

No. of Printed Pages : 7 **MSTL-002(Set-II)**

**POST GRADUATE DIPLOMA IN
APPLIED STATISTICS (PGDAST)**

Term-End Practical Examination

December, 2024

MSTL-002(Set-II) : INDUSTRIAL 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) The production line data of battery life
(in months) produced by a company are
given as follows : 15

Sample No.	Observations			
1	26	22	35	23
2	29	16	26	31

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3	20	43	21	27
4	41	20	30	23
5	50	33	16	11
6	32	30	28	21
7	30	22	18	12
8	34	47	21	46
9	21	33	14	41
10	22	50	44	40
11	33	21	35	43
12	31	47	31	32
13	33	31	27	37
14	27	29	16	22
15	43	31	21	40
16	26	42	35	28
17	37	39	50	31
18	25	27	33	38
19	41	37	51	35
20	30	32	39	45
21	22	43	47	32
22	27	33	38	43
23	24	28	39	32
24	30	38	44	31
25	37	27	38	21

- (i) Which control charts should be used to control the process mean and process variability ?
- (ii) Construct these charts and check whether the process is under statistical control or not.
- (iii) Also plot the revised control charts, if necessary.
- (b) The following table gives the results of daily inspection of vacuum tubes for 26 days of a month : 10

Day	Number of Inspected tubes	Number of Defective tubes
1	530	24
2	1392	61
3	1421	60
4	1501	74
5	1249	45
6	2000	58
7	684	27
8	2386	90

9	2150	89
10	2416	114
11	2550	116
12	1500	73
13	2150	58
14	2330	75
15	2008	80
16	2199	85
17	2270	68
18	1947	40
19	2151	77
20	1700	49
21	2215	68
22	2394	82
23	1198	56
24	850	27
25	849	30
26	850	34

- (i) Draw a suitable control chart and interpret the results.
- (ii) Also plot the revised control chart, if necessary.

2. The following data give the average monthly prices of a commodity for four years : 14+3+5+3

Month	Year			
	2020	2021	2022	2023
January	170	190	210	230
February	190	210	180	230
March	170	180	190	210
April	160	170	170	190
May	140	150	160	170
June	150	190	170	210
July	160	230	230	240
August	180	220	240	250
September	200	220	250	260
October	220	230	230	250
November	220	230	240	260
December	230	250	260	280

- (i) Calculate the seasonal variation indices using moving average method.
- (ii) Obtain deseasonalised values.
- (iii) Estimate the trend line by method of least squares.
- (iv) Plot the given data and the deseasonalised values on the same graph.

3. A study was conducted to examine those variables which are thought to be related to the job satisfaction of employees of a non-professional organisation. A random sample of 15 employees is selected and the data are given as follows :

7+8+10

Score on Job Satisfaction Test	Coded Intelligence Score	Index of Personal Adjustment
54	15	8
37	13	1
30	15	1
48	15	7
37	10	4
37	14	2
31	12	3
49	1	7
43	3	9
12	15	1
30	14	1

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37	14	2
61	9	10
31	8	1
31	4	5

- (i) Prepare a matrix plot to get an idea about the relationship among the variables.
- (ii) Develop a regression model and perform its analysis at 5% level of significance.
- (iii) Check linearity and normality assumptions for the fitted regression model.

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