END TERM EXAMINATION

FOURTH SEMESTER [BCA] MAY-JUNE 2016

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

Note: Attempt any five questions including Q no.1 which is compulsory.
Select one question from each unit.

Q1 (a) A number is selected at random form the first 1000 natural numbers. What is the probability that the number so selected would be a multiple of 7 or 11?   **(2.5)**

(b) Find the value of r if $^{18}C_r = {}^{18}C_{r+2}$ **(2.5)**

(c) If a, b, c, d are the arguments of $f(x) = \frac{1}{x}$, show that $f(a,b,c,d) = -\frac{1}{abcd}$.   **(2.5)**

(d) If $f(x) = kx(x-1), 0 < x < 1$ and 0 elsewhere, is a density function, then find the value of k.   **(2.5)**

(e) Three persons A, B and C are to speak at a function along with five other. If they all speak in random order, find the probability that A speaks before B and B speaks before C.   **(2.5)**

(f) Find the moment generating function of a random variable that is exponentially distributed.   **(2.5)**

(g) Determine f(x) whose first difference is $9x^2 + 11x + 5$.   **(2.5)**

(h) Evaluate $\Delta^n [e^x]$.   **(2.5)**

(i) If X is a binomial variate with p=1/5, for the experiment of 50 trails, then find the standard deviation of the distribution.   **(2.5)**

(j) Find $\Delta^2 \left[\frac{1}{x(x+3)(x+6)} \right]$ **(2.5)**

UNIT-I

Q2 (a) Box A contains 4 red, 2 white and 6 black balls and box B contains 3 red and 5 white balls. A fair die is tossed. If 1 or 6 appears, a ball is chosen from A, otherwise a ball is chosen from B. If a red ball is chosen, what is the chance that a 6 appeared on the die?   **(6.5)**

(b) Find the binomial expansion of $(a+b)^9$ **(6)**

Q3 (a) Four different objects 1,2,3,4 are distributed at random on four places marked 1,2,3,4. What is the probability that none of the object occupies the place corresponding to its number?   **(6.5)**

(b) An integer is chosen at random from the first two hundred integers. What is the probability that the integer chosen is divisible by 6 or 8?   **(6)**

UNIT-II

Q4 (a) X is a continuous random variable with probability density function given by

$f(x) = \begin{cases} x^3, & 0 \le x \le 1 \\ (2-x)^3, & 1 \le x \le 2 \end{cases}$ Find the mean and standard deviation of X. **(6.5)**

(b) An urn contains balls numbered 1, 2, 3. First a ball is drawn from the urn and then a fair coin is tossed the number of times as the number shown on the drawn ball. Find the expected number of heads. https://www.ggsipuonline.com   **(6)**

Q5 (a) Mean of Binomial distribution is 4 and its third moment about mean is 1.92. Find other constants of the distribution.   **(6)**

(b) If X is normally distributed with mean 3 and variance 4, find k so that $P[|X-3| > k] = 0.05$.   **(6.5)**

P.T.O.

UNIT-III

Q6 (a) In the following table one value of y is incorrect and that y is a cubic polynomial in x. Construct a difference table for y and use it to locate and correct the wrong value. (6.5)

x	0	1	2	3	4	5	6	7
y	25	21	18	18	27	45	76	123

(b) The following are data form the steam table: (6)

tempC°(t)	140	150	160	170	180
Pressure kgf/cm^2(P)	3.685	4.854	6.302	8.076	10.22

Using Newton's formula, find the pressure of steam for temperature 142°

Q7 (a) Evaluate the square root of 5 using the equation $x^2 - 5 = 0$ by applying Newton-Raphson Method. (6.5)

(b) Find the real root of $xe^x = 3$ by Regular falsi method correct to three decimal places. (6)

UNIT-IV

Q8 (a) Solve by Gauss-Seidel method the following system of equations: (6.5)

$$28x + 4y - z = 32;$$
$$x + 3y + 10z = 24;$$
$$2x + 17y + 4z = 35$$

(b) Find area bounded by the curve, x-axis and lines x=1, x=4 using Simpson's 3/8 rule, which passes through the following points: (6)

x	1	1.5	2	2.5	3	3.5	4
y	2	2.4	2.7	2.8	3	2.6	2.1

Q9 (a) Evaluate $\int_0^6 \dfrac{dx}{1+x^2}$ using Trapezoidal rule by taking h = 1. (6)

(b) Determine f(x) as a polynomial in x for the following data: (6.5)

x	-4	-1	0	2	5
y	1245	33	5	9	1335

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