

POST GRADUATE DIPLOMA IN APPLIED STATISTICS (PGDAST)

Term-End Examination

December, 2015

00817

MSTL-001 : BASIC STATISTICS LAB

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 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	1	2	3	4	5	6
Units (in kWh)	1080	1150	1365	1275	1425	1134
S. No	7	8	9	10	11	12
Units (in kWh)	1310	1365	1095	1125	1340	1425
S. No	13	14	15	16	17	18
Units (in kWh)	1150	1187	1545	1140	1054	1620
S. No	19	20	21	22	23	24
Units (in kWh)	1094	1310	1645	1565	1215	1275
S. No	25	26	27	28	29	30
Units (in kWh)	1465	1543	1154	1340	1543	1175

- (i) Construct class intervals of suitable width. 5
- (ii) Construct the continuous frequency distribution. 5
- (iii) Draw a histogram. 5
- (b) A local pizza restaurant and a branch of a standard brand are located across the street from the University campus. The local pizza restaurant advertises that they deliver pizza to the dormitories 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 the standard brand at different times and recorded the delivery times (in minutes). The data are given in the following table : 10

Table : Delivery Time

S. No	Delivery Time (in minutes)	
	Local Restaurant	Branch of Standard
1	16.4	20.4
2	15	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	

- (b) A manager of cooking oil manufacturing company wants to prepare its marketing strategy in three different regions. In this regard, a sample of 100 families in three regions I, II and III was selected and the cooking oil preferences of these families are recorded in the following table :

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Table : Choice of families regarding cooking oils.

Cooking Oil	Number of families		
	I	II	III
Sunflower	19	17	28
Soyabean	15	13	10
Cottonseed	18	15	16
Olive	11	14	14
Mustard	18	5	8
Ghee	12	13	10
Other	7	23	14

Draw the suitable bar diagram to compare the cooking oil preferences in these three regions.

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

2. (a) The tensile strength of a certain synthetic fibre is thought to be related to the percentage of cotton in the fibre and to the drying time of the fibre. A study was conducted on ten pieces of fibre. The results are given in the following table :

Percentage of cotton	Drying Time	Tensile strength
23	12.1	222
25	12.2	231
28	12.5	240
30	12.4	229
28	13.2	255
30	13.3	248
27	14.1	253
28	14.3	252
29	11.4	228
27	12.2	254

- (i) Check the symmetry and kurtosis of the variable, which is most consistent. 10
- (ii) Determine the correlation coefficient between tensile strength and the joint effect of drying time and percentage of cotton. 5

- (b) In a national survey of employees, 75% of them said that work stress had a negative impact on their personal lives. To check this statement, an analyst took a sample of 40 employees. She recorded the data by recording "Yes" for the employees who said that claim was true and "No" for those who said that claim was false. The data are shown in the following table : 10

Table : Data of 40 Employees

Employees Number	Answer	Employees Number	Answer
1	Yes	21	No
2	Yes	22	No
3	Yes	23	Yes
4	Yes	24	Yes
5	Yes	25	Yes
6	Yes	26	Yes
7	No	27	Yes
8	Yes	28	Yes
9	Yes	29	Yes
10	Yes	30	Yes
11	Yes	31	Yes
12	No	32	Yes
13	No	33	Yes
14	No	34	Yes
15	Yes	35	No
16	Yes	36	Yes
17	Yes	37	Yes
18	Yes	38	Yes
19	Yes	39	Yes
20	Yes	40	Yes

Formulate the null and alternative hypotheses. Also test the claim at 5% level of significance.

3. (a) The cutting speed of four types of tools are being compared in an experiment. Five cutting materials of varying degree 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 four different tools produce the same results or not. 18
- (ii) If the results are significant, do the pair wise comparison between them.
- (iii) Is the effect of each cutting material same for all cutting tools ?