Q.3 By means of Newton's divided difference formula, find the value of f(8) from the following table :

x	4	5	7	10	11	13
f(x)	48	100	294	900	1210	2028

OR

Find the cubic polynomial which takes the following values :

x	0	1	2	3
y	1	2	1	10

Q.4 Find the value of $\int_0^6 y^3 dx$ using Simpson's three eight rule, from following table :

x	0	1	2	3	4	5	6
y	0.146	0.161	0.176	0.190	0.204	0.217	0.230

OR

Use trapezoidal rule to evaluate $\int_{-1}^{1} y^2 dx$ considering five subinterval.

Q.5 Using Taylor's series method, solve y' = 1 - 2xy given that y(0) = 0.

OR

Use Runge Kutta method to solve y' = xy for x = 1.4, initially x = 1, y = 2 (take h = 0.2)

---x---

Roll No..... Total No. of Sections : 03

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Annual Examination - 2018

BCA - II

(BCA - 201)

THEORETICAL FOUNDATION OF COMPUTER SCIENCE

Paper - I

NUMERICAL ANALYSIS

Max.Marks : 50

Time : 3 Hrs. Min.Marks : 20

Note : Section 'A', containing 10 very short-answer-type questions, is compulsory. Section 'B' consists of short answer type questions and Section 'C' consists of long answer type questions. Section 'A' has to be solved first.

Section - 'A'

Answer the following very short-answer-type questions in one or two sentences : **(1×10=10)**

Q.1 Write difference between Algebraic Equation and Transcendental Equation.

Q.2 Write definition of zero of an equation.

Q.3 Write statement of Intermediate value theorem.

Q.4 Find the determinant of the matrix A =

Q.5 Write formula of Newton Raphson method.

Q.6 Write formula of Simpson's One Third rule.

Q.7 Write formula for Trapezoidal rule.

Q.8 Write Taylor's series.

Q.9 Write formula of nth approximation in Picard's method.

Q.10 Runge Kutta method is to solve which equation?

Section - 'B'

Solve the following : **(3 5=15)**

Q.1 Find the real root of the equation $x^4 - x - 9 = 0$ by Newton Raphson method, correct to three decimal places.

OR

Find the root of the equation $x^3 - x - 4 = 0$ using the bisection method.

Q.2 Determine rank of following matrix :

OR

Find the eigen values and eigen vectors of the matrix :

Q.3 Evaluate : .

OR

Given the values

x	5	7	11	13	17
F(x)	150	392	1452	2366	5202

Evaluate F(q) using Lagrange's formula.

Q.4 Find the value of $\int_1^2 \frac{dx}{x}$ by Simpson's rule.

OR

A river is 80 meter wide. The depth d (in meter) of the river at distance x from the bank is given by the following table :

x	0	10	20	30	40	50	60	70	80
d	0	4	7	9	12	15	14	8	3

Find approximately the area of cross section of the river.

Q.5 Use Picard's method to solve = 1 + xy, with $x_0 = 2$, $y_0 = 0$.

OR

Solve y' = x+y, y(0) = 1 by Taylor's series method.

Section - 'C'

Solve the following : **(5 5=25)**

Q.1 Use Newton's method to find a root of the equation $x^3 - 3x - 5 = 0$.

OR

Find the cube root of 2 approximately by Newton Raphosn method correct to five decimal places.

Q.2 Apply Gauss - Jordan method and solve the system of equations: $10x + y + z = 12$, $2x + 10y + z = 13$, $x + y + 5z = 7$.

OR

Using Cayley - Hamilton theorem, find the inverse of the matrix.