Daffodil International University

Department of Electrical and Electronic Engineering

Faculty of Engineering

Midterm Examination, Summer-2026

Course Code: 0714-323 | Course Title: Digital Electronics

Section: A, B, C, D, E | Level-Term: L3-T1 | Teacher's Initial: DAS, BS

Full Marks: 25 | Exam Date: June 27, 2026 | Time: 1.5 Hours

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

Q1. (a) **Simplify** the following Boolean function to a minimum number of literals using the laws of Boolean algebra. CO1 (C3) **3+8**

$F(A,B,C,D) = (A + B + C' + D)(B' + C' + D)(A' + C + D')$

(b) **Design** a combinational circuit that accepts decimal digits represented in 84-2-1 code as input and generates the corresponding 8421 code as output. CO3 (C3)

Q2. (a) **Implement** the following Boolean function using NOR gates only. CO1 (C3) **2+4**

$F(A,B,C) = \sum(0,6)$

(b) Using K-map **find** the simplest form in SOP and POS for the following Boolean function: CO1 (C3)

$F(w,x,y,z) = \sum(3,4,13,15)$ with the don't care conditions given by $d(w,x,y,z) = \sum(1,2,5,6,8,10,12,14)$

Q3. (a) **Define** noise margin and propagation delay. **Explain** how the fan out capability of DTL can be increased. CO2 (C2) **5+3**

(b) **Draw** neat and properly labeled circuit diagrams of the CMOS NOR and NAND gates. CO2 (C2)