POST GRADUATE DIPLOMA IN APPLIED STATISTICS (PGDAST)

Term-End Examination

00144

December, 2017

MSTL-002/S2 : INDUSTRIAL STATISTICS LAB SET-2

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.

(iv) Symbols have their usual meanings.

1. (a) A nationwide mail order house desires to verify the accuracy of its clerical work in completing invoices. Subgroups of 200 mail orders are taken each day for 30 consecutive days for inspection. A defective is defined in invoice from containing at least one of a number of possible errors. The number of defectives found in each of these 30 groups are as follows :

7	5	6	3	4	10	3	2	5	8	6	1	2
3	5	4	8	9	7	20	3	5	4	2	3	7
6	4	3	5									

Construct a suitable control chart of the data given above and comment on the state of control. Also construct a revised control chart, if required. *10*

(b) The following data gives the life (in '00 hrs) of 20 samples each of 4 lamps. Construct the control charts for average life and span of lifetime for the given data.

Sample No.	Life of Lamps (in '00 hrs)			
1	17	22	19	12
2	8	15	21	9
3	10	14	10	13
4	4	6	7	2
5	14	23	28	27
6	18	20	11	1
7	16	10	15	20

Sample No.	Life of Lamps (in '00 hrs)			
8	25	16	18	12
9	29	20	5	22
10	11	11	31	16
11	17	36	25	18
12	16	28	35	19
13	26	8	12	15
14	13	21	21	7
15	9	16	8	14
16	13	20	19	8
17	28	15	6	12
18	17	36	9	15
19	16	6	10	8
20	17	10	15	22

Also construct the revised charts, if necessary. *15*

2. A Private Ltd. company is primarily engaged in the manufacture of home appliances. The following table provides the sales turnover (in million rupees), compensation to employees (in million rupees), rent and lease rent (in million rupees), advertising expenses (in million rupees) and marketing expenses (in million rupees) of the company from 1995 to 2007 :

Year	Sales	Compensation to Employees	Rent and Lease Rent	Advertising Expenses	Marketing Expenses
1995	4426·7	293·0	9·1	9·6	659·2
1996	4390·1	528·0	13·7	171·7	580·8
1997	7876·7	674·0	42·6	233·3	891·7
1998	6704·8	802·0	147·3	451·0	469·5
1999	6371·5	489·3	74·9	319·0	498·1
2000	9947·4	789·7	105·5	315·1	910·9
2001	10507·1	778·7	139·3	482·2	934·7
2002	11072·0	802·4	165·6	420·5	1049·7
2003	12437·3	911·7	153·9	495·9	1341·7
2004	15636·5	1091·8	169·2	531·0	1867·6
2005	11220·3	950·8	105·4	395·7	1358·8
2006	14308·8	1059·5	112·3	384·5	1550·6
2007	16462·1	1183·8	116·3	424·7	1949·3

Build a regression model by selecting appropriate regressors in the model using stepwise selection method. *25*

3. The number of units produced by a company in terms of production (in units) for the following 5 years for all the four quarters of each year is given in the following table :

Years	Production (in Units)			
	Quarter I	Quarter II	Quarter III	Quarter IV
2011	2022	2100	2150	2120
2012	2200	2250	2150	2340
2013	2250	2300	2350	2250
2014	2400	2450	2300	2270
2015	2500	2560	2400	2350

(a) Compute the seasonal indices for the four quarters.

(b) Obtain deseasonalised values and estimate the trend line by the method of least squares.

(c) Plot the given data and the deseasonalised values. *12+8+5*