(Please write your Exam Roll No.)   Exam Roll No. 006149208

END TERM EXAMINATION

FOURTH SEMESTER [BCA] MAY-2010

Paper Code: BCA 202   **Subject: Mathematics-IV**
Paper ID: 20202
Time : 3 Hours
                                                 Maximum Marks : 75

Note: Question 1 is compulsory. Attempt one question from each unit.

Q1. (a) Define: Circular permutations. A round table conference is to be held between 20 delegates of 20 countries. In how many ways they be seated if two particular delegates are always to sit together.

(b) If three coins are tossed, represent the sample space and the event of getting (i) two head and one tail (ii) at least two tails and the number of sample points in them.

(c) Prove that: $nc_r + nc_{r-1} = n+1c_r$

(d) A die is thrown at random. What is the expectation of the number on it? Also find $E(x^2)$.

(e) Define: Moment generating function about an arbitrary point 'a'. What will be its value when a =0?

(f) Define: Correlation, Linear correlation and non-linear correlation.

(g) Evaluate by Newton- Raphson method.

$$x = \left(\frac{1}{3}\right)^{1/4}$$

(h) Fit a curve of the type $y = ab^x$ to the data.

x	2	3	4	5	6
y	144	172.8	207.4	248.8	298.5

(i) Define: Numerical Integration.

(j) Find the inverse of the matrix by Gauss- Elimination method.

$$\begin{bmatrix} 2 & 2 & 1 \\ 1 & 0 & 2 \\ 2 & 1 & 2 \end{bmatrix}$$ **(2.5x10=25)**

Unit-I

Q2. (a) Define: Conditional probability.   **(2.5)**

(b) A problem in Discrete Mathematics is given to three students whose chances of solving it are $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$ respectively. What is the probability that only one of them solves it correctly?   **(5)**

(c) Using Binomial theorem, find the value of $\sqrt[3]{128}$ to four decimal places. **(5)**

Q3. (a) State Baye's theorem.   **(2.5)**

(b) Find the probability that in random arrangement of the letters of the word "FORTUNATES", two 'T' come together.   **(5)**

(c) Prove that the co-efficient of x^n in the expansion of $(1-4x)^{1/2}$ is $\frac{(2n)!}{(n!)^2}$. **(5)**

Unit-II

Q4. A typist kept a record of mistakes made per day during 300 working days of a year.

Mistakes per day	0	1	2	3	4	5	6
No. of days	143	90	42	12	9	3	1

Fit an appropriate poisson distribution to the data. Given $e^{-0.89}$ =0.410656.**(12.5)**

P.T.O.

P_1

Q5. (a) Define: Spearman's rank correlation and write the formula. (2.5)

(b) From the following data obtain the two regression equations. (10)

X	6	2	10	4	8
Y	9	11	5	8	7

Unit –III

Q6. (a) Define: Backward Difference Operator. Write formulae for $\nabla^2 f(n)$ and $\nabla^n f(n)$. (5)

(b) Find a real root of the equation $xe^x - 1 = 0$ using False position method (upto 3 iterations). (7.5)

Q7. (a) Prove that $1 + \mu^2 \delta^2 = \left(1 + \dfrac{\delta^2}{2}\right)^2$. (5)

(b) Determine the real root of $2x - 3\sin x = 0$ by Newton Raphson method. (7.5)

Unit-IV

Q8. (a) Solve the equations by Gauss- Jacobi method:- (6.5)

$$x_1 + 2x_2 + x_3 = 8$$
$$2x_1 + 3x_2 + 4x_3 = 20$$
$$4x_1 + x_2 + 2x_3 = 16$$

(b) Evaluate $\int_0^6 \dfrac{1}{1+x^2}$ by using Trapezoidal rule. (6)

Q9. (a) Find the double root of the equation $x^3 - x^2 - x + 1 = 0$. (6.5)

(b) A curve passes through the following points. (6)

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.

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