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MSTL-002/S1

POST GRADUATE DIPLOMA IN APPLIED STATISTICS (PGDAST)

Term-End Examination

00021

December, 2016

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 production line data of battery life (in months) produced by a company are given below :

Sample No.	Observations			
1	27	23	36	24
2	30	17	27	32
3	21	44	22	28
4	40	21	29	24
5	51	34	17	10
6	33	30	28	22
7	30	22	18	12
8	35	48	20	47
9	20	34	15	42
10	22	50	45	41
11	34	22	36	44
12	32	48	32	33
13	34	32	28	38
14	28	30	17	23
15	44	32	22	41
16	26	42	35	28
17	38	40	51	32

Sample No.	Observations			
18	26	28	34	39
19	42	38	52	36
20	30	32	39	45
21	23	44	48	33
22	28	34	39	44
23	25	29	40	33
24	30	38	44	32
25	38	27	39	22

(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. *15*

(b) The following table gives the results of daily inspection of vacuum tubes for 26 days of a month :

Day	Number Inspected	No. of Defectives	Day	Number Inspected	No. of Defectives
1	531	25	14	2331	75
2	1393	62	15	2009	81
3	1422	61	16	2198	86
4	1500	73	17	2271	67
5	1250	46	18	1948	41
6	2000	58	19	2150	77
7	685	28	20	1700	49
8	2385	89	21	2214	68
9	2150	89	22	2394	82
10	2150	58	23	1197	56
11	2417	115	24	850	27
12	2549	115	25	848	30
13	1500	73	26	850	33

(i) Draw a suitable control chart and interpret the result.

(ii) Also plot the revised control chart, if necessary. *10*

2. The following data on monthly sales (in ₹ '000s), monthly advertisement cost (in ₹ '000s) and price per litre of juice (in ₹) were obtained for 20 months to explore the relationship of sales with advertisement cost and price of juice :

Month No.	Sales	Advertisement Cost	Price
1	100	9	72
2	115	10	76
3	52	6	59
4	85	8	68
5	135	10	60
6	58	5	58
7	90	8	70
8	60	7	65
9	45	4	54
10	125	11	83
11	86	7	64
12	80	7	66
13	65	6	61
14	95	8	66
15	25	5	57
16	125	11	81
17	45	5	59
18	95	9	71
19	70	6	62
20	120	10	75

(a) Prepare a scatter 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.

7+10+8

3. The data for the number of persons visiting a place of interest from 2013 to 2015 are given in the following table :

Year 2013	No. of Persons	Year 2014	No. of Persons	Year 2015	No. of Persons
January	900	January	1000	January	1100
February	850	February	890	February	930
March	700	March	740	March	780
April	600	April	620	April	660
May	550	May	550	May	580
June	450	June	470	June	400
July	300	July	300	July	350
August	400	August	430	August	450
September	700	September	650	September	720
October	1200	October	1270	October	1300
November	1150	November	1180	November	1180
December	1180	December	1200	December	1240

(a) Compute the seasonal indices using Ratio-to-trend method.

(b) Obtain the deseasonalised values.

(c) Plot given data and the deseasonalised values. *25*
