Professional Course Examination, Nov/Dec 2019

Semester : **3**

Subject Code : **III/BCA/302**

Subject : **Bachelor of Computer Applications [Course : BCA-302]**

Name of the Paper : **Mathematics—III (Numerical Analysis)**

Date of Examination : **26-11-2019**

Full Marks : 75 **Time : 3 Hours**

Serial No. 192

INSTRUCTIONS TO CANDIDATES

Please read the instructions carefully before you start writing your answers

1. Candidate should write answers to Objective Section–A (and Section–B in case of CBCS) in the space provided and should write answers to Descriptive questions (and Objective Section–B in case of Pre-CBCS) from the very next page.
2. Candidate should clearly indicate the Question Nos., while attempting the Descriptive questions (and Objective Section–B in case of Pre-CBCS).
3. Candidate will collect copy of Question Paper **(Student's Copy)** from the concerned Invigilator on Duty while submitting his/her Question-cum-Answer Booklet.
4. The Question-cum-Answer Booklet contains **32** pages. Please check all the pages before writing—whether the Booklet is complete and in good condition.
5. Please write your Roll No. and Registration No. clearly and correctly to the space provided.
6. Do not write your name or the name of your college/institution anywhere or anything else, which is not part of your answer.
7. Write legibly on both sides of the sheet. You may use some space for your rough notes or calculations in the Question-cum-Answer Booklet, if you so desire. The rough calculations or notes must be scored out before submitting the Question-cum-Answer Booklet.
8. Do not tear off any page from the Question-cum-Answer Booklet.
9. Do not write anything on the Question Paper or blotting paper or any pieces of paper while you are in the Examination Hall.
10. Use of Mobile Phone, Tablet or any other electronic devices inside the Examination Hall is strictly prohibited.

OBJECTIVE	
Total of Section–A	Marks
Section–B	
Question Nos.	Marks
Total	

DESCRIPTIVE	
Question Nos.	Marks
Total	
G. Total	

To be filled in by the Candidate

Date of Examination
26-11-2019

Semester : **3**

Subject Code
III/BCA/302

Subject
BCA [Course : BCA-302]
Mathematics—III
(Numerical Analysis)

Roll No. _____

Regn. No. _____

No. of Additional Sheet(s) :

_____

Scrutinizer's Signature *Examiner's Signature* *Invigilator's Signature*

Professional Course Examination, November/December 2019

(3rd Semester)

BACHELOR OF COMPUTER APPLICATIONS

Course : BCA–302

[Mathematics—III (Numerical Analysis)]

Full Marks : 75

Time : 3 hours

(PART : A—OBJECTIVE)

(*Marks* : 25)

The figures in the margin indicate full marks for the questions

SECTION—A

(*Marks* : 15)

Tick (✓) the correct answer in the brackets provided : 1×10=10

1. The relation between the operations E and ∇ is

(a) $\nabla = E - 1$ ( )

(b) $E = \nabla^{\frac{1}{2}} - \nabla^{\frac{-1}{2}}$ ( )

(c) $\nabla = 1 - E^{-1}$ ( )

(d) $E = \nabla - 1$ ( )

2. A numerical integration when applied to a function of a single variable is known as

(a) quadratuple ( )

(b) quadrature ( )

(c) quarterback ( )

(d) None of the above ( )

3. The order of convergence of regula-falsi method is

(a) 1·218 ( )

(b) 1·518 ( )

(c) 1·618 ( )

(d) 1·718 ( )

4. Given polynomial $x^3 - 2x^2 + x - 1$, then $\Delta^4 f(x)$ is equal to

(a) 0 ( )

(b) 12 ( )

(c) $12x$ ( )

(d) 6 ( )

5. The order of the differential equation $\left(\frac{dy}{dx}\right)^4 + 3y\frac{d^2y}{dx^2} = 0$ is

(a) 4 ( )

(b) 2 ( )

(c) 1 ( )

(d) 3 ( )

6. By using trapezoidal rule

$$\int_0^6 \frac{dx}{1+x}$$

is equal to

(a) 2·0432 ( )

(b) 2·0314 ( )

(c) 2·0414 ( )

(d) 2·0214 ( )

7. The number of subintervals required in Simpson's $\frac{3}{8}$th rule is a multiple of

(a) 6 ( )

(b) 2 ( )

(c) 3 ( )

(d) 1 ( )

8. In bisection method, the convergence is

(a) linear ( )

(b) very fast ( )

(c) quadratic ( )

(d) very slow ( )

9. $\mu + \frac{1}{2}\delta$ is equal to

(a) $\mu\delta$ ( )

(b) $E^{\frac{1}{2}}$ ( )

(c) $\nabla\Delta$ ( )

(d) $E^{-\frac{1}{2}}$ ( )

10. The process of computing the value of the function outside the given range is called

(a) extrapolation ( )

(b) interpolation ( )

(c) intervention ( )

(d) None of the above ( )

Indicate whether the following statements are *True (T)* or *False (F)* by putting a Tick (✓) mark in the brackets provided : 1×5=5

1. The degree of $\left(\frac{d^2y}{dx^2}\right)^3 + 2\left(\frac{dy}{dx}\right)^4 + 9 = \sin x$ is 3.

(T / F)

2. If $f(x)$ is a transcendental function like $a + be^x + c\sin x + d\log x$, etc., the solution is exact.

(T / F)

3. $E\nabla = \nabla = \nabla E$.

(T / F)

4. The formula for Taylor's method is

$$y = y_0 + (x - x_0)(y')_0 + \frac{(x - x')^2}{2!}(y'')_0 + \frac{(x - x')^3}{3!}(y''')_0 + \cdots\cdots$$

(T / F)

5. Gauss forward interpolation formula employs odd differences below the central line.

(T / F)

SECTION—B

(*Marks* : 10)

Answer the following questions : 2×5=10

1. Write the formula for Newton's forward interpolation formula.

2. Prove that $\Delta^3 y_2 = \nabla^3 y_5$.

3. Express $y = 2x^3 - 3x^2 + 3x - 10$ in factorial notation.

4. Verify that $y = A\cos x - B\sin x$ is a solution of the differential equation

$$\frac{d^2y}{dx^2} + y = 0$$

5. Write the formula for Lagrange's inverse interpolation formula.