SRM Institute of Science and Technology
Department of Mathematics
21MAB206T- Numerical Methods and Analysis
2023-2024 ODD
Answer all questions (5 X 10 = 50 marks)
Assignment - 2

S.No.

1. Given that

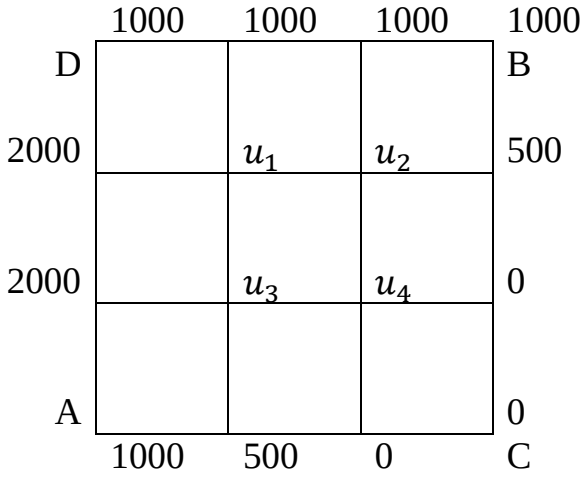
x:	1.0	1.1	1.2	1.3	1.4	1.5	1.6
y:	7.989	8.403	8.781	9.129	9.451	9.750	10.031

Find the first derivative and second derivative of y w.r.t x at (a) $x = 1.1$ (b) $x = 1.6$ using Newton's forward and backward differentiation formulae.

2. Evaluate $\int_0^6 \frac{dx}{1+x^2}$ by
   i) Trapezoidal rule
   ii) Simpson's one-third and three-eighth rule
   Also check the results by actual integration

3. Using Runge-Kutta method of 4th order, find y(0.8) correct to 4 decimals places if $y' = y - x^2, y(0.6) = 1.7379$

4. Evaluate the function $u(x, y)$ satisfying $\nabla^2 u = 0$ at the lattice points given the boundary as follows:



5. Using Crank-Nicholson's scheme
   Solve $u_{xx} = 16u_t, 0 < x < 1, t > 0$, given $u(x,0) = 0, u(0,t) = 0,\ u(1,t) = 100t$
   Compute u for one step in t direction taking $h = \frac{1}{4}$.