No. of Printed Pages : 6 **MSTL–002(Set-I)**

POST GRADUATE DIPLOMA IN APPLIED STATISTICS (PGDAST)

Term-End Practical Examination

June, 2025

MSTL-002(Set-I) : 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, hypothses, interpretations etc.

1. A study was conducted to examine those variables which are thought to be related to the job satisfaction of employees of a non-professional organization. A random sample

of 15 employees was selected and the result obtained are given in the table : 25

Score on Job Satisfaction Test	Coded Intelligence Score	Index of Personal Adjustment
53	15	08
36	13	01
29	15	01
47	15	07
36	10	04
36	14	02
30	12	03
48	01	07
42	03	09
11	15	01
29	14	01
36	14	02
60	9	10
30	8	01
30	4	05

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

(b) Develop a regression model and perform its analysis at 5% level of significance.

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

2. (a) The following data gives the average quarterly prices of a commodity for five years : 15

Year / Quarter	2019	2020	2021	2022	2023
I	130	135	131	131	134
II	126	128	129	131	136
III	122	122	128	125	126
IV	131	136	132	135	133

(i) Compute the seasonal indices using ratio to moving average method.

(ii) Obtain deseasonalized values and then fit a linear trend line to the annual prices using method of least squares.

(iii) Plot the original data, deseasonalized data and trend values.

(b) A company produces bond papers and random samples of size 50 are inspected at regular intervals of time. Data on defective number of papers in 20 such random samples are given in the table : 10

Sample	No. of Defectives	Sample	No. of Defectives
1	4	11	6
2	5	12	2
3	2	13	4
4	6	14	8
5	10	15	4
6	3	16	2
7	4	17	1
8	2	18	2
9	4	19	1
10	2	20	2

Construct a suitable chart for given data and check whether the process is under statistical control. If not, draw the revised chart.

3. A meteorologist has taken the data of annual rainfall (in cm) in the region of Delhi state 1980 to 2020. The data is given in the following table : 25

Year	Rainfall	Year	Rainfall	Year	Rainfall
1980	664	1994	590	2008	798
1981	728	1995	556	2009	334
1982	447	1996	292	2010	465
1983	663	1997	327	2011	468
1984	630	1998	494	2012	554
1985	451	1999	448	2013	744
1986	617	2000	704	2014	943
1987	734	2001	624	2015	582
1988	491	2002	473	2016	581

1989	520	2003	750	2017	437
1990	280	2004	343	2018	417
1991	548	2005	484	2019	617
1992	417	2006	545	2020	571
1993	387	2007	419		

(a) Use of exponential smoothing method with $\alpha = 0.5$ and obtain the smoothed series of observations.

(b) Plot the original and smoothed values in the chart.

(c) Compute the seasonal indices using 4-yearly ratio to moving average method.

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