

PARUL UNIVERSITY
FACULTY OF IT & COMPUTER SCIENCE
BCA Winter 2018 – 19 Examination

Semester:3

Subject Code: 05191205

Subject Name: Computer Oriented Numerical & Statistical Methods

Date: 02/11/2018

Time: 10:30am to 01:00pm

Total Marks: 60

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 Answer the followings.**A. Write short notes****(05)**

1. Define truncation error
2. Define Absolute error
3. Define Mutually Exclusive events
4. Prove that $(1 + \Delta)(1 - \nabla) = 1$
5. The mean and variance of Binomial distribution are _____ and _____ respectively.

B. Multiple choice type questions/ Give the sentence true or false. (Each of 01 marks)**(10)**1. Newton's first divided difference $[x_0, x_1] =$ _____ .

- (a) $y_1 - y_0$ (b) $\frac{y_1 - y_0}{x_0 - x_1}$ (c) $\frac{y_1 - y_0}{x_1 - x_0}$ (d) $\frac{y_0 - y_1}{x_0 - x_1}$

2. The system of n linear equations in n unknowns is diagonally dominant if _____

- (a) $|a_{ii}| \geq \sum_{j \neq i} |a_{ij}|$ (b) $|a_{ii}| < \sum_{j \neq i} |a_{ij}|$ (c) $|a_{ii}| \geq 0$ (d) $\sum_{j \neq i} |a_{ij}| = 0$

3. The coefficient of variation (C.V) is

- (a) $\frac{\dagger}{\bar{x}} * 100$ (b) $\frac{\bar{x}}{\dagger} * 100$ (c) $\frac{\dagger}{\bar{x}}$ (d) none of these

4. Which of the following method is a direct method?

- (a) Gauss Seidel (b) Gauss Jacobi (c) Gauss Elimination (d) none of these

5. Which of the following is a transcendental equation?

- (a) $x^3 - 2x^2 + x + 1 = 0$ (b) $\cos x - xe^x = 0$ (c) $x^3 - 2x - 1 = 0$ (d) None of these

6. Rounding off the number 80.758 to one decimal gives 80.76. **(T/F)**7. The total area under the normal curve is 1. **(T/F)**8. The expected value $E(x - \sim) = 0$, where \sim is the mean of the random variable x .**(T/F)**9. The necessary condition to find interval in which a root of transcendental equation lies is $f(a).f(b) < 0$.**(T/F)**10. The mean and variance of Poisson distribution are nq and pq respectively. **(T/F)****Q.2 Answer the following**1. If the Median and Mode of 10 observations are respectively 44.4 and 45.5. Find the Mean. **(02)**2. A and B are two independent events and $P(A) = \frac{1}{2}$, $P(B) = \frac{1}{5}$, find $P(A \cup B)$. **(02)**3. Write the normal equations for the exponential function $y = ae^{bx}$ **(02)**

4. Find the mode of the following data:

Class	0-10	10-20	20-30	30-40	40-50	50-60
f(x)	5	9	11	13	10	7

(03)

5. Solve the following system of equations by using Gauss Jacobi method up to 2 iterations:

$$5x - 2y + 3z = -1; \quad -3x + 9y + z = 2; \quad 2x - y - 7z = 3$$

(03)6. For a Poisson Variate $3P(x = 2) = P(x = 4)$. Find mean and variance.**(03)****(15)**

Q.3 Answer the following (Any three)

1. Find the roots of the equation $x^3 - 4x - 9 = 0$ using Bisection method up to 4th iteration.

2. Solve the following system of equations by Gauss Elimination method:

$$2x - y + 3z = 8 ; -x + 2y + z = 4 ; 3x + y - 4z = 0$$

3. From the following table, find $f(3)$ using Newton's Divided difference formula:

x	1	2	7	8
f(x)	1	5	5	4

4. The probability distribution of a random variable

Random variable, x	0	1	2	3	4
Probability	1/10	p	3/10	p	1/10

(i) Find the value of p

(ii) Find $E(x + 1)$

Q.4 Answer the following.

A. Using Newton's Forward interpolation formula, find the value of y for $x=0.5$ for the following data:

X	0	1	2	3
y	1	2	1	10

(05)

B. (i) Determine $f(10)$ by Lagrange Interpolation from the following data:

x	5	6	9	11
F(x)	12	13	14	16

(ii) If y is the pull required to lift a load x by means of a pulley block, find a linear law of the form $y=mx + c$

(10)

y	12	15	21	25
x	50	73	100	120

OR

B. (i) Solve the following system of equations by using Gauss- Seidel method correct up to 3 decimal places:

$$12x + 3y - 5z = 1; x + 5y + 3z = 28; 3x + 7y + 13z = 76$$

(ii) The probability that a bomb dropped from a plane will hit a target is $2/5$. Two bombs are enough to destroy a bridge. If 4 bombs are dropped on a bridge, find the probabilities that

(10)

(i) The bridge will be destroyed

(ii) The bridge will be partially destroyed

(iii) The bridge will be saved