

Roll No

MCADD-302

M.C.A. (Integrated), III Semester

Examination, June 2024

Computer Oriented Numerical Methods

Time : Three Hours

Maximum Marks : 70

Note: i) Attempt any five questions.

ii) All questions carry equal marks.

1. a) Discuss truncation errors, relative and absolute errors.
b) Solve $x^4 - 5x^3 + 20x^2 - 40x + 60 = 0$ by Newton-Raphson method given that all the roots of the given equation are complex.
2. a) Explain the basic principle used in Newton-Cotes methods.
b) Evaluate analytically the below integrals:
 - i) $\int_0^2 (3x^2 + 2x - 5) dx$
 - ii) $\int_0^2 (3x^3 + 2x^2 - 1) dx$
 - iii) $\int_0^\pi (3 \cos x + 5) dx$
3. a) Find the probability distribution of the number of doublets in four throws of a pair of dice.
b) A random variable X has a Poisson distribution with parameter λ such that $P(X = 1) = (0.2) P(X = 2)$. Find $P(X = 0)$.

4. a) Derive mean and Variance of Binomial Distribution.
 b) Solve $27x + 6y - z = 85$, $6x + 15y + 2z = 72$,
 $x + y + 54z = 110$ by Gauss Seidel iteration method.
5. Fit a binomial distribution for the following data and compare the theoretical frequency with the actual ones:

x	y
0	2
1	14
2	20
3	34
4	22
5	8

6. a) Derive the false position formula for evaluating a root of a nonlinear equation.
 b) Describe how Taylor's theorem of expansion can be used to solve a differential equation.
7. a) Derive Newton's forward interpolation formula and how it uses to find the value of $f(1.3)$ From the following?
- | | | | | |
|---------|-----|-----|-----|-----|
| $X:$ | 1 | 1.4 | 1.8 | 2.2 |
| $F(x):$ | 3.5 | 4.8 | 6.0 | 6.5 |
- b) Evaluate $\int_0^6 \frac{1}{1+x^2} dx$ by using
 i) Using Simpson's 1/3 Rule
 ii) Simpson's 3/8 Rule
8. Explain the following
 i) Null hypothesis
 ii) Levels of Significance
 iii) Standard errors
 iv) Testing Hypothesis
