



Daffodil International University
Department of Electrical and Electronic Engineering
Faculty of Engineering
Midterm Examination, Fall-2026

Course Code: 0714-323

Course Title: Digital Electronics

Section: A, B, C, D

Level-Term: L2-T3

Teacher's Initial: DAS, BS

Full Marks: 25

Exam Date: November 01, 2026

Time: 1.5 Hours

[Notes: Answer all the questions. The number on the rightmost side of the question indicates the marks]

- Q1.** (a) **Represent** your student ID in 84-2-1 code. **Perform** the following subtraction operation using both r's and (r-1)'s complement: **CO1** [5+3+4]
 $11111_2 - 1111_2$ **(C3)**
- (b) **Simplify** the following Boolean function to a minimum number of literals using the laws of Boolean algebra.
 $F(a, b, c, d) = (b'c' + d)' + d + bc + ad$
- (c) Using K-map **find** the simplest form in SOP and POS for the following Boolean function:
 $F(w, x, y, z) = \sum(1, 3, 7, 11, 15)$ with the don't care conditions given by
 $d(w, x, y, z) = \sum(0, 2, 5)$
- Q2.** (a) **Implement** the following Boolean function using NAND gates only. **CO1** [3+3]
 $F(x, y, z) = x + y'z$ **(C3)**
- (b) **Implement** the full subtractor circuit using half subtractor circuits and external gates. **CO3**
(C3)
- Q3.** (a) **Define** the following performance characteristics of digital logic families: **CO2** [3+4]
 Propagation Delay, Noise Margin and Figure of Merit. **(C2)**
- (b) **Draw** and properly labeled circuit diagrams of the CMOS AND and CMOS OR gates.