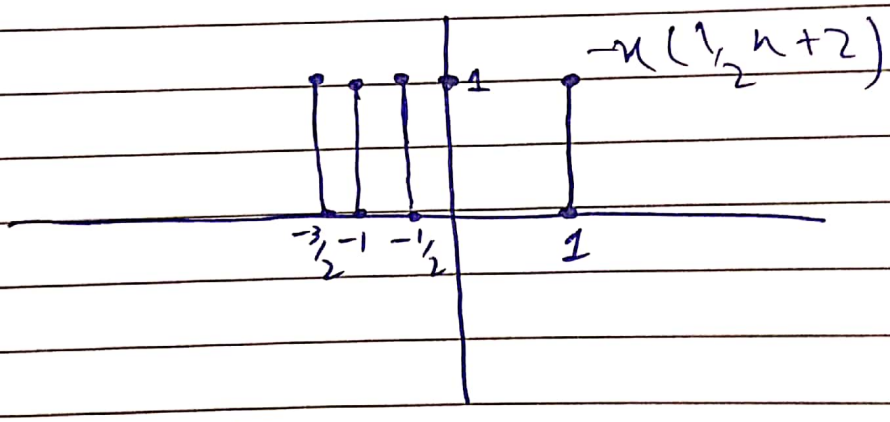
so it satisfies Nyquist theorem.

No: Date:

(Question 3)

(i) (a) $-u\left(\frac{1}{2}n+2\right)$





(b) $2u(-2n+3)$

$-2n+3=2$

$-2n=2-3$

$\boxed{n=\frac{1}{2}}$

$-2n+3=3$

$-2n=0$

$\boxed{n=0}$

No: Date:

$-2n + 3 = 4$

$-2n = 1$

$n = -1/2$