

1482/III

B.C.A. (PART-II) EXAMINATION, 2022-23

(Third Semester)

(BCA 302 : COMPUTER ORIENTED)

MATHEMATICS

Paper : II

Time : Three Hours]

[Maximum Marks : 70

- Note:** (i) Answer **Five** Questions in all.
(ii) Question No.1 is **Compulsory**.
(iii) Answer remaining **Four** questions, selecting **Two** from each Section A and B.
(iv) All questions carry equal marks.
(v) Non-programmable scientific calculators are allowed.

1. Attempt any four parts of the following :
- (a) Define absolute and relative errors.
 - (b) Differentiate between mean and mode.
 - (c) Discuss about maxima and minima.
 - (d) Discuss the relation among h and n for Newton-cotes formula base numerical integration method.

- (e) What is the pivot element that involves in gauss elimination method.
- (f) How concept of accuracy and precision are closely related to significant digits.

SECTION-A

2. What is an error propagation? Discuss the arithmetic of error propagation and its effects?

3. Use the false position method to find a root of the function $f(x) = x^2 - x - 2 = 0$ in the range $1 < x < 3$.

4. Obtain the solution of the following system using gauss-Seidel iteration method,

$$2x_1 + x_2 + x_3 = 5$$

$$3x_1 + 5x_2 + 2x_3 = 15$$

$$2x_1 + x_2 + 4x_3 = 8$$

5. Evaluate the following integral using Simpson's 1/3 rule $\int_1^2 (x^3 + 1) dx$ and also estimate with associate error.

SECTION-B

6. (a) What do you understand with round off error? Find the round off error in storing the number 572. 6745 using four digit mantissa.
- (b) A civil bridge engineer has measured the length of a 10 section of complete bridge as 2950 m and the working length of each section 35 m, while the true values are 2945 m and 30 m respectively. Compare their absolute and relative errors.
7. (a) Discuss the starting and stopping. Criteria of an iterative process for root finding method.
- (b) Estimate the possible guess value for equation $2x^3 - 8x^2 + 2x + 12 = 0$.
8. (a) Derive the Newton Raphson method and further discuss it any one limitation.
- (b) Solve the equation

$$2x + 4y - 6z = -8$$

$$x + 3y + z = 10$$

$$2x - 4y - 2z = -12$$

Using Gauss elimination or Gauss Jordan method.

9. Answer any two of the following:

- (a) The table below gives square roots for integers

x	1	2	3	4	5
$f(x)$	1	1.4142	1.7321	2	2.2361

Determine the square root of 2.5.

- (b) Calculate mean, mode and standard deviation from the following table:

Class interval	0-5	5-10	10-15	15-20	20-25	25-30	30-35
No. of frequency	5	7	22	4	8	14	5

- (c) (i) If $y = \sin(\sqrt{\sin x + \cos x})$, find $\frac{dy}{dx}$.
- (ii) Evaluate $\int \frac{1}{(\sqrt{x}+x)} dx$.

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