

UNIVERSITY OF SASKATCHEWAN  
ELECTRICAL ENGINEERING 362.3

Assignment Quiz 4  
March 20, 2003

Instructor: B.L. Daku

Time: 10 minutes

Aids: None

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Name:

Student Number:

1. A linear time-invariant system is defined by

$$H(z) = (1 - e^{j\pi/2}z^{-1})(1 - e^{-j\pi/2}z^{-1})(1 - z^{-1})$$

The input to the system is

$$x[n] = 5 + 20 \cos(\pi n/2 + \pi/4) + 10\delta[n - 3]$$

Use superposition to determine the corresponding output of the LTI system  $y[n]$  for  $-\infty < n < \infty$ .

$$h[n] = (1 - z^{-1})(1 - z^{-1})(1 - z^{-1})$$

$$= (1 - 2z^{-1} + z^{-2})(1 - z^{-1})$$

$$= 1 - z^{-1} - 2z^{-1} + 2z^{-2} - z^{-2} - z^{-3}$$

$$= 1 - 3z^{-1} + 2z^{-2} - z^{-3}$$

$$1 \quad 3 \quad -3 \quad 1$$

$$1 - 3 + 3 - 1 = 0$$

$$y[n] = 10\delta[n-3] + 30\delta[n-4] + 30\delta[n-5] + 10\delta[n-6]$$

(10)