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Roll No

MCADD-302

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

Examination, June 2023

Computer Oriented Numerical Methods

Time : Three Hours

Maximum Marks : 70

Note: i) Attempt any five questions.

ii) All questions carry equal marks.

1. a) Explain Horner's rule? How does it improve the accuracy of evaluation of a polynomial?
- b) Find the absolute and relative errors in evaluating the following expressions:

i) $\sqrt{x^2 + y^2}$

ii) xe^y

Assume $x = 1.25$ and $y = 2.16$.

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) What is triangularisation of equations? How does it help obtain the solution?

- b) Find the Cholesky decomposition of the matrix

$$\begin{bmatrix} 4 & 1 & 1 \\ 1 & 5 & 2 \\ 1 & 2 & 3 \end{bmatrix}$$

4. 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 $P(X = 0)$.
5. a) What will be the z value when the given parameters are sample mean = 600, population mean = 585, the standard deviation is 100 and the sample size is 150?
b) What are the main steps to developing a scientific theory?
6. a) List, with examples, different forms of polynomials that could be used for constructing interpolation functions.
b) When a biased coin is tossed, the probability of getting a head 3 times more than the probability of getting a tail. Find the probability distribution for getting a tail, if the coin is tossed twice.
7. 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.
8. Explain in brief
 - a) hypothesis
 - b) directional hypothesis
 - c) non-directional hypothesis?
