

Roll No.

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BT-6/M-23

46291

APPLIED STATISTICAL ANALYSIS FOR AI

Paper-ES-CS-AIDS-304 A

Time : Three Hours]

[Maximum Marks : 75

Note : Attempt any *five* questions.

1. (a) What is statistics and explain statistics in our everyday life.
- (b) Retail stores experience their heaviest returns in December each year. Most are gifts that, for some reason, did not please the recipient. The number of items returned, by a sample of 30 persons at a large discount department store, is observed and the data of the table given below are obtained.

Number of items returned

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 4 | 3 | 2 | 3 | 4 | 5 | 1 | 2 | 1 |
| 2 | 5 | 1 | 4 | 2 | 1 | 3 | 2 | 4 | 1 |
| 2 | 3 | 2 | 3 | 2 | 1 | 4 | 3 | 2 | 5 |

Determine the frequency distribution. Draw the line diagram and the histogram of the frequency distribution.

2. Explain in detail :
- (i) Population.
 - (ii) Sample.
 - (iii) Types of sampling.

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- (iv) Sampling classification.
- (v) Graphical representation of data.
3. The monthly rents for 8 one-bedroom apartments located in one area of the city, are :
- 625 740 805 670 705 740 870 875
- (a) Give *two* possible factors that may contribute to variation in the monthly rents.
- (b) Calculate the sample variance.
- (c) The sample standard deviation.
4. (a) Find the mean and standard deviation of the following :

| Series | Frequency |
|--------|-----------|
| 15-20 | 2 |
| 20-25 | 5 |
| 25-30 | 8 |
| 30-35 | 11 |
| 35-40 | 15 |
| 40-45 | 20 |
| 45-50 | 20 |
| 50-55 | 17 |
| 55-60 | 16 |
| 60-65 | 13 |
| 65-70 | 11 |
| 70-75 | 5 |

- (b) A die is tossed thrice. A success is 'getting 1 or 6' on a toss. Find the mean & variance of the number of successes.

5. (a) A coin was tossed 400 times and the head turned up 216 times. Test the hypothesis that the coin is unbiased.
- (b) A normal population has a mean of 6.8 and a standard deviation of 1.5. A sample of 400 members gave a mean of 6.75. Is the difference significant?
6. (a) Samples of sizes 10 and 14 were taken from two normal populations with standard deviations 3.5 and 5.2. The sample means were found to be 20.3 and 18.6. Test whether the means of the two populations are the same at 5% level.
- (b) Explain the analysis of variance (ANOVA). Distinguish between one-way and two-way ANOVA techniques.
7. Calculate the co-efficient of correlation and obtain the least square regression line of y on x for the following data :

| | | | | | | | | | |
|-----|---|---|----|----|----|----|----|----|----|
| x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| y | 9 | 8 | 10 | 12 | 11 | 13 | 14 | 16 | 15 |

8. A random sample of 10 students in Mathematics and Statistics marks are given below. Test whether the correlation exists between the marks of the two subjects at a 5% level of significance. ($t_{0.05} = 2.36$ for 08 degrees 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 |

9. The marks secured by recruits in the selection test (X) and in the proficiency test (Y) are given below :

| Serial No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|------------|----|----|----|----|----|----|----|----|----|
| X | 10 | 15 | 12 | 17 | 13 | 16 | 24 | 14 | 22 |
| Y | 30 | 42 | 45 | 46 | 33 | 34 | 40 | 35 | 39 |

Calculate the rank correlation coefficient.
