Green University of Bangladesh

Faculty of Science and Engineering

Department of Computer Science & Engineering

Program: B.Sc. Engg. in CSE

First Class Test, Fall 2021

MAT 103: Ordinary and Partial Differential Equations and Co-ordinate Geometry

Section: DB; Shift: Day; Batch ID: 212

Full Marks: 15 **Time: 30 minutes**

1. Identify order, degree, linear or nonlinearities of the following differential equations: 3

   i. $\sqrt[6]{\left(\frac{d^4y}{dx^4}\right)^5 + 5x\frac{d^3y}{dx^3} + y} = \sqrt[3]{\left(\frac{d^3y}{dx^3}\right)^4 + y^2}$

   ii. $(y'' + y')^2 = x(xy'' + y)^{-3}$

2. Find the differential equation whose solution is $xy^2 = ax + b \ln x$. 4

3. Solve the following differential equation: 4

   $$\frac{1}{x^3}\frac{dy}{dx} + \frac{1+y^2}{y^2(1+x^2)} = 0.$$

4. Solve the following differential equation by using LDE method: 4

   $$y\,dx - x\,dy + \ln x\;dx = 0.$$