No. of Printed Pages : 8 **MSTL–002(Set-II)**

POST GRADUATE DIPLOMA IN APPLIED STATISTICS (PGDAST)

Term-End Practical Examination

June, 2025

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, hypothesis, interpretations, etc.

1. (a) A process for manufacture of 4 feet by 8 feet wood gain panels has performed with an average of 2.7 imperfections per 100 panels. Construct a suitable chart to be used in the inspection of the

panels, and discuss whether the process is under statistical control, if 25 successive 100-panel lots contained the following number of imperfect panels per lot :

4, 1, 0, 3, 5, 3, 6, 4, 1, 4, 0, 1, 4, 2, 3, 8, 4, 2, 1, 3, 0, 2, 6, 1, 3

Also compute the revised control line and control limits and plot the revised control chart, if necessary. 10

(b) A multinational company fills mango juice into cans, advertising as containing 200 ml of the juice. The weights of the juice are taken immediately after filling in the cans and 20 samples each of 4 cans are taken by a random method at an interval of 30 minutes. The sample values are tabulated in the table given below : 15

Sample No.	**Weight of each can (in ml)**
1	215
2	210

3	208
4	212
5	218
6	220
7	225
8	213
9	209
10	206
11	205
12	203
13	206
14	212
15	215
16	218
17	213
18	210
19	205
20	206

(i) Which control chart should be used to control the process mean and range of weight of juice filled in can ?

(ii) Construct these charts and check whether the process is under statistical quality control.

(iii) Also plot the revised control charts, if necessary.

2. A sample of 20 houses was selected to develop a linear model for the electricity consumption of a household and to predict the electricity consumption during summers. The data on the electricity consumption (in kWh), size of house (in sq. ft.), and AC (0 for no AC and 1 for having AC) is tabulated in the following table : 25

Table : Electricity Consumption Data

S. No.	Unit (in kWh)	Area (in sq. ft.)	AC
1	512	725	1
2	925	1000	1
3	706	925	1
4	1045	1300	0
5	1195	1400	1
6	1060	1200	1

7	712	825	0
8	515	775	1
9	372	675	0
10	1070	1350	0
11	735	825	1
12	592	850	0
13	865	1000	1
14	780	950	1
15	920	1100	0
16	870	1100	0
17	805	1075	0
18	880	1000	1
19	666	875	1
20	820	1025	0

(a) Prepare a scatter plot to get an idea about the relationship among the variables.

(b) Develop a linear regressive model and perform related analysis at 5% level of significance.

(c) Check the linearity and normality assumptions for the regression analysis.

(d) Draw both fitted regression lines on the scatter plot.

3. Suppose the owner of an ice-cream parlour situated in a locality of a metro city want to analyse its monthly sales. The data of the total quantity of ice-cream sold every month for past 4 years from 2020 to 2023 are recorded in the following table : 25

Table : Monthly Sales of Ice-cream

Month	Quantity (in liter)
1	288
2	316
3	414
4	540
5	558
6	586
7	558
8	54830
9	540
10	565
11	465
12	396

13	396
14	450
15	648
16	764
17	824
18	802
19	812
20	776
21	767
22	738
23	689
24	596
25	540
26	630
27	879
28	990
29	1032
30	1020
31	1005
32	1017
33	967

34	924
35	848
36	774
37	694
38	765
39	1134
40	1224
41	1210
42	1237
43	1248
44	1217
45	1215
46	1134
47	1024
48	898

(a) Compute the seasonal indices for the 12 months.

(b) Obtain the deseasonalised values.

(c) Plot the given data and deseasonalised values.

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