

II Semester B.C.A. Examination, June 2009  
(Y2K7 Scheme)  
COMPUTER SCIENCE  
BCA 203 : Numerical and Statistical Methods

Time : 3 Hours

Max. Marks : 80

*Instruction : Answer all the Sections.*

SECTION - A

Answer any eight.

(8×3=24)

1. Solve  $f(x) = e^x - 3x = 0$  using iteration method. Perform two iterations.
2. Explain shift operator.
3. Write Lagrange's interpolation formula for n variables.
4. Write the normal equations for the curve of the form  $y = ab^x$ .
5. What is partial pivoting ? Write the steps in partial pivoting.
6. If the mean and SD of a set of values are 12 and 3 respectively. Find the coefficient of variation.
7. The mean age of the first group of 80 boys is 10 years and that of second group of 20 girls is 15 years. Find the combined mean of boys and girls.
8. Prove that  $P(\bar{A})=1-P(A)$ .
9. Define mathematical expectation of discrete and continuous random variable.
10. If x is a exponential variate with mean 4. Find  $P(0 < X < 1)$ .

## SECTION - B

Answer any four.

(4×14=56)

11. a) Find the root of the equation  $\cos x = 3x - 1$  between 0 and 1 using regula falsi method. Perform 4 iterations.

b) Evaluate  $\int_4^{5.2} \log_e x \, dx$  by using Simpson's  $\frac{3}{8}$ th rule with  $h = 0.2$ .

12. a) Solve the following equations using Gauss elimination method.

$$x + y + z = 7$$

$$2x + 3y + 2z = 17$$

$$4x + 9y + z = 37$$

b) Use power method to find the largest eigen value of the matrix  $A = \begin{bmatrix} 4 & 2 \\ 1 & 3 \end{bmatrix}$ .

13. a) Find a polynomial using Lagrange's interpolation formula and hence find  $f(5)$ .

x	0	2	3	6
f(x)	648	704	729	792

b) Fit a curve of the form  $y = ae^{bx}$  to the following data.

X	1	2	3	4	5	6
Y	1.6	4.5	13.8	40.2	125	300

14. a) Compute SD for the following data.

Class	5-15	15-25	25-35	35-45	45-55
Frequency	8	12	15	9	6

- b) Find the rank correlation coefficients for a group of 6 persons between their examination marks and IQ's.

<b>Exam marks</b>	70	60	80	90	10	20
<b>IQ</b>	110	100	140	120	80	90

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15. a) State and prove Baye's theorem.

- b) There are two book shelves in a room. The first shelf has 8 Hindi books and 4 Kannada books. The second shelf has 10 Hindi and 15 Kannada books. One of the two shelves is selected at random. Two books are then selected at random from the selected shelf. Find the probability that,

- i) Both the selected books are Kannada books.  
 ii) One of them is a Kannada book and the other is a Hindi book.

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16. a) Find k, mean and variance for the following distribution.

<b>x</b>	-3	-2	-1	0	1	2	3
<b>P(x)</b>	K	2K	3K	4K	3K	2K	K

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- b) Derive mean and SD of Binomial distribution.

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