BT-3/ D-21: 43207

BS-CS-AIML-201A: Applied Statistical Analysis for AI

Time: 3 Hours]   **[Max. Marks: 75**

Note: Attempt five questions in all, selecting at least one questions from each unit. All questions carry equal marks.

Unit-I

Q. 1   Define Statistics. Discuss its importance and limitations in detail.   (15)

Q. 2   Explain the various methods that are used in the collection of primary data, pointing out their merits and demerits.   (15)

Unit-II

Q. 3(a)   The median and mode of the following wage distribution are known to be Rs. 33.5 and Rs. 34 respectively. Find the values of A, B and C:

Wage(in Rs.):	0-10	10-20	20-30	30-40	40-50	50-60	60-70
No. of person:	4	16	A	B	C	6	4

Total number of person is 230.

Q. 3(b)   Show that sum of the deviations about mean is zero.   (10+5)

Q. 4(a)   Discuss briefly the merits and demerits of the various measures of dispersion.   (10+5)

Q. 4(b)   Show that the mean deviation about arbitrary point is least when that point is median.

Unit-III

Q. 5   Explain clearly the procedure generally followed in testing of a hypothesis. Also point out the difference between type-1 and type-1 errors with the help of example.   (15)

Q. 6(a)   A sample of 12 students from a school has the following scores in an I.Q. test.

         89 87 76 78 79 86 74 83 75 71 76 92

Do this data support that the mean I.Q. mark of the school students is 80? Test at 5% level of significance. ($t_{0.05}$=2.26 for 11 degree of freedom)   (7+8)

Q.6(b)   A random sample of 10 student's marks in Mathematics and Statistics are given below. Test whether the correlation exists between the marks of two subjects at 5% level of significance. ($t_{0.05}$=2.36 for 08 degree of freedom)

Marks in Mathematics: 68 54 78 75 76 85 54 68 87 75

Marks in Statistics: 59 68 72 67 72 78 64 58 68 74

Unit-IV

Q.7(a)   Show that coefficient of correlation is the geometric mean of coefficients of regression.

Q. 7(b)   The table below lists husbands' hours of housework per week (Y), number of children (X), and husbands' years of education (Z) for a sample of 12 dual-career households:

Family	1	2	3	4	5	6	7	8	9	10	11	12
Husband's Housework	1	2	3	5	3	1	5	0	6	3	7	4
Number of Children	1	1	1	1	2	2	3	3	4	4	5	5
Husband's year of education	12	14	16	16	18	16	12	12	10	12	10	16

Calculate the partial correlation between husbands' housework and number of children controlling for husbands' years of education. (7+8)

Q.8(a) The equation of two regression lines obtained in a correlation analysis of 60 observations are 5x-6y=24 and 768x-1000y=3708. If the variance of y is 2, find the variance of x and correlation coefficient of x and y. (8)

Q. 8(b) Show that the co-efficient of correlation is independent of change of scale and origin of the variables and state the limits between co-efficient of correlation lies. (7)