University of Information Technology & Sciences
Faculty of Science and Engineering
Department of CSE

Time: 1(One)hour

Marks: 20

Answer all questions.

1. (a) Define order and degree of a differential equation. State the order and degree **[4]** of the following equations and whether the equation is linear or nonlinear:

(i) $\frac{d^2y}{dx^2} - \left(\frac{dy}{dx}\right)^3 = 0$ (ii) $\left(\frac{dr}{ds}\right)^3 = \sqrt{\frac{d^2r}{ds^2} + 1}$.

(b) Form the differential equations of the following equation: $y = c(x - c)^2$, **[3]** where c is arbitrary constant.

(c) Identify the exactness and Solve the differential equation; **[3]**

$(x^2 - 2xy + 3y^2)dx + (4y^3 + 6xy - x^2)dy = 0.$

2. (a) Solve the differential equations: **[10]**

i) $\frac{dy}{dx} + 3x^2y = 4x^2y^2$.

ii) $(x^3 + 3xy^2)dx + (y^3 + 3x^2y)dy = 0$