Jagannath University, Dhaka

Department of CSE

Mid-Examination-2020

Course Code: CSER-2105, Math-III, Ordinary Differential Equations

Full Marks: 10 Time: 30 minutes

There are **Four** questions. Answer any **Three** of the questions.

1.	a)	What do you mean by order and degree of the differential equation (D. E.).	
	b)	Find the order and degree of the following D. E. (i) $\left(\frac{dy}{dx}\right)^2 + 2y^2 = 5\left(\frac{dy}{dx}\right) + 4y$ (ii) $\frac{d^3y}{dx^3} + 3\left(\frac{d^2y}{dx^2}\right)^2 - \frac{dy}{dx} + y = 0$ (iii) $\left(\frac{d^2y}{dx^2}\right)^2 - y = e^x.$	
2.		Form the D.E. of the family of circles touch the x-axis at origin.	
3.		Solve following differential equations: i) $x\frac{dy}{dx} - y = x\sqrt{x^2 + y^2}.$ ii) $\frac{dy}{dx} + \frac{2}{x}y = \frac{y^3}{x^3}.$	
4.		Show that the transformation $v = y^{1-n}$ reduces the Bernoulli's differential equation $xy' - y = x^k y^n; n \neq 1$ and $k + n \neq 1$ to a linear differential equation in v of order one and hence solve it.	