

POST GRADUATE DIPLOMA IN APPLIED STATISTICS (PGDAST)**Term-End Examination**

00320

June, 2017

MSTL-002/S1 : INDUSTRIAL STATISTICS LAB SET-1*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 following data are related to life times (in hours) of 20 random samples of 4 LED bulbs each, drawn at intervals of one hour from a production process :

Sample Number	Life-times (in hours)			
	x_1	x_2	x_3	x_4
1	1700	2200	1900	1200
2	800	1500	2100	900
3	1000	1400	1000	1300
4	400	600	700	200
5	1400	2300	2800	2700
6	1800	2000	1100	100
7	1600	1000	1500	2000
8	2500	1600	1800	1200
9	2900	2000	500	2200
10	1100	1100	3100	1600
11	1700	3600	2500	1800
12	600	2800	3500	900
13	2600	2800	3200	4500
14	2300	2100	2100	1700
15	1900	1600	1800	1400
16	1300	2000	3900	800
17	2800	1500	600	200
18	1700	3600	900	1500
19	1600	600	1000	800
20	1700	1000	500	2200

Draw the \bar{X} and R charts and comment whether the process is under control. If not, draw the revised charts.

15

- (b) Thirty-five successive samples of 100 castings each taken from a production line contained respectively 3, 3, 5, 3, 5, 0, 3, 2, 3, 5, 6, 5, 9, 1, 2, 4, 5, 2, 0, 16, 3, 6, 3, 2, 5, 6, 3, 3, 2, 5, 1, 0, 7, 4 and 3 defectives. Construct a suitable chart for the above data and state whether the process is in statistical control. If not, draw the revised chart.

10

2. A study was conducted to examine those variables which are thought to be related to job satisfaction of employees of an organisation. A random sample of 15 employees is selected and the data are given below :

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	01	7
43	03	9
12	15	1
30	14	1
37	14	2
61	09	10
31	08	1
31	04	5

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

25

3. A restaurant manager wishes to improve customer service and employee scheduling based on the daily levels of customers in the past 10 weeks. The number of customers served in the restaurant are given below :

Week	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
1	439	604	367	337	540	456	328
2	275	354	308	373	434	273	398
3	215	284	345	219	371	204	195
4	260	339	186	358	419	198	383
5	200	269	330	204	369	212	388
6	275	288	413	230	299	360	234
7	328	237	344	373	248	428	437
8	317	474	495	474	323	600	425
9	584	645	519	695	495	565	768
10	654	844	839	789	747	971	937

- (a) Determine seasonal indices for the above data using 7-day moving averages.
- (b) Obtain the deseasonalised values.
- (c) Fit appropriate trend for deseasonalised data using method of least-squares by matrix approach that best describes the data.
- (d) Plot original data, deseasonalised data and trend values. $10+5+5+5=25$