UNIVERSITI MALAYSIA PERLIS

Peperiksaan Buku Terbuka I
Semester Kedua
Sidang Akademik 2021/2022

MEI 2022

NDJ10303 – Digital System l
[Sistem Digit l]

Masa : 2 jam

Please make sure that this question paper has **THREE (3)** pages including this front page before you start the continuous assessment.
*[Sila pastikan kertas soalan ini mengandungi **TIGA (3)** muka surat termasuk muka hadapan sebelum anda memulakan penilaian berterusan ini.]*

This paper has **TWO (2)** questions. Answer **ALL** questions**.** (40 Marks)
*[Kertas ini mengandungi **DUA (2)** soalan. Jawab **SEMUA** soalan. (40 Markah)]*

Question 1
[Soalan 1]

a) Convert the following binary numbers to decimal, hexadecimal and octal.
[Tukarkan nombor perduaan berikut kepada perpuluhan, perenambelasan dan perlapanan.]

      i. 1100.101_2
      ii. 100011.0111_2

(6 Marks/*Markah*)

b) Convert the following decimal numbers 81_{10} and 28_{10} into BCD numbers. Then add both numbers in BCD.
[Tukarkan nombor perpuluhan 81_{10} dan 28_{10} berikut kepada nombor-nombor BCD. Kemudian, tambah kedua-dua nombor dalam BCD.]

(3 Marks/*Markah*)

c) Solve each of the following arithmetic operations in binary.
[Selesaikan setiap operasi aritmetik berikut dalam perduaan.]

      i. $31.105_{10} + 21.25_{10}$
      ii. $26.35_{10} + 32.105_{10}$

(6 Marks/*Markah*)

Question 2
[Soalan 2]

a)   Given a Boolean expression shown as

$$\overline{(AB + \bar{C}\bar{D}) + E\overline{FBC}}$$

i)   By using De Morgan's Theorem and Boolean algebra law, prove Boolean expression to the smallest equivalent expression allowed.
[Dengan menggunakan Teori De Morgan dan Hukum Boolean, ringkaskan persamaan Boolean berikut kepada persamaan Boolean yang paling kecil yang dibenarkan.]

(4 Marks/*Markah*)

ii)   Draw the logic circuit based on the answer in **2a(i)**.
[Lukis litar logik tersebut berdasarkan soalan dalam 2a(i).]

(6 Marks/*Markah*)

c)   The following questions are based on the given function X.
[Soalan berikut berdasarkan fungsi X yang diberi.]

$$X (A,B,C, D) = \pi M (1,2,5,7,11,14,15)\ D(0,4,6,12)$$

i)   Expressed the following terms for the function in Truth table.
[Tunjukkan terma-terma berikut bagi fungsi di dalam jadual kebenaran.]

(4 Marks/*Markah*)

ii)   Map the terms in the answer **c(i)** and simplify the function using Karnaugh Map (K-map) technique.
[Petakan terma-terma di dalam jawapan c(i) dan ringkaskan fungsi tersebut menggunakan teknik Peta Karnaugh (K-map).]

(3 Marks/*Markah*)

iii)   From the answer in **c(ii),** write the Boolean equation in SOP format
[Dari jawapan di c(ii), tuliskan persamaan Boolean dalam format SOP.]

(2 Marks/*Markah*)

iv)   Draw a logic gate circuit based on answer in c(ii).
[Lukis litar get logik berdasarkan jawapan di c(ii).]

(6 Marks/*Markah*)

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