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# POST GRADUATE DIPLOMA IN APPLIED STATISTICS (PGDAST)

## Term-End Practical Examination

## June, 2025

### MSTL-001(Set-II) : BASIC STATISTICS LAB

*Time : 3 Hours* *Maximum Marks : 50*

***Note :*** *(i) Attempt any **two** questions.*

*(ii) Solve the questions in Microsoft Excel.*

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

*(iv) Mention necessary steps, hypotheses, interpretation, etc.*

1. (a) A manufacturing company employed 200 employees for a factory. To monitor the absenteeism rate in the

organisation, the following data of vacations (in days) availed in a year and the number of employees who availed vacations are collected :

| **Vacation availed in a year** | **Number of Employees** |
|---|---|
| 0–10 | 4 |
| 10–20 | 15 |
| 20–30 | 25 |
| 30–40 | 45 |
| 40–50 | 60 |
| 50–60 | 65 |
| 60–70 | 40 |
| 70–80 | 32 |
| 80–90 | 18 |
| 90–100 | 6 |

(i) Construct the Histogram and both Ogives.

(ii) Compute the coefficients of skewness ($Y_1$) and kurtosis ($Y_2$) and interpret the results. 9+8

(b) An Electric Voltage Tester manufacturer claims that more than 75% of its products are non-defective. For verifying this claim, a random sample of 40 voltage testers was taken and the following data are obtained :

| Voltage Tester | Non-Defective | Voltage Tester | Non-Defective |
|---|---|---|---|
| 1 | YES | 21 | YES |
| 2 | YES | 22 | YES |
| 3 | NO | 23 | NO |
| 4 | YES | 24 | YES |
| 5 | YES | 25 | YES |
| 6 | NO | 26 | YES |
| 7 | YES | 27 | NO |
| 8 | YES | 28 | YES |
| 9 | YES | 29 | YES |
| 10 | YES | 30 | NO |

| | | | |
|---|---|---|---|
| 11 | YES | 31 | YES |
| 12 | YES | 32 | YES |
| 13 | YES | 33 | YES |
| 14 | NO | 34 | YES |
| 15 | YES | 35 | NO |
| 16 | YES | 36 | YES |
| 17 | YES | 37 | YES |
| 18 | YES | 38 | YES |
| 19 | NO | 39 | YES |
| 20 | YES | 40 | NO |

Test the claim at 1% level of significance. 8

2. (a) Ten participants were rated by two experts in a cooking show for pizza making. A rating on a 7-point scale (1 = extremely unpleasant, 7 = extremely pleasant) is given for each of the four characteristics : taste, aroma, appearance and richness. The following

data display the summated rating accumulated over all four characteristics :

| Participant | Expert | |
|---|---|---|
| | A | B |
| 1 | 25 | 28 |
| 2 | 28 | 25 |
| 3 | 20 | 28 |
| 4 | 25 | 23 |
| 5 | 23 | 25 |
| 6 | 27 | 28 |
| 7 | 26 | 23 |
| 8 | 24 | 27 |
| 9 | 28 | 26 |
| 10 | 27 | 27 |

Compute the rank correlation coefficient between the experts and interpret the results. 15

(b) Two machines were installed to produce school bags. The manufacturer of the machines claims that there is no variation in the number of school bags produced at the end of the day. To check

the manufacturer's claim, a researcher has taken a random sample of the bags manufactured by both machines, which are given in the following table :

| Machine 1 | | Machine 2 | |
|---|---|---|---|
| 19 | 18 | 16 | 19 |
| 20 | 17 | 17 | 20 |
| 20 | 18 | 18 | |
| 18 | 19 | 18 | |
| 18 | 20 | 15 | |
| 20 | 15 | 16 | |
| 17 | 19 | 17 | |
| 19 | | 17 | |
| 19 | | 16 | |
| 18 | | 16 | |
| 18 | | 17 | |
| 16 | | 17 | |
| 18 | | 18 | |
| | | 17 | |
| | | 18 | |
| | | 18 | |
| | | 18 | |
| | | 17 | |

Use $\alpha = 0.05$, to test the claim of the manufacturer, assuming that both the machine operators are equally efficient. Also, assume that the data follow normal distribution with equal variances. 10

3. Following are the yields of potatoes (in quintals) recorded in a field experiment having 10 different variates of potatoes seeds :

| Block 1 | | Block 2 | | Block 3 | | Block 4 | |
|---|---|---|---|---|---|---|---|
| 10 | 28.8 | 9 | 36.5 | 7 | 31.2 | 1 | 22.3 |
| 9 | 37.8 | 5 | 34.1 | 3 | 30.2 | 6 | 32.4 |
| 7 | 33.7 | 4 | 26.3 | 2 | 35.7 | 4 | 31.8 |
| 6 | 31.7 | 1 | 29.0 | 5 | 31.9 | 9 | 32.8 |
| 2 | 34.5 | 10 | 35.4 | 9 | 31.2 | 2 | 29.5 |
| 4 | 23.4 | 6 | 31.1 | 4 | 24.8 | 8 | 27.7 |
| 5 | 31.3 | 2 | 29.4 | 1 | 27.6 | 3 | 29.8 |
| 1 | 30.2 | 3 | 28.0 | 8 | 28.3 | 5 | 29.1 |
| 8 | 30.4 | 7 | 30.8 | 10 | 32.7 | 7 | 27.7 |
| 3 | 33.2 | 8 | 29.6 | 6 | 29.5 | 10 | 30.8 |

Under the assumption of normality with equal variances, carry out the analysis at 5% level of significance. Also, do pairwise testing, if needed. 25

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