

**2111000303023002**  
**EXAMINATION OCTOBER 2024**  
**BACHELOR OF SCIENCE (COMPUTER SCIENCE)**  
**(NON-NEP) (THIRD SEMESTER)**  
**MATHEMATICS PAPER-VI**

[Time: As Per Schedule]

[Max. Marks: 50]

**Instructions:**

1. Fill up strictly the following details on your answer book
  - a. Name of the Examination: **BACHELOR OF SCIENCE (COMPUTER SCIENCE) (NON-NEP) (THIRD SEMESTER)**
  - b. Name of the Subject: **MATHEMATICS PAPER-VI**
  - c. Subject Code No: **2111000303023002**
2. Sketch neat and labelled diagram wherever necessary.
3. Figures to the right indicate full marks of the question.
4. All questions are compulsory.
5. Follow usual notations.
6. Use of Scientific non-programmable calculator is allowed.

Seat No:

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Student's Signature

**Q.1 Answer any FIVE as directed.**

**10**

- (1) What is a percentage error?
- (2) Find the interval in which the root of the equation  $3x^3 - x - 1 = 0$
- (3) Prove:  $\delta^2 \equiv \nabla\Delta$ .
- (4) Construct the difference table for the data: (1, 0), (2, 9), (3, 12), (4, 19) and (5, 24).
- (5) Round-off the following numbers to the four significant digits: 0.0022218, 10.035101, 18.46355 and 80.255
- (6) Find the value of  $E^2x^3$ , when the value of  $x$  vary by a constant increment two.
- (7) Evaluate:  $\Delta^2\{(1+x)(1+2x)\}; h = 1$
- (8) Define: Interpolation.

**Q.2 Attempt any TWO.**

**10**

- (1) Sum the numbers: 105.6, 27.28, 5.63, 0.1467, 0.000523, 208.5, 0.0235, 0.432 and 0.0467, where each number is correct to the digits given. Estimate the absolute error in the sum.

- (2) Find the value of  $s = \frac{a^2\sqrt{b}}{c^3}$ ; where  $a = 6.54 \pm 0.01$ ,  $b = 48.64 \pm 0.02$ ,  $c = 13.5 \pm 0.03$ .
- (3) Find the absolute error in  
 (i) a product of two numbers a and b  
 (ii) the quotient  $\frac{a}{b}$

**Q.3 Attempt any TWO.**

**10**

- (1) Explain 'Iteration Method' to obtain the real root of an equation  $f(x) = 0$ .
- (2) Find a real root of the equation  $x^3 + x^2 - 1 = 0$ , using 'Bisection Method' correct up to two decimal places
- (3) Obtain a real root of the equation  $4e^{-x} \sin x = 1$  using 'Newton-Raphson Method' correct up to four decimal places.

**Q.4 Attempt any TWO.**

**10**

- (1) Prove that  

$$\Delta^n u_{x-n} = u_x - nu_{x-1} + \frac{n(n-1)}{2}u_{x-2} - \dots + (-1)^n u_{x-n}.$$
- (2) Obtain the value of  $\Delta^3\{(1+x)(1-3x)(1+5x)\}$ ; where  $h = 1$ .
- (3) Evaluate (i)  $\left(\frac{\Delta^2}{E}\right)x^3$  and (ii)  $\Delta^2[\cos x]$

**Q.5 Attempt any TWO.**

**10**

- (1) Derive 'Newton's forward difference interpolation formula'.
- (2) Obtain the value of  $y(x)$  at  $x = 38$  from the following table:

$x$	15	20	25	30	35	40
$y(x)$	0.2588	0.3420	0.4226	0.5	0.5735	0.6427

- (3) Using Gauss's formula, obtain  $f(2.5)$ ;

$x$	0	1	2	3	4
$y = f(x)$	11.180	11.184	11.189	11.193	11.198

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