



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER I
SESSION 2016/2017**

COURSE NAME : MULTIMEDIA COMMUNICATION
COURSE CODE : BNF 41203
PROGRAMME : 4 BNF
EXAMINATION DATE : DISEMBER 2016 / JANUARY 2017
DURATION : 3 HOURS
INSTRUCTION : ANSWER ALL QUESTIONS

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THIS QUESTION PAPER CONSISTS OF FOUR (4) PAGES

Q1 (a) Explain briefly the differences between analog signals, digital signals and discrete signals. Draw suitable graphs to show the differences. (6 marks)

(b) Given $x[n] = \{-2, 1, 4, -3, 6, 2\}$. Determine and sketch:

- (i) $y[n] = x[n - 3]$
- (ii) $f[n] = x[n + 2]$
- (iii) $g[n] = x[-n]$
- (iv) $h[n] = x[-n + 1]$
- (v) $s[n] = x[-n - 4]$

(10 marks)

(c) Given $x[n] = \{1, 2, 6, 4, 8\}$. Using step interpolation, determine $x[n/2]$.

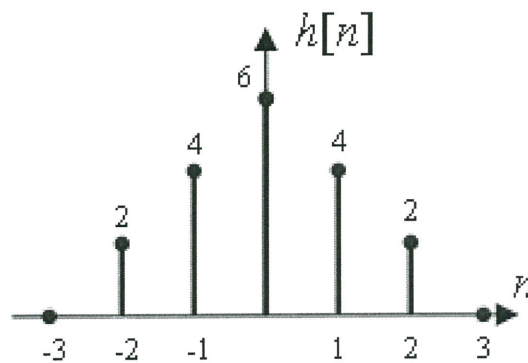
(4 marks)

Q2 (a) Write the following signals as a sum of impulses.

- (i) $x[n] = \{3, -5, 6, 4, 8\}$.
- (ii) $x[n] = \{1, 2, 6, 4, -6\}$.
- (iii) $x[n] = \{4, 2, 6, 1, 8\}$.
- (iv) $x[n] = \{-3, 7, -2, 6, 1\}$.
- (v) $x[n] = \{3, 2, -3, 2, 6\}$.

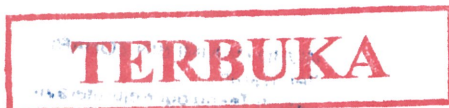
(5 marks)

(b) Describe the following signal as:



- (i) A numeric sequence
- (ii) A sum of impulses
- (iii) A sum of steps and ramps

(9 marks)



- (c) Discuss the advantages of Digital Signal Processing (DSP) over Analog Signal Processing (ASP). (6 marks)

Q3 (a) Explain briefly the convolution concept. (3 marks)

(b) An FIR (finite impulse response) filter has an impulse response given by $h[n] = \{1, -6, 2, 7\}$. Find its response $y[n]$ to the input $x[n] = \{2, -4, 1\}$. Assume that both $x[n]$ and $h[n]$ start at $n = 0$. (5 marks)

(c) Let $h[n] = \{0, 4, -1, 5\}$ and, $x[n] = \{1, -5, 2\}$ convolution starts at $n = 0$. Determine the output $y[n]$ using the following methods: (12 marks)

- (i) Sum by column
- (ii) Sliding strip
- (iii) Polynomial multiplication
- (iv) Zero insertion

Q4 (a) Determine the periodic convolution of $x_p[n] = \{1, -4, 2, 6\}$ and $h_p[n] = \{3, 2, -6, 1\}$ with the period of $N = 4$. (6 marks)

(b) Given the signal $x_1(t)$ be band-limited to 4 kHz and $x_2(t)$ be band-limited to 6 kHz. Find the Nyquist rate for the following signals by using properties of the Fourier transform:

- (i) $x_1(3t)$
 - (ii) $x_2(t - 5)$
 - (iv) $x_1(t) + x_2(t)$
 - (v) $x_1(t)x_2(t)$
- (5 marks)

(c) Draw analog to digital converter block diagram and explain briefly each basic part in analog to digital converter. (9 marks)

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Q5 (a) Discuss the following multimedia security applications:.

- (i) Digital watermarking
- (ii) Video watermarking
- (iii) Image Watermaking

(8 marks)

(b) Discuss the following multimedia conferencing issues:

- (i) Multimedia conferencing system.
- (ii) Multimedia conferencing standard.

(6 marks)

(c) A multimedia engineer needs to provide an online data storage for the backup of his company. Propose suitable compression for the video data and explain advantages of the compression.

(6 marks)

- **END OF QUESTIONS** -

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BRANCO S118 (2019/2020) Page 14
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