Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
(TAKE- HOME)
SEMESTER II
SESSION 2020/2021

COURSE NAME	:	DIGITAL SIGNAL PROCESSING
COURSE CODE	:	BEJ 30603/BEB 30503/BEV 30603
PROGRAMME CODE	:	BEJ / BEV
EXAMINATION DATE	:	JULY 2021
DURATION	:	4 HOURS
INSTRUCTION	:	ANSWERS **ALL** QUESTIONS. **OPEN BOOK EXAMINATION**

THIS QUESTION PAPER CONSISTS OF **THREE (3)** PAGES

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Please download an excel file of signal ($x[n]$ for **Q1** and the signal $b[n]$ for **Q2**) from your individual folder in the ***Individual activities*** of ***AUTHOR*** platform.

Q1 Given a discrete signal, $x[n]$ is measured from a sensor. In order to process the signal, a system has been developed and is as shown in **Figure Q1**. Calculate the output signal $y[n]$ of the system, if the system is characterized as :

$$a[n] = u[n+5] - u[n] - 2\delta[n] + 2\delta[n-1]$$

(20 marks)

Q2 An engineer has generated a discrete signal, $b[n]$ to be fed to a communication module with the sampling frequency of 10 Hz.

(i) Estimate the magnitude spectrum of the signal.

(31 marks)

(ii) Filter the lowest frequency component of signal using IIR filter based on direct analog-to-digital transformation method. Please prove the filtering effect of the designed filter. Use 10 samples for your answer.

(49 marks)

*You must use **four decimal points** in your calculation.*

-END OF QUESTIONS –

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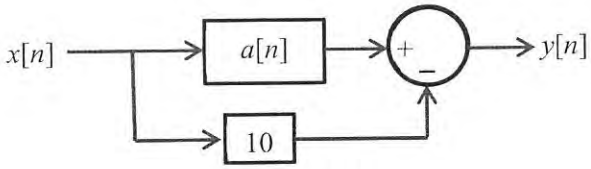

Figure Q1

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