

No. of Printed Pages : 2 **MMT-007(P)(Set-I)**

**M. SC. (MATHEMATICS WITH
APPLICATIONS IN COMPUTER
SCIENCE) [M. SC. (MACS)]**

Term-End Practical Examination

December, 2024

**MMT-007(P)(Set-I) : 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 viva-voce.*

(iii) *Symbols have their usual meanings.*

1. Write a 'C' program to solve the boundary value problem : 15

$$y'' - 3y' + 2y = 2$$

$$y(0) - y'(0) = -1$$

$$y(1) + y'(1) = 1$$

using the second order finite difference method
with $h = \frac{1}{2}$.

2. Write a program in 'C' language to solve the equation : 15

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

$$u(x, 0) = \sin(\pi x), \quad 0 \leq x \leq 1$$

$$u(0, t) = 0 = u(1, t), \quad t > 0$$

with step length $h = \frac{1}{3}$ and mesh ratio $\lambda = \frac{1}{6}$ by

using Laasonen method. Solve the tridiagonal system using Gauss elimination method.

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