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MSTL-001/S2

POST GRADUATE DIPLOMA IN APPLIED STATISTICS (PGDAST)

00331

Term-End Examination

December, 2016

MSTL-001/S2 : BASIC 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.

1. (a) Sales for a store are highly seasonal and therefore quarterly revenues were considered. The following table lists the quarterly revenues (in billions of $) :

Quarter	2005	2006	2007	2008	2009	2010	2011	2012
I	143·0	148·6	155·0	156·7	164·8	171·6	179·6	185·4
II	146·1	153·3	159·7	162·6	169·7	176·8	184·5	191·2
III	145·7	151·8	158·8	162·4	168·5	175·4	183·5	190·9
IV	156·6	164·2	171·1	174·5	182·2	188·6	198·1	206·3

(i) Construct time-series plot of the given data and interpret.

(ii) Which quarter is most consistent ?

4+6

(b) There are several methods for calculating fuel economy. The following table indicates the mileage (in km/litre) as calculated by the owners and by the current Government standards for 9 different makes of a company :

Makes	1	2	3	4	5	6	7	8	9
Owner	29	30	55	55	100	34	48	66	74
Government	33	35	54	68	96	37	57	66	89

(i) Compute the covariance and coefficient of correlation.

(ii) Represent the above data using a suitable diagram.

(iii) Compute the coefficients of skewness and kurtosis and interpret. *2+5+8*

2. (a) A company has 20 operators in a particular department. The long-serving operators feel that they should have a promotion based on length of service built into their job structure. An assessment of their efficiency by their department manager and the personnel department produces a score of efficiency based on different parameters, as given below :

S.No.	Length of Service	Efficiency Scores
1	5	67
2	12	85
3	8	69
4	12	83
5	7	65
6	8	72
7	9	72
8	8	73
9	10	82
10	9	75
11	7	67
12	11	78
13	11	79
14	10	79
15	11	80
16	10	85
17	6	64
18	8	84
19	10	85
20	8	74

(i) Compute the Spearman's rank correlation coefficient between the length of service and efficiency scores.

(ii) Draw the Box plots separately for Length of service and Efficiency scores and interpret. *15+10*

3. (a) The speed of four types of cutting tools are being compared in an experiment. Six cutting materials of varying degrees of hardness are to be used as experimental blocks. The data on the measurement of cutting time (in seconds) are given in the following table :

Tools	Blocks					
	1	2	3	4	5	6
1	16	15	12	13	8	14
2	28	18	16	28	16	19
3	17	11	17	12	18	12
4	11	14	14	15	11	15

(i) Analyse the design at 1% level of significance, and test whether the four different tools as well as the materials produce the same results or not.

(ii) If the results are significant, do the pair-wise comparison between them.

(b) A problem with a telephone line that prevents a customer from receiving or making calls is disconcerting to both the customer and the telephone company. The following data represents a sample of 10 problems reported to two different offices of the time (in minutes) to clear these problems :

Office I	15	17	7	28	5	16	40	33	12	31
Office II	80	37	10	11	6	5	33	21	58	40

Test the equality of population variances at 5% level. *15+10*