POST GRADUATE DIPLOMA IN APPLIED STATISTICS (PGDAST)

Term-End Examination

June, 2022

MST-002 : DESCRIPTIVE STATISTICS

Time : 3 hours *Maximum Marks : 50*

Note :

(i) *Question no. **1** is **compulsory**.*

(ii) *Attempt any **four** questions out of the remaining Questions no. 2 to 7.*

(iii) *Use of scientific calculator (non-programmable) is allowed.*

(iv) *Use of Formulae and Statistical Tables Booklet for PGDAST is allowed.*

(v) *Symbols have their usual meanings.*

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1. State whether the following statements are *True* or *False*. Give reasons in support of your answers. *5×2=10*

(a) If each observation of data set

10, 25, 12, 15, 20, 10, 18, 10, 12, 16, 15, 20

is divided by 6, then the arithmetic mean of the data set so obtained will also be divided by 6.

(b) In an agricultural experiment, if a scientist is interested to know the correlation among the yields of the plots of the same block, then he/she has to use correlation ratio.

(c) If two variables are uncorrelated, then two regression equations will coincide.

(d) If (AB) = (A), then Yule's coefficient of association (Q) will be 1.

(e) If $r_{12} = 0{\cdot}60$, $r_{13} = 0{\cdot}50$ and $r_{23} = 0{\cdot}40$, then $r_{1{\cdot}23}$ will be 0·44047.

2. (a) 1482 persons in a locality were exposed to Coronavirus. Out of 1482 persons, 368 were actually infected. Among the total 1482 persons, 343 had been treated with some combination of medicines and among these only 35 were truly infected. Can this treatment be regarded as a preventive measure of Corona infection ? *5*

(b) In an observation of 100 learners of PGDAST, it was found that the number of unmarried learners was 40, number of learners who failed the PGDAST exam was 55 and number of married learners who failed was 30.

From the information given above, find out

(i) the number of married learners,

(ii) the number of learners passing the exam,

(iii) the number of married learners who passed the exam,

(iv) the number of unmarried learners who passed the exam, and

(v) the number of unmarried learners who failed. *3*

(c) Define Ultimate Class Frequency with an example. *2*

3. (a) Define Correlation and give an example. *2*

(b) A departmental store gives in-service training to its nine salesmen which is followed by a test. The management is considering whether it should terminate the service of any salesman who does not perform well in the test. The following data gives the test scores and sales of salesmen during a certain period :

Test Scores	Sales ₹ '00
14	31
19	36
24	48
21	37
26	50
22	45
15	33
20	41
19	39

(i) Calculate the coefficient of correlation between the test scores and sales. *6*

(ii) Does it indicate that the termination of services of low test scores is justified ? *2*

4. (a) Define Multiple Correlation with an example. If r_{12} = 0·87, r_{13} = 0·82 and r_{23} = 0·62, then calculate the correlation coefficient between the first and the third variables after eliminating the linear effect of the second variable. *4*

(b) Fit an exponential curve of the type $Y = ab^X$ for the following data : *6*

X	1	2	3	4	5
Y	8	15	33	65	130

5. (a) A batsman scored on an average, 60 runs per inning against Team A. The standard deviation of the runs scored by him was 12. One year later against Team B, his average came to 50 runs per inning and the standard deviation of the runs scored was 9. Therefore, is it correct to say that his performance was worse against Team B and also that there was lesser consistency in his batting against Team B ? *3*

(b) The first four moments of a distribution about the value 5 are 2, 20, 40 and 50. Find mean, variance, coefficients of skewness and kurtosis. Also interpret the results. *7*

6. (a) Write any two properties of mean. *2*

(b) The annual growth rates achieved by a nation for the last 5 years are 5, 7·5, 2·5, 5 and 10 percent, respectively. By suitable measure of central tendency, find the average growth rate of the nation. *3*

(c) The mean of 5 observations is 4·4 and the variance is 8·24. If three of the 5 observations are 1, 2 and 6, then find the values of the other two. *5*

7. (a) The following data are given regarding Advertisement expenditure and Sales of a particular firm :

	Advertisement Expenditure (₹ lakh)	Sales (₹ lakh)
Mean	10	90
SD	3	12

Correlation coefficient = 0·8.

Obtain both the regression lines. Also find the most probable value of Sales if Advertisement expenditure is ₹ 20 lakh. *6*

(b) Given the following class frequencies, do you find any inconsistency in the data ? *4*

$(A) = 30,\ (B) = 15,\ (\alpha\beta) = 11,\ N = 50$