**2021/TDC/CBCS/ODD/
BCADSE-501T/023**

TDC (CBCS) Odd Semester Exam., 2021
held in March, 2022

COMPUTER APPLICATION

(5th Semester)

Course No. : BCADSE–501T

(Numerical and Statistical Methods)

Full Marks : 50

Pass Marks : 20

Time : 3 hours

*The figures in the margin indicate full marks
for the questions*

SECTION—A

Answer any *fifteen* of the following as directed :

$1 \times 15 = 15$

1. What do you mean by percentage error?

2. What is round-off error?

3. What is convergence criteria for iterative method?

(Turn Over)

(2)

4. Write the fundamental formula of bisection method.

5. When to use Newton's and Lagrange's interpolation formula?

6. What is interpolation?

7. What is the necessity of pivoting?

8. Back substitution is used in Gauss elimination/Gauss-Jordan method.

(Choose the correct answer)

9. Write down the Simpson's $\frac{3}{8}$th rule for integration.

10. The predictor-corrector method is a combination of _____.

(Fill in the blank)

11. What is the order of Euler's method?

12. Simpson's $\frac{3}{8}$th rule gives more accurate results than Simpson's $\frac{1}{3}$rd rule.

(Write True or False)

13. What do you mean by variance?

(3)

14. What is recurrence relation?

15. Define Poisson distribution.

16. How does normal distribution differ from binomial distribution?

17. What is linear correlation?

18. How does Poisson distribution differ from binomial distribution?

19. What does a correlation value of 0·8 represent?

20. How do you interpret a linear regression?

SECTION—B

Answer any *five* of the following questions : 2×5=10

21. Derive Newton-Raphson formula using Taylor's series.

22. The approximate value of the number $\frac{1}{3}$ is given as 0·34. Find the absolute and relative errors.

23. Write the steps in Gauss elimination method.

24. Write down the formula for Lagrange's interpolation with five values of x and $f(x)$.

25. Derive trapezoidal rule.

26. Find $y(0.01)$ and $y(0.02)$ for the differential equation $y' = -y$ with the condition $y(0) = 1$ and $h = 0.01$.

27. Write down the importance of moment generating functions.

28. Describe mathematical expectation in brief.

29. Write the properties of correlation coefficient.

30. Differentiate between correlation and regression.

SECTION—C

Answer any *five* of the following questions : 5×5=25

31. Find a real root of the equation

$$f(x) = x^3 - x - 1 = 0$$

using bisection method.

32. Find a real root of the equation

$$f(x) = x^3 - 2x - 5 = 0$$

using regula-falsi method.

33. Use Gauss elimination method to solve the system

$$2x + y + z = 10$$
$$3x + 2y + 3z = 18$$
$$x + 4y + 9z = 16$$

34. Find the value of $f(5)$ from the following table :

x	2	4	6	8	10
$f(x)$	5	18	39	66	102

35. Given $\dfrac{dy}{dx} = y - x$, where $y(0) = 2$. Find $y(0.2)$ and $y(0.4)$ using Runge-Kutta second-order method.

36. Evaluate

$$\int_0^1 \frac{1}{1 + x^2} dx$$

using trapezoidal rule and Simpson's $\frac{3}{8}$th rule.

37. Find $E(X)$ and $E(X^2)$ for the number X shown on the face when a dice is thrown.

38. Prove that $E(X + Y) = E(X) + E(Y)$ and $E(X \cdot Y) = E(X) \cdot E(Y)$.

39. The correlation coefficient r between two variables X and Y is 0·4. Their covariance is 7·89. The variance of X is 10. Find the standard deviation of Y-series.

40. Find the coefficient of correlation between the following values :

x	21	22	23	24	25
y	3·2	3·3	3·4	3·5	3·6

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