END TERM EXAMINATION

FOURTH SEMESTER [BCA] MAY 2017

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. Use of scientific calculator is allowed.

Q1 (a) Show that $E^r = \left(\mu + \dfrac{\delta}{2}\right)^{2r}$ **(2.5)**

(b) Estimate the missing term in the following table **(2.5)**

x	0	1	2	3	4
f(x)	1	3	9	-	81

(c) A random variable x has the following probability function **(2.5)**

x	-2	-1	0	1	2	3
f(x)	0.1	k	0.2	2k	0.3	k

find the value of k.

(d) If a random variable has a Poisson distribution such that P(1) = P(2), find the mean of the distribution. **(2.5)**

(e) For a normally distributed variable with mean 1 and S.D 3, find the probability that $3.43 \le x \le 6.19$ **(2.5)**

(f) If X and Y are independent binomial variables such that X~b(5, 1/2), Y~b(7, 1/2). Find P [X+Y=3]. **(2.5)**

(g) Find the Lagrange interpolating polynomial that fit the following data values. **(2.5)**

x	-1	2	3	4
f(x)	-1	11	31	69

Also interpolate at x=1.5

(h) Events A and B are such that **(2.5)**

$P[A \cup B] = \dfrac{3}{4}$, $P[A \cap B] = \dfrac{1}{4}$, and $P[\bar{A}] = \dfrac{2}{3}$ Find P[B] and $P[A \cap \bar{B}]$.

(i) The expected value of a random variable x is 2 and its variance is 1. Find the variance of 3x+4. **(2.5)**

(j) If two regression coefficients are 0.8 and 0.2. What would be the value of coefficient of correlation? **(2.5)**

UNIT-I

Q2 (a) A bag contains 40 tickets numbered 1,2,3,..,40 of which four are drawn at random and arranged in ascending order $(t_1 < t_2 < t_3 < t_4)$ Find the probability of t₃ being 25. **(6.5)**

(b) The probability that Nirmal will solve a problem is 2/3 and the probability that Satyajit will solve it is ¾. What is the probability that (i) the problem will be solved (b) neither can solve it. **(6)**

Q3 (a) The content of three urns are: 1 white, 2 red, 3 green balls; 2 white, 1 red, 1 green balls and 4 white, 5 red, 3 green balls. Two balls are drawn from an urn chosen at random. These are found to be one white and one green. Find the probability that the balls so drawn come from the third urn. **(6.5)**

(b) For what value of n is $3.^{n+1}c_3 = 7.^{n}c_2$? **(6)**

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UNIT-II

Q4 (a) If the moment generating function of normal distribution is $M_x(t) = e^{2t+32t^2}$. Find $P[-2 \le X \le 6]$. **(6.5)**

(b) Calculate the coefficient of rank correlation from the following- **(6)**

x	4	20	6	13	9	13	6	19	25	15
y	16	65	9	48	24	33	16	57	40	16

Q5 (a) Find E[X], $E[X^2]$ and variance for the following distribution. **(6.5)**

X	8	12	16	20	24
P(x)	1/8	1/6	3/8	1/4	1/12

(b) From the given data obtain the two regression equations using the method of least square. **(6)**

x	4	20	6	13	9	13	6	19	25	15
y	16	65	9	48	24	33	16	57	40	16

UNIT-III

Q6 (a) Express $f(x) = 2x^3 - 3x^2 + 3x - 10$ in factorial form and hence evaluate $\Delta^3 f(x)$. **(6.5)**

(b) Using Newton-Raphson method evaluate to two decimal figures, the root of the equation $e^x = 3x$, lying between 0 and 1. **(6)**

Q7 (a) Use Newton's interpolating formulae to find y when x= 1.85 and x= 2.4 from the data. **(6.5)**

x	1.7	1.8	1.9	2.0	2.1	2.2	2.3
y=e^x	5.474	6.050	6.686	7.389	8.166	9.025	9.974

(b) Find a root of $x^3 - 5x + 3 = 0$, by Newton-Raphson method. **(6)**

UNIT-IV

Q8 (a) Solve by Jacobi's Method- **(6.5)**

$4x + y + 3z = 17$

$x + 5y + z = 14$

$2x - y + 8z = 12$

(b) Given that

x	1.0	1.1	1.2	1.3	1.4	1.5	1.6
y	7.989	8.403	8.781	9.129	9.451	9.750	10.031

Find $\frac{dy}{dx}$ and $\frac{d^2 y}{dx^2}$ at x = 1.1 and x = 1.6. **(6)**

Q9 (a) Apply LU Method to solve the equations 3x+2y+7z=4, 2x+3y+z=5, 3x+4y+z=7. **(6.5)**

(b) Calculate the value of $\int_0^{\pi/2} Sinx\, dx$ by Simpson's 1/3 rule using 11 ordinals. **(6)**

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