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MSTL-001/S1

POST GRADUATE DIPLOMA IN APPLIED STATISTICS (PGDAST)

Term-End Examination

00014

December, 2016

MSTL-001/S1 : BASIC 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) A random sample of 30 houses was selected to study the electricity consumption of a household during summers. The data on the electricity consumption (in kWh) for one month during summer are given in the following table :

Table : Electricity Consumption Data

S. No.	Units (in kWh)
1	1080
2	1150
3	1365
4	1275
5	1425
6	1134
7	1310
8	1365
9	1095

S. No.	Units (in kWh)
10	1125
11	1340
12	1425
13	1150
14	1187
15	1545
16	1140
17	1054
18	1620
19	1094
20	1310
21	1645
22	1565
23	1215
24	1275
25	1465
26	1543
27	1154
28	1340
29	1543
30	1175

(i) Construct class-intervals of suitable width and continuous frequency distribution.

(ii) Draw the histogram.

(iii) Construct cumulative frequency distributions and ogives of "less than" as well as "more than" types. *5+5+8*

(b) The local pizza restaurant advertises that they deliver pizza faster than the standard brand. In order to determine whether this advertisement is valid, some students decided to order 10 pizzas from the local pizza restaurant and 9 pizzas from the branch of standard brand at different times and recorded the delivery times (in minutes). The data are given in the following table :

S.No.	Delivery Time (in minutes)	
	Local Restaurant	Branch of Standard Brand
1	16·4	20·4
2	15·0	16·2
3	17·5	15·0
4	14·2	18·2
5	20·0	22·5
6	15·4	16·2
7	17·5	20·0
8	14·1	15·0
9	13·4	15·0
10	20·7	–

Formulate the null and alternative hypotheses. Is variance of delivery time of the local pizza restaurant less than that of the standard brand at 1% level of significance ? 7

2. (a) Suppose that a fast-food chain wants to evaluate the service of eight restaurants. The Customer Service Director hires seven evaluators to act as raters. To reduce the effect of variability from rater to rater you use a randomised block design, with raters serving as the block. The eight restaurants are the groups of interest.

The seven raters evaluate the service of each of the eight restaurants in a random order. A rating scale from 0 (low) to 100 (high) is used. The following table summarises the results :

Raters	Restaurants							
	A	B	C	D	E	F	G	H
1	75	66	87	79	73	64	85	86
2	82	80	93	81	80	78	91	92
3	81	72	95	85	79	70	87	93
4	85	68	92	81	83	66	90	91
5	89	71	97	89	87	69	95	96
6	83	73	99	91	81	71	85	97
7	82	80	93	81	80	78	91	89

The effect of evaluation of each rater is normally distributed with approximately equal variances.

(i) Analyse the design at 1% level of significance. Are average services of the eight restaurants significantly different ? If the difference between the average services of restaurants are significant, do the pair-wise comparison between them.

(ii) Find out which restaurant is most consistent as far as service is concerned. *15+10*

3. (a) The following data represents the calories and fat (in grams) in 7 different types of cold coffee :

Coffee type	1	2	3	4	5	6	7
Calories	240	260	350	350	420	510	530
Fat	8	3·5	22	20	16	22	19

Draw the Box plots separately for calories and fat data. *5+5*

(b) Nine contestants were rated by two experts in a cooking show for coffee making. A rating on a 7-point scale (1 = extremely unpleasant, 7 = extremely pleasing) is given for each of the following five characteristics : taste, aroma, richness, presentation and acidity. The following data displays the summated ratings accumulated over all five characteristics :

Contestant	Expert	
	X	Y
A	29	31
B	32	32
C	24	27
D	29	32
E	27	30
F	31	32
G	32	31
H	30	32
I	27	28

Compute the rank correlation coefficient. *15*