

Index Number: \_\_\_\_\_ Programme: \_\_\_\_\_



UNIVERSITY OF ENERGY AND NATURAL RESOURCES, SUNYANI, GHANA

SCHOOL OF ENGINEERING

DEPARTMENT OF COMPUTER AND ELECTRICAL ENGINEERING, UENR

LEVELS 200 & 300: MID- SEMESTER EXAMINATION, 2016/2017

Bachelor of Science (Computer, Electrical and Electronics Engineering)

ELNG 222: Signals and Systems

March, 2017

Time: 45 Minutes

Materials required: Non-programmable calculator

Instructions: Answer all questions. [30 marks]

1. Define Energy and power signal. [3 marks]
2. Briefly explain the major classifications of a signal. [4 marks]
3. State the Convolution Property in relation to Fourier transform. [3 marks]
4. What is the relationship between Fourier Series and Fourier transform? [4 marks]
5. State the Time Reversal Property and Time Scaling Property in relation to Fourier Series [6 marks]
6. Compute the energy  $E_{\infty}$  and the power  $P_{\infty}$  of the following discrete-time signal  $x[n] = j$  [10 marks]

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LEVEL 200: MID SEMESTER EXAMINATION, 2017/2018

Bachelor of Science (Electrical and Electronics and Computer Engineering)

ELNG 222: Signals and Systems

April, 2018

Time: 1 hour

Materials required: Non-programmable calculator

Instructions: Answer all questions.

### Question 1

a. A continuous-time signal  $x(t)$  is shown in figure 1. Sketch and label each of the following signals.

- i.  $x(t-2)$       ii.  $x(2t)$       iii.  $x(t/2)$       iv.  $x(-t)$

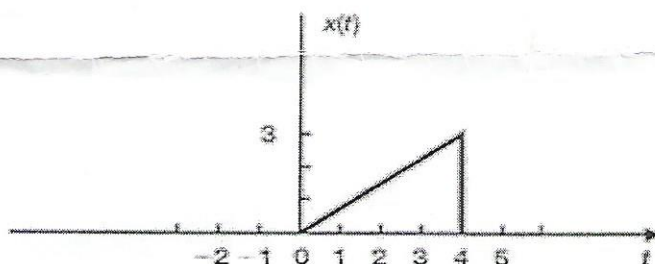


Figure 1

b. A discrete-time signal  $x[n]$  is shown in figure 2. Sketch and label each of the following signals.

- i.  $x[n-2]$       ii.  $x[2n]$       iii.  $x[-n]$       iv.  $x[-n+2]$

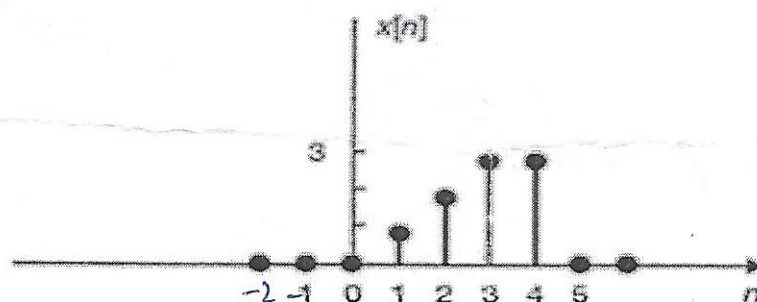


Figure 2

c. Compute the energy  $E_\infty$  and the power  $P_\infty$  of the following discrete-time signal  $x[n] = j$

- d. Express the signals shown in Fig. 1 in terms of unit step functions.

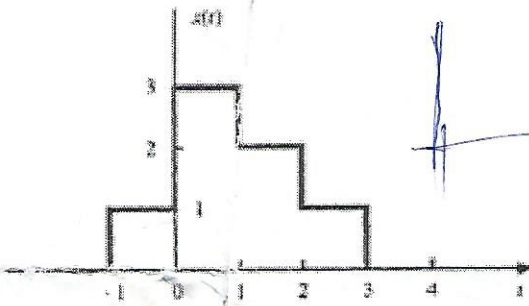


Figure 3

### Question 2

- a. Find the range of convolution of the signals given below, and then find the DC component of the resultant convoluted signal.

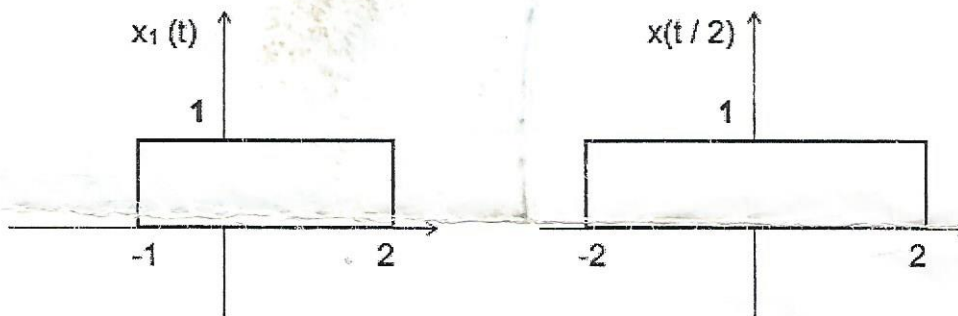


Figure 4

- b. Convolute two sequences  $x[n] = \{1, 2, 3\}$  and  $h[n] = \{-1, 2, 2\}$

### Question 3

Consider the system shown in Figure 5 Determine whether it is (a) memoryless, (b) causal, (c) linear, (d) time-invariant, or (e) stable.

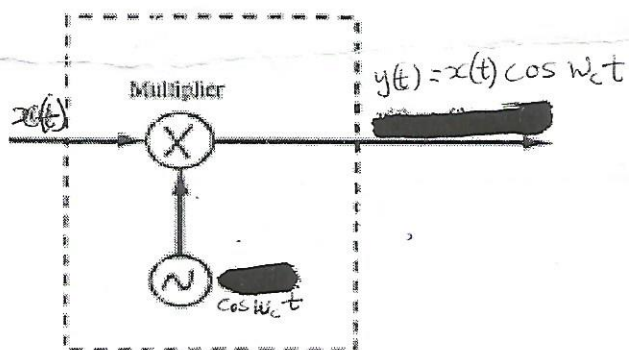


Figure 5