Master of Computer Application (MCA - I) (CBCS Pattern) First Semester

PSMCAT104.2 - Paper-IV Elective-II
Numerical Methods

P. Pages : 2 **GUG/W/18/11091**

Time : Three Hours * 3 2 0 3 * Max. Marks : 80

Notes : 1. All questions are compulsory and carry equal marks.
2. Draw neat & labeled diagram and use supporting data whenever necessary.
3. Avoid vague answers and write specific points / answer related to questions.

1. **Either**

a) Explain in detail the Algorithm of Bisection method with example. **8**

b) Use false position method to find the roots of the equations. **8**

$x^3 - x - 4 = 0$

OR

c) Write a note on : **8**

i) Algebraic equation.

ii) Polynomial equation

d) Find the real root of equation by Newton Raphson method. **8**

$x^3 - 2x - 5 = 0$

2. **Either**

a) Find the inverse of matrix by the Gauss Jordan method. **8**

$$A = \begin{bmatrix} 1 & 1 & 3 \\ 1 & 3 & -3 \\ -2 & -4 & -4 \end{bmatrix}$$

b) Write a note on : **8**

i) Gauss elimination method.

ii) Gauss elimination with pivoting.

OR

c) Solve the following equation by using partial pivoting techniques. **8**

$2x_1 + 2x_2 + x_3 = 6$

$4x_1 + 2x_2 + 3x_3 = 4$

$x_1 - x_2 + x_3 = 0$

d) Explain the process of Round off errors and refinement. **8**

3. **Either**

a) Estimate the missing figure in the following table using Newtons method. **8**

X	1	2	3	4	5
Y = F(x)	2	5	7	-	32

b) What is interpolation ? Explain linear interpolation. **8**

OR

c) Describe multiple linear regression with example. **8**

d) Given the data point estimate the function value of x = 3.5 using cubic spline. **8**

i	0	1	2	3
x_i	1	3	4	7
f_i	1.5	4.5	9	25.5

4. **Either**

a) Compute the integral **8**

$$I = \int_{-2}^{2} e^{-x/2} dx$$

Using 2 point Gauss legendary formula.

b) Explain and Derive Trapezoidal Rule. **8**

OR

c) What is Multistep method ? Explain Milne Simpson's method. **8**

d) Use Simpson's $3/8^{th}$ rule to integrate the function **8**

$f(x) = 0.2 + 20x + 25x^2 + 60x^3$

over the limit a = 0.0 to b = 1.0.

5. Solve all the questions.

a) Explain iterative method and starting and stopping Iterative method. **4**

b) Describe Cholesky method with example. **4**

c) Explain interpolation with equidistant points. **4**

d) Define Simpson 1/3 Rule with example. **4**

****