1482/III

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

(Third Semester)

9148

(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. Evaluates 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 Jordon 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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B.C.A. (Part-II[nd]) EXAMINATION, 2023-24

(Third Semester)

1181

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. (a) What do you mean by approximate value ?

(b) List any three methods for the solution of transcendental equation and name the best approach to solve it.

(c) Explain about derivatives of a f^n.

(d) Explain with suitable example about "Mean" of given values.

Section-A

2. Define the interpolation. For unequal intervals data series which formula is used ? Solve the following with that method to evaluate f (9)

x	50	75	110	130	172
f(x)	150	392	1452	2366	5020

3. For finding the roots of nonlinear equation describe Newton Raphson method. Find the solution of $\sqrt{N}$, where N is a positive integer 39 upto two decimal places.

4. Solve the following system of equations.

$$10x + y + 2z = 40$$

$$2x + 10y + z = 57$$

$$x + 2y + 10z = 71$$

by using gauss Scidel method.

5. Calculate the mean, median and mod for the following data :

Size of items	0	1	2	3	4	5	6	7	8	9
Frequency	3	6	8	5	4	2	1	0	0	1

Section-B

6. (a) Use the slope formula to find $\frac{d}{dx}(x^3 - 7x)$.

   (b) 50 children used guessed the number of marbles in a jar and the average guess was 627. However three of the guesses were way too high and so were excluded then the average guess was reduced by 114, what is the mean of the three outliers ?

7. (a) If $f(1) = 5$, $f(2) = 8$, $f(3) = 37$ and $f(4) = 77$ find $f(1.5)$.

   (b) Evaluate $\int_0^1 \frac{dx}{1+x}$ by using trapezoidal and Simpson's 3/8 rule.

8. (a) Calculate the value of $\sqrt{102} - \sqrt{101}$, correct to four significant figures. Find Absolute and relative error if you take only two significant figures as approximate value of each also.

   (b) By using gauss-elimination, solve the following :

   $x + 2y + 3z = 1$

   $x + 3y + 2z = 2$

   $3x + 3y + 4z = 1$

9. Attempt any two of the following :

(a) Find the mean and median of 7, 12, 10, 15, 9 and explain measure of central tendency with examples.

(b) Find the positive root between 0 and 1 of the equation $x = e^{-x}$.

(c) How to calculate inverse of the given matrix?

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