POST GRADUATE DIPLOMA IN APPLIED STATISTICS (PGDAST)

Term-End Examination

00113

June, 2017

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 soap manufacturing company was distributing a particular type of brand, say Brand A through a large number of retail stores. These stores also sell another famous brand of soap, say Brand B. Manager of the company wants to compare popularity of newly launched soap (Brand A) with old popular Brand B of the soap. For this purpose, a random sample of 40 stores of each brand is selected. The sales data are given below :

Store No.	Brand A	Brand 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
16	261	272
17	384	299
18	264	289
19	375	262
20	246	396
21	239	302
22	190	417
23	195	342
24	221	243
25	175	450
26	435	189
27	124	233
28	207	330
29	367	245
30	184	416
31	274	315
32	230	399
33	291	139
34	415	168
35	334	480
36	374	271
37	302	435
38	355	319
39	177	407
40	115	370

Answer the following :

(a) Which soap brand has more average sales ?

(b) Which soap brand has higher coefficient of variation in the sales ?

(c) Determine the correlation coefficient between sales of both brands of soap.

(d) Compute suitable width of the class-intervals for both brands.

(e) Construct the continuous frequency distribution for both brands. *5+5+5+5+5*

2. (a) The following data represent 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. *10*

(b) A researcher wishes to find out whether the waiting time for a patient to meet a doctor in the emergency room at a government hospital is more than the corresponding waiting time at a private hospital. Waiting time for 25 patients in both hospitals are recorded. The data are given as follows :

S. No.	Waiting time (in minutes)	
	Government	Private
1	30	12
2	20	10
3	15	20
4	20	15
5	24	10
6	20	8
7	15	10
8	20	18
9	25	15
10	15	10
11	22	15
12	20	20
13	34	15
14	20	30
15	35	15
16	20	10
17	15	10
18	40	12
19	20	30
20	15	15
21	25	20
22	30	10
23	14	10
24	20	12
25	25	15

Assuming that the waiting times are normally distributed with equal variances,

(i) Formulate the null and alternative hypotheses.

(ii) Is there enough evidence that the average waiting time for a patient to see a doctor in the emergency room at a government hospital is more than the average waiting time at a private hospital at 2% level of significance ?

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3. A steel and iron company produces 8-metre long steel rods, which are used in the construction of buildings. The company has four machines that manufacture steel rods in three shifts. The company's quality control officer wishes to test whether there is a significant difference in the average length (in metres) of the iron rods by shifts or by machines. The data produced by machines and shifts through a random sampling process were collected and are given below :

Machine	Shift I	Shift II	Shift III
1	8·05 8·01 8·10	8·11 8·10 8·06	8·06 8·04 8·10
2	7·80 7·90 7·95	7·77 7·90 7·80	7·90 7·88 7·95
3	8·20 8·15 8·22	8·22 8·25 8·20	8·12 8·10 8·16
4	7·80 7·90 7·80	7·85 7·94 7·96	7·73 7·80 7·90

Employ a two-way analysis of variance and determine whether there is a significant difference in effects. Take $\alpha = 0{\cdot}05$. *25*