Daffodil International University

Faculty of SIT

Department of CSE

Midterm Examination | **Semester: Summer-2022**

Course Code: MAT-121 | **Course Title: Mathematics-II**

Section: W, X | **Level & Term: L1T2**

Course Teacher: Masuma Parvin (MAP)

Total Marks: 25 | **Time: 1:30 hours**

(All parts of each question must be answered contiguously)

Answer any 5(five) from the following questions | **Marks: 25**

1. Evaluate: (a) $\int_0^{\frac{\pi}{2}} 35\cos^{16} x \sin^{8} x \, dx$ (b) $\int_0^1 \frac{45}{7}(1-x)^{15}x^{\frac{13}{2}} dx$ 2.5+2.5

2. Compute: $\int_0^{3a}\int_0^{2a}\int_0^{a}(2x+5y+7z)dy\,dx\,dz$ 5

3. Compute: $\int_1^3\int_x^{x^2}\int_0^{\ln x} xe^{y}\,dy\,dz\,dx$ 5

4. (a) Prove that, $\left|\frac{1}{2}\right| = \sqrt{\pi}$ 2

   (b) $\int_0^{\infty} e^{-x}x^{\frac{11}{2}}dx$ 3

5. If $u = e^{xyz}$ then show that 5

$$\frac{\partial^3 u}{\partial x \partial y \partial z} = \left(1+3xyz+x^2y^2z^2\right)e^{xyz}$$

6. If $f(x,y,z)=\ln\sqrt{x^2+y^2+z^2}$ 5

Show that $(x^2+y^2+z^2)\left(\frac{\partial^2 f}{\partial x^2}+\frac{\partial^2 f}{\partial y^2}+\frac{\partial^2 f}{\partial z^2}\right)=1$