M.Sc. (MATHEMATICS WITH APPLICATIONS IN COMPUTER SCIENCE)
M.Sc. (MACS)

00373 Term-End Practical Examination

December, 2017

MMT-007(P) : DIFFERENTIAL EQUATIONS AND NUMERICAL SOLUTIONS

Time : $1\frac{1}{2}$ Hours *Maximum Marks : 40*

Note : *(i) There are two questions in this paper, totalling 30 marks. Answer* ***both*** *of them.*

(ii) Remaining 10 marks are for the viva-voce.

1. Write a program in 'C' language to solve the initial value problem

$$\frac{dy}{dx} = y^2 \cos x,\ y(0) = 1$$

in the interval [0, 2] using fourth order Milne's Predictor-Corrector method with $h = 0{\cdot}4$. Calculate the starting values using the fourth order Runge-Kutta method with the same step-length. Perform two corrector iterations per step. *15*

2. Write a program in 'C' language to solve the equation

$$\frac{\partial u}{\partial t} = \frac{\partial^2 u}{\partial x^2},\ 0 \le x \le 1,\ t > 0$$

using the Crank-Nicolson method, where $u(0, t) = u(1, t) = 0$, $u(x, 0) = \sin(2\pi x)$. Integrate for two time levels assuming $h = 0{\cdot}25$ and $\lambda = 0{\cdot}6$. *15*