POST GRADUATE DIPLOMA IN APPLIED STATISTICS (PGDAST)

Term-End Examination

December, 2017

□□263　　　**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 crystal ball manufacturing company is distributing a particular variety, say variety A, through a large number of showrooms. These showrooms also sell another famous variety of crystal balls, say variety B. The manager of the company wants to compare the popularity of the newly manufactured crystal balls with variety B. For this purpose, the data from 30 stores were collected and shown in the following table :

Showroom No.	Variety	
	A	B
1	154	412
2	278	404
3	212	161
4	314	234
5	428	118
6	318	254
7	456	112
8	312	278
9	101	434
10	321	206
11	472	109
12	278	312
13	482	128
14	441	180
15	378	342

Showroom No.	Variety	
	A	B
16	471	189
17	277	234
18	481	175
19	440	125
20	377	315
21	260	334
22	383	132
23	263	455
24	374	220
25	245	133
26	238	413
27	189	467
28	194	385
29	220	445
30	174	399

(i)   Which variety shows greater variability in sales ?

(ii)   Compute the suitable width of the class intervals for both varieties and construct the continuous frequency distributions.

(iii) Also, construct the histogram for both the brands and interpret the results.   *4+8+6*

(b)   The production manager of a company that manufactures electric heaters believes that at least 10% of the heaters are defective. For testing her belief, she took a random sample of 20 heaters and recorded her observation in the following table :

Sample No.	Defective
1	No
2	No
3	No
4	Yes
5	No
6	No
7	Yes
8	No
9	No
10	No
11	Yes

Sample No.	Defective
12	No
13	No
14	No
15	No
16	Yes
17	Yes
18	No
19	Yes
20	Yes

Use $\alpha = 0.05$ to test her belief.   7

2. (a) Four experiments are conducted to determine the moisture content of samples of a powder. Each of the four observers took a sample from each of six consignments. Their assessments are given below :

Observer	Consignment					
	1	2	3	4	5	6
1	9	10	9	10	11	11
2	12	11	9	11	10	10
3	11	10	10	12	11	10
4	12	13	11	14	12	10

Perform suitable tests to examine whether there is any significant difference in the moisture content (i) between consignments, and (ii) between observers at 5% level of significance. If there are significant differences, carry out pairwise comparisons.   15

(b) A shoe manufacturing company has collected data on its sales in different shoe size categories, which is shown in the table given below :

Category Size	Sales (₹ '000)
3	110
4	120
5	115
6	95
7	155
8	140
9	80

(i) Construct a pie chart to compare the sales in various categories.

(ii) Also, compute the suitable measure of central tendency and dispersion for sales.   5+5

3. (a) A plant has installed two machines producing polythene bags. During the installation, the manufacturer of the machines has stated that there is a variation in the number of bags produced at the end of the day. To check the manufacturer's statement, a researcher has taken a random sample of the bags for both the machines, which is recorded in the following table :

Machine 1	18	19	19	18	17	19	18
	19	18	19	17	18	18	19
Machine 2	16	17	17	17	16	18	16
	16	17	17	16	16	17	15
	18	18	17	16			

Use $\alpha = 0 \cdot 05$, to test the statement of the manufacturer. *10*

(b) A researcher wants to find out the degree of association between sugar prices and wheat prices. He/she has collected the data, shown in the following table, relating to the prices of sugar and wheat in 14 randomly selected months from the last 20 years :

Month	Price of Wheat	Price of Sugar
1	8	10
2	9	11
3	7	13
4	10	12
5	6	15
6	12	18
7	14	20
8	11	18
9	12	22
10	15	24
11	17	23
12	16	22
13	19	27
14	21	29

Compute the Spearman's rank correlation coefficient for the given data. *15*