(Please write your Exam Roll No.) *Exam Roll No. .....*

END TERM EXAMINATION

SECOND SEMESTER [BCA] MAY-JUNE 2026

Paper Code: BCA-102 ***Subject: Applied Mathematics***

Time: 3 Hours ***Maximum Marks: 60***

Note: Attempt all questions as directed. Internal choice is indicated.

Q.1 Attempt **any four** of the following questions. **(4x5=20)**

a) What do you understand by Binomial Distribution, explain briefly?

b) Construct the divided difference table form the given values of x and y given below:

X	1	2	3	5
Y	2	8	27	64

c) What is the difference between PMF and PDF?

d) If $P(A)=\frac{1}{2}$, $P(B)=\frac{1}{3}$, and $P(A\cap B)=\frac{1}{4}$, find:

a) P(A|B)

b) P(B|A)

e) What is conditional probability? Explain with a suitable example.

f) Determine the expectation of the random variable X having the following probability distribution.

X	1	2	3	4
Y	0.15	010	0.55	0.20

g) What is interpolation? Explain its importance.
Write Lagrange's interpolation formula for n data points.

h) Define Simpson's 1/3 rule for Integration also write its formula? Also define numerical Differentiation.

Q.2 **(10)**

a) A factory has three machines A, B, and C producing 20%, 30%, and 50% of the total output respectively. The percentages of defective items produced are 5%, 4%, and 2% respectively. If a randomly selected item is defective, find the probability that it was produced by:

a) Machine A

b) Machine B

c) Machine C

b) The following table represents a probability distribution as follows:

X	0	1	2	3	4
P(X)	K^2	K^2+2k	$2K^2+k$	$13K^2-2k$	$8K^2-k$

Find the value of K and list the distribution.

OR

Q.3 **(10)**

a) Explain binomial distribution with conditions.
A cricket player hits a boundary with probability 0.3. In 7 balls, find:

a) Probability of exactly 3 boundaries

b) Probability of at most 2 boundaries

b) What is the difference between a binomial distribution and Poisson distribution?

P.T.O.

Q.4

a) Define Newton Raphson Method. Determine the real root of $2x - 3\sin x = 0$ by Newton Raphson method. **(10)**

b) What is the difference between forward and backward difference operator? When to use forward and backward interpolation?

OR

Q.5

a) Find the polynomial by using Lagrange's formula and hence find f (3) for **(10)**

x	0	1	2	3
f(X)	2	3	12	147

b) Find the approximate value of the root of the equation $3x - \sqrt{1+\sin x} = 0$ up to 6th iteration.

Q.6 **(10)**

Solve the following system of equations using Gauss elimination method.

$2x + y + 4z = 12$

$8x - 3y + 2z = 23$

$4x + 11y - z = 33$

OR

Q.7 From the following data. Find f"(10) **(10)**

x	3	5	11	27	34
f(X)	-13	-23	899	17315	35606

Q.8 Solve the following LPP by simplex method: **(10)**

Maximize $Z = 3x+5y + 4z$

Subject to constraints:

$2x+3y \leq 8$

$2y +5z \leq 10$

$3x + 2y + 4z \leq 15$

$x, y, z \geq 0$

OR

Q.9 Solve the following assignment problem and also determine the minimal cost of assignment **(10)**

	Jobs			
	J_1	J_2 J_3	J_4	J_5
Persons				
P_1	12	5 5	4	10
P_2	11	910	4	9
P_3	9	7 8	4	6
P_4	11	1211	8	12
P_5	5	710	4	6

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