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 $f(x) = \dfrac{1}{x}$, show that $f(a,b,c,d) = -\dfrac{1}{abcd}$. (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 $\Delta^2 \left[\dfrac{1}{x(x+3)(x+6)} \right]$ (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. (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)

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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/cm²(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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