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Roll No.....

Total No. of Sections : 03

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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 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 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 $h = 0.2$)

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Annual Examination - 2018

BCA - II

(BCA - 201)

THEORETICAL FOUNDATION

OF COMPUTER SCIENCE

Paper - I

NUMERICAL ANALYSIS

Max.Marks : 50

Min.Marks : 20

Time : 3 Hrs.

$$\int_0^6 3x^2 dx$$

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.

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- 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 $y' = 1 + xy$, with $x_0 = 2, y_0 = 0$.

OR

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

Section - 'C'

2	1	1
4	7	1
2	4	2

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 Raphson 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.