

No. of Printed Pages : 05

Following Paper ID and Roll No. to be filled in your Answer Book.

**PAPER ID : 1117**Roll  
No.

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## BCA Examination 2018-19

(Even Semester)

### NUMERICAL AND STATISTICAL TECHNIQUES

*Time : Three Hours]**[Maximum Marks : 100***Note :-** Attempt all questions.1. Attempt any four parts of the following :  $5 \times 4 = 20$ 

(a) Determine the absolute error, relative error when the following numbers are rounded off up to decimal places :

(i) 94.525

(ii) 0.0015281

(iii) 1.225

(b) What are the pit falls of floating point representation?

*[ P. T. O.*

(c) If  $5/6$  is approximated as  $0.8333$ , find relative and percentage error.

(d) What is binary floating point representation? Explain with example.

(e) Round-off the following numbers up four places :

(i) 2.74356

(ii) 2.74354

(iii) 2.74359

(f) Write short notes on the following :

(i) Normalization

(ii) Rounding

(iii) Truncation

2. Attempt any two parts of the following :  $10 \times 2 = 20$

(a) Find the root of the equation  $x^3 - x - 11 = 0$  by bisection method upto two decimal places.

(b) Find the value of  $\sqrt{15}$  upto three decimal places by using Newton-Rapson method.

(c) Solve the following system of linear equations by Gauss-Seidel method :

$$8x + y + z = 8$$

$$2x + 4y + z = 4$$

$$x + 3y + 5z = 5$$

3. Attempt any two parts of the following :  $10 \times 2 = 20$

(a) By using Newton's forward interpolation formula, find the value of  $f(1.6)$  if :

<b>x</b>	1	1.4	1.8	2.2
<b>f(x)</b>	3.49	4.82	5.96	6.5

(b) If

$$f(0) = 8, f(1) = 11, f(4) = 68, f(15) = 123$$

then find the form of polynomial which satisfies the above values.

(c) By using Lagrange's interpolation formula compute  $f(0.4)$  using following table :

<b>x</b>	0.3	0.5	0.6
<b>y</b>	0.61	0.69	0.72

4. Attempt any two parts of the following :  $10 \times 2 = 20$

(a) Compute the value of

$$\frac{dy}{dx} \text{ and } \frac{d^2y}{dx^2} \text{ at } x = 0$$

from the following data :

x	0	2	4	6	8	10
y	0	12	248	1284	4080	9980

(b) Evaluate

$$\int_0^{0.4} \cos x \, dx$$

taking 8 equal intervals, by using :

- (i) Trapezoidal rule
- (ii) Simpson's 1/3 rule
- (c) Solve the following equation

$$\frac{dy}{dx} = x - y^2, y(0) = 1$$

for  $x = 0.2$  and  $0.4$ , upto two decimal places, by using Runge-Kutta fourth order method.

5. Attempt any four parts of the following :  $5 \times 4 = 20$

(a) Fit a straight line  $y = ax + b$  to the given data :

x	0	1	2	3
y	2	5	8	11

(b) What is a cubic spline method of fitting of cubic?

(c) What is the difference between curve fitting and interpolation?

(d) Establish the formula between mean, median and mode.

(e) Derive the general quadrature formula for numerical integration.

(f) Write short notes on any three of the following :

- (i) Histogram
- (ii) Method of Least squares
- (iii) Frequency curves
- (iv) Pi-chart
- (v) Dispersion

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