FD-2871

BCA (Part-III) Examination, 2022

Paper - I

Statistical Analysis

Time : Three Hours] [*Maximum Marks* : 80
[*Minimum Pass Marks* : 27

Note : Answer any **two** parts from each question. All questions carry equal marks.

Unit-I

1. (*a*) Prove that the coefficient of x^r in the expansion of :

$$(x+3)^{n-1} + (x+3)^{n-2}(x+2) + (x+3)^{n-3}(x+2)^2 + (x+3)^{n-4}(x+2)^3 + \ldots\ldots + (x+2)^{n-1}$$

is $= (3^{n-r} - 2^{n-r}) \cdot {}^nC_r$.

(*b*) How many numbers can be made by using seven digits 1, 1, 0, 2, 3, 5, 5 which are greater than ten lakhs.

(*c*) If $\frac{1}{{}^{5}C_{r}} + \frac{1}{{}^{6}C_{r}} = \frac{1}{{}^{4}C_{r}}$, then find the value of r. Hence verify the formula ${}^{n}C_{r} + {}^{n}C_{r+1} = {}^{n+1}C_{r+1}$ for $n = 5$ for this value of r.

Unit-II

2. (*a*) Calculate the mean deviation from the mean and standard deviation for the series a, $a + d$, $a + 2d$, $a + 3d$, ..., $a + 2nd$.

(*b*) Find the unknown frequencies f_1 and f_2 in the following data. It is given that the median of the data is 46 :

Class	Frequency
10-20	12
20-30	30
30-40	f_1
40-50	65
50-60	f_2
60-70	25
70-80	18
Total	229

(*c*) Find the weighted arithmatic average (mean) of first n natural numbers whose weights are equal to the corresponding number.

Unit-III

3. (*a*) An urn contains *a* white and *b* black balls and *c* balls are drawn from the urn. Find the expectation of the number of white balls.

(*b*) What is the chance that a leap year selected at random will contain 53 Sundays ?

(*c*) Show that the m^{th}-moment M_m about the origin of the binomial distribution of degree n is given by :

$$M_m = \left(p \frac{\partial}{\partial p} \right)^m (p+q)^n$$

Unit-IV

4. (*a*) The marks of eight students in maths and computer science are given below :

Maths	76	90	98	69	54	82	67	52
Computer Science	25	37	56	12	7	36	23	11

Calculate the coefficient of correlation using rank method.

(*b*) Fit a straight line to the following data :

x	0	5	10	15	20	25
y	12	15	17	22	24	30

(*c*) Find the value of χ^2 for the following data :

Diet	Males	Females
A	123	153
B	145	150

Unit-V

5. (*a*) A coin was tossed 400 times and there were 216 Heads. Discuss that the coin is biased or not.

(*b*) From a population, 10 men are selected at random, whose heights are following (in inches) :

63, 63, 64, 65, 66, 69, 69, 70, 70, 71

Test the statement that the mean height of population is 65 inch. Given that for 9 degree of freedom and 5% level of significance the student's *t*-value is 2.262.

(*c*) Use *z*-test to show that the following data of two samples are taken from one population or not ?

x	17	27	18	25	27	29	27	23	17
y	16	16	20	16	20	17	15	21	—

Given that for degree of freedom $v_1 = 8$ and $v_2 = 7$ the *z*-value for 5% level of significance is 0.6576.

Also may be used the calculation :

$\log_e 10 = 2.3026$ and $\log_{10}(4.251) = 0.6285$

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