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**II Semester B.C.A. Degree Examination, April/May 2015**  
**(CBCS) (2014 – 15 and Onwards)**  
**Computer Science**  
**BCA 205 : NUMERICAL AND STATISTICAL METHODS**

Time : 3 Hours

Max. Marks : 100

**Instruction :** Answer **all** Sections.

SECTION – A

I. Answer **any ten** of the following.

(2×10=20 Marks)

- 1) Multiply  $+5543E12 \times 4111E-15$ .
- 2) Define :
  - i) Truncation error
  - ii) Round off error.
- 3) Write the formula for Newton-Raphson method.
- 4) Construct the difference table for the following data.

x	0	1	2	3	4
f (x)	1	3	7	13	21

- 5) Write Newton's Backward interpolation formula.
- 6) Explain Doolittle method of solving linear equations of the form  $AX = B$ .
- 7) Find the positive root of the equation  $x^3 - 3x - 5 = 0$  which lies between 2 and 2.5 by bisection method (use one approximation).
- 8) From the following data compute the value of harmonic mean.  
85, 70, 10, 75, 500, 8, 42, 250, 40, 36.
- 9) Define correlation.
- 10) Write a formula to calculate Arithmetic mean by step deviation method.

P.T.O.



- 11) State Bayes theorem.
- 12) From a pack of 52 cards, what is the probability of drawing one card that it is either king or queen

## SECTION – B

II. Answer **any six** of the following.

**(6×5=30 Marks)**

- 13) Find a real root of the equation  $f(x) = x^3 - 5x + 1 = 0$  lies in the interval (0, 1) perform four iterations of the secant method.

- 14) Estimate the population during the period 1955 from the following data.

Year	1921	1931	1941	1951	1961	1971
Pop. in lakhs	20	24	29	36	46	51

- 15) Using Lagrange's interpolation formula find the value of  $f(x)$  at  $x = 6$  from the data.

x	3	7	9	10
f(x)	168	120	72	63

- 16) Evaluate  $\int_0^6 \frac{dx}{1+x^2}$  by Trapezoidal rule by taking  $n = 1$ .

- 17) By using Simpson's  $\frac{3}{8}$  rule evaluate  $\int_0^3 \frac{dx}{(1+x)^2}$  by taking  $n = 1$ .

- 18) Solve by Gauss-Seidel method.

$$10x + y + z = 12, \quad x + 10y + z = 12, \quad x + y + 10z = 12$$

- 19) Solve using Crout's LU decomposition method.

$$x_1 + x_2 + x_3 = 1$$

$$4x_1 + 3x_2 - x_3 = 6$$

$$3x_1 + 5x_2 + 3x_3 = 4$$

- 20) Determine the single-precision machine representation of the decimal number 52.234375 in both single precision and double precision.



SECTION – C

III. Answer **any six** of the following.

(6×5=30 Marks)

21) Solve by Gauss-elimination method.

$$x + 2y + 3z = 6, 2x + 4y + z = 7, 3x + 2y + 9z = 14$$

22) Find the dominant eigen value of the matrix  $A = \begin{bmatrix} 4 & 2 \\ 1 & 3 \end{bmatrix}$ .

23) Solve the system of equations by Gauss-Jacobi method.

$$10x + y + z = 12, 2x + 10y + z = 13, 2x + 2y + 10z = 14$$

24) Use Taylors series method to find  $y(1.02)$  when  $\frac{dy}{dx} = xy - 1$  for  $y(1) = 2$ .

25) Solve  $\frac{dy}{dx} = 2x - y$  with  $y(0) = 3$  by Picard's iterative method upto third approximation.

26) Solve  $\frac{dy}{dx} = xy$ ,  $y(1) = 2$  by Runge-Kutta IV order method by taking  $n = 0.2$ .

27) Calculate HM from the following data

85, 70, 10, 75, 500, 8, 42, 250, 40, 36

28) A bag X contains 2 white, 3 red balls and a bag Y contains 4 white and 5 red balls. One ball is drawn at random from one of the bags and is found to be red. Find the probability that it was drawn from bag Y.

SECTION – D

IV. Answer **any four** from the following.

(4×5=20 Marks)

29) From the following data calculate Arithmetic mean

Marks	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60
No. of Students	10	5	30	25	10	20



- 30) Compute the standard deviation from the following data.

<b>Salaries in thousands</b>	45	50	55	60	65	70	75	80
<b>Number of Persons</b>	3	5	8	7	9	7	4	7

- 31) Calculate Karl Pearson's coefficient of skewness for the following data.

25, 15, 23, 40, 27, 25, 23, 25, 20

- 32) A die is thrown twice and the sum of the numbers appearing is observed to be 6. What is the conditional probability that the number 4 has appeared at least once ?

- 33) If A and B are two events then prove that  $P(A/\bar{B}) = \frac{P(A) - P(A \cap B)}{1 - P(B)}$

where  $P(B) \neq 1$ .

- 34) Fit a normal distribution to the following data.

<b>xi</b>	5	7	9	11	13	15	17	19	21	23	25
<b>fi</b>	2	8	16	23	36	44	39	21	14	16	2

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