

PARUL UNIVERSITY
FACULTY OF IT & COMPUTER SCIENCE
MCA, Summer 2018 – 19 Examination

Semester: 2

Subject Code: 05291151

Subject Name: Computer Oriented Numerical and Statistical Methods

Date: 24/04/2019

Time: 2:00pm to 4:30pm

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. Do as directed****(05)**

1. Define Relative error
2. State relation between mean, median and mode.
3. Round off the number 223.56389 to 3 decimal places
4. Write a probability mass function of Binomial distribution.
5. Define Probability

B. Multiple choice type questions/ Give the sentence true or false**(10)**

1. In Newton's forward interpolation formula value of $p =$ _____.

a) $\frac{x-x_0}{h}$ b) $\frac{x_0-x}{h}$ c) $\frac{x_n-x}{h}$ d) None of these

2. How many significant digits are there in 2.10500?

a) 2 b) 3 c) 4 d) 6

3. Which of the following method is direct method?

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

4. Which one is the correct formula of Newton Raphson Method

a) $x_1 = x_0 - \frac{f(x_0)}{f'(x_0)}$ b) $x_1 = \frac{f(x_0)}{f'(x_0)} - x_0$ c) $x_1 = x_0 - \frac{f'(x_0)}{f(x_0)}$ d) none of these

5. The probability of impossible event is

a) 1 b) 0 c) 0.5 d) none of these

6. If A and B are mutually exclusive events, then $P(A \cap B) = 0$. True/False

7. The coefficient of correlation r takes values from 0 to 1. True/False

8. If A and B are independent events, then $P(A \cap B) = P(A) + P(B)$. True/False

9. Bisection method converges faster than Newton Raphson method. True/False

10. In Simpson's $1/3^{\text{rd}}$ rule, the interval should be even. True/False

Q.2 Answer the followings (3 mark each)**(15)**

1. Find the mean, median and mode for the data 2,3,6,5,3,4,3,2,2,4
2. A river is 80 meters wide. The depth 'd' in meters at a distance x meters from one bank is given by the following table calculate the area of cross-section of the river using Trapezoidal rule.

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

3. If Y is the pull required to lift a load X by means of a pulley block, find a linear law of the form $Y=a+bX$ connecting Y and X using the following data:

X	12	15	21	25
Y	50	70	100	120

4. The mean and variance of a Binomial distribution are 15 and 6 respectively. Find the values of n and p .
5. Probability distribution of a random variable is given:

X	0	1	2	3	4
P(x)	1/16	p	3/8	p	1/16

Find the value of p and $E(x)$.

Q.3 Answer the following. (Any three) (15)

- Use bisection method to find a root of $x^3 + 4x - 9 = 0$ up to 2 decimal places.
- Solve by Gauss Seidel method up to 3 decimal places
 $10x + y + z = 6, x + 10y + z = 6, x + y + 10z = 6$

3. Estimate the number of students who obtained 45 marks in the test using Newton's forward interpolation

Marks	40	50	60	70	80
No. of students	31	73	124	159	190

4. Use Lagrange's method to find the value of y when $x=3$ for the following information:

X	0	2	5	8
Y	0	6	30	72

Q.4 Answer the following

- A. A stenographer claims that he can write at an average speed of 120 words per minute. In 100 trials he obtained an average speed of 116 words per minute with a standard deviation of 15 words. Is the claim justified? Use 5% level of significance for two tailed test. (05)
[table value :1.645]
- B. i. Using Runge-Kutta 2nd order Method, solve: $\frac{dy}{dx} = x + y$ with $y(0) = 1$. Taking $h=0.1$, compute $y(0.2)$ (05)
- ii. The number of road accidents on a high way during a week is given below. Can it be concluded that the proportion of accidents are equal for all days. (05)

Day	Mon	Tue	Wed	Thu	Fri	Sat	Sun
No. of accidents	14	16	8	12	11	9	14

[Table value: 12.59]

OR

- B. 1. Find the mean and variance for a Poisson variate $3P(x = 2) = P(x = 4)$. (05)
2. Solve the following system of linear equations by Gauss Elimination method with partial pivoting.

$$x + y + z = 9$$

$$2x - 3y + 4z = 13$$

$$3x + 4y + 5z = 40$$

(05)