

Daffodil International University Department of Software Engineering Faculty of Science & Information Technology Final Examination, Fall 2022 Course Code: MAT101; Course Title: Mathematics-I Sections & Teachers: All

Time: 2:00 Hrs

Marks: 40

Answer ALL Questions

[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]

1.	 a) u = (x² + y² + z²)^{-1/2}, Is it symmetric? Using the rules of partial differentiation, show that ∂²u/∂x² + ∂²u/∂y² + ∂²u/∂z² = 0. b) u = tan⁻¹ (x³-y³/(x-y)), Is it a Homogeneous function? Using Euler's theorem show that x ∂u/∂x + y ∂u/∂y = sin 2u 	[Marks- 10]	CO-2 Level-1
2.	Solve the following integrals by using the appropriate method. a) $\int \frac{dx}{(1+x^2)(9-(\tan^{-1}x)^2)}$ b) $\int x^2 \sin x dx$ c) $\int \frac{(x+5)dx}{(x^2+3)\sqrt{x^2+6}}$ d) $\int_0^2 \frac{dx}{(x+2)\sqrt{1+x}}$ e) $\int_0^1 \frac{x^5}{16-x^{12}} dx$ f) $\int_0^3 \frac{x^2-1}{(x+1)^2(x-2)} dx$	[Marks-20]	CO-3 Level-3
3.	 Using the proper method, solve the following multiple integrals. a) ∫₀² ∫₁² (2x − 5y²)dxdy b) ∫₁³ ∫₋₁² ∫₀¹ 6xy³z²dzdxdy 	[Marks-10]	CO-3 Level-3