



OR

- 5 Using Newton divided difference interpolation, find  $f(2)$  and  $f(-0.5)$  of the given data. [10M] CO2 L3

$x$	-1	0	1	3
$f(x)$	2	1	0	-1

- 6 Compute  $\left(\frac{dy}{dx}\right)_{x=x_0}$  and  $\left(\frac{d^2y}{dx^2}\right)_{x=x_0}$  for the following data [10M] CO3 L4

$x$	3	3.2	3.4	3.6	3.8	4.0
$y$	-14	-10.032	-5.296	-0.256	6.672	14

OR

- 7 Evaluate  $\int_0^{\pi} \frac{\sin x}{x} dx$  by trapezoidal rule and simpsons 1/3<sup>rd</sup> rule. Take  $n=6$  CO3 L5

[5M+5M]

- 8 Using Taylor's series method, find  $y$  at  $x = 0.1$ , if  $\frac{dy}{dx} = x^2y - 1$ ,  $y(0) = 1$ . [10M] CO4 L3

OR

- 9 Solve  $\frac{dy}{dx} = 1 - y$ ,  $y(0) = 0$ , by using modified Euler method and find the values of  $y(0.1), y(0.2)$ . [10M] CO4 L3

- 10 Solve by implicit Crank-Nicolson's method  $U_{xx} = U_t$  for  $0 < x < 1, t > 0$  and  $U(0, t) = 0, U(1, t) = 0, U(x, 0) = 100(x - x^2)$ . Compute  $U$  for one time step,  $h=1/4$ . [10M] CO5 L3

OR

- 11 Solve the Poisson equation  $\nabla^2 u = -10(x^2 + y^2 + 10)$ , over the square with sides  $x=0, y=0, x=3, y=3$  and  $u=0$  on the boundary taking  $h=1$ . [10M] CO5 L3