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

END TERM EXAMINATION

SECOND SEMESTER [BCA] JUNE 2024

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

(BATCH 2021 ONWARDS)

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

Note: Attempt five questions in all including Q.No.1 which is compulsory. Select one question from each unit.

Q1 Attempt ***any four*** of the following: **(4x5=20)**

a) If A and B are two events such that P(A)= $\frac{7}{13}$, P(B)= $\frac{9}{13}$ and P(A∩B) =$\frac{4}{13}$. Find P(A/B).

b) In an MBA exam, the probability of E passing is $\frac{1}{2}$, the probability of F passing is $\frac{1}{3}$, and the probability of neither E or F passing is $\frac{1}{4}$.

c) Find the probability of E and F passing the exam.

d) Evaluate $\sqrt{29}$ by Newton – Raphson method.

e) A random variable X has the following distribution.

X	0	1	2	3	4	5	6	7	8
P(X)	A	3a	5a	7a	9a	11a	13a	15a	17a

i) Determine the value of a. ii) Find P(2≤X≤4)

f) A person requires 10, 12 and 12 units chemicals A, B, and C respectively for his garden. A liquid product contains 5, 2 and 1 units of A, B, and C respectively per jar. A dry product contains 1,2 and 4 units of A, B, C per cartoon. If the liquid product sells whose cost price is Rs. 3 per jar and the dry product cost for Rs. 2 per cartoon, how many of each should be purchased, in order to minimize the cost and meet the requirements? Formulate the LPP

g) If the probability of a defective bolt is 0.2. Find the mean and standard deviation.

UNIT-I

Q2 a) If X follows a binomial distribution with parameter n= 8 and p= $\frac{1}{2}$ then, find P (|X-4|≤ 2) **(5)**

b) Five cards are drawn successfully with replacement from a well-shuffled deck of 52 cards, what is the probability that i) All five cards are spades? ii) Only three cards are spades **(5)**

Q3 a) In a sample of 1000 items, the mean weight is 45 kg with a standard deviation of 15 kg. Assuming the distribution to be normal, find the number of items weighting between 40 and 60 kgs. **(5)**

b) A die is thrown of random. What is the expectation of the number on it. Also find E(X^2). **(5)**

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UNIT-II

Q4 a) Obtain the missing values in the following table. **(5)**

X:	0	0.1	0.2	0.3	0.4	0.5	0.6
F(x):	0.135	----	0.111	0.100	----	0.082	0.074

b) Find a real root of the equation $x^3 - 9x + 1 = 0$ by bisection method for the value between x= 2 and x= 4 upto 8 iterations **(5)**

Q5 a) Estimate by Newton's method of interpolation, the expectation of life at 32 from the following data **(5)**

Age (years)	10	15	20	25	30	35
Expectation of life (years)	35.3	32.4	29.2	26.1	23.2	20.5

b) Find the root equation $x^3 - x - 1 = 0$ by Regula- Falsi method correctly upto 3 decimal place and upto fifth iteration. **(5)**

UNIT-III

Q6 a) By Gausss – elimination method, solve
$5x-y-2z= 142$; $x- 3y- z= -30$; $2x - y-3z = 5$ **(5)**

b) A curve passing through the following points.(Simpson's rule) **(5)**

x	0	1	2	3	4	5	6
y	0.146	0.161	0.176	0.190	0.204	0.217	0.230

Find the area of the curve between x = 0 to x = 6

Q7 a) Solve using the LU decomposition method
$x + 2y + 3z= 14$; $2x + 5y + 2z = 18$; $3x + y + 5z = 20$ **(5)**

b) Solve the following set of equations by Gauss-Jacobi method
$27x + 6y - y = 85$; $6x + 15y + 2z = 72$; $x + y + 54z = 110$ **(5)**

UNIT-IV

Q8 a) Solve the following LPP by using Simplex method
Maximize $Z = 3x_1 + 5x_2 + 4x_3$
Subject to the constraints
$2x + 3x_2 \leq 8$; $2x + 5x_2 \leq 10$; $3x + 2x_2 + 4x_3 \leq 15$ $x_1, x_2, x_3 \geq 0$ **(7)**

b) Write the steps used in solving an LPP by Graphical method. **(3)**

Q9 a) Solve the following assignment problem and also determine the minimal cost of assignment. **(7)**

Jobs

Persons	J_1	J_2	J_3	J_4	J5
P_1	12	5	5	4	10
P_2	11	9	10	4	9
P_3	9	7	8	4	6
P_4	11	12	11	8	12
P_5	5	7	10	4	6

b) Define any three methods for finding the initial feasible solution for the transportation problem. **(3)**

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