

POST GRADUATE DIPLOMA IN APPLIED STATISTICS (PGDAST)

Term-End Examination

June, 2018

00445

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, interpretations, etc.

1. (a) A company employed 159 employees for a factory. The company's management is worried about high absenteeism rate in the organisation. The following table shows vacations (in days) availed in a year and the number of employees who availed vacations :

Vacations availed in a year	Number of employees
0 – 10	2
10 – 20	18
20 – 30	30
30 – 40	45
40 – 50	35
50 – 60	20
60 – 70	6
70 – 80	3

- (i) Construct the histogram and both the ogives.
- (ii) Compute the coefficients of skewness (γ_1) and kurtosis (γ_2) and interpret the results.

- (b) An electric bulb manufacturer claims that more than 80% of its products are non-defective. For verifying this claim, a client takes a random sample of 50 bulbs and obtains the following data :

Bulb	Non-Defective	Bulb	Non-Defective
1	Yes	26	Yes
2	No	27	No
3	Yes	28	No
4	No	29	No
5	No	30	No
6	Yes	31	Yes
7	Yes	32	No
8	Yes	33	Yes
9	No	34	No
10	Yes	35	No
11	Yes	36	No
12	Yes	37	Yes
13	No	38	Yes
14	No	39	Yes
15	No	40	No
16	Yes	41	Yes
17	No	42	Yes
18	No	43	Yes
19	Yes	44	No
20	Yes	45	Yes
21	Yes	46	Yes
22	No	47	Yes
23	No	48	Yes
24	Yes	49	Yes
25	Yes	50	Yes

Test the claim at 1% level of significance.

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2. (a) A questionnaire has been administered to 25 randomly selected customers of Product A and 20 randomly selected customers of Product B. The scores obtained from these customers are given in the following table :

Product A		Product B	
30	32	40	38
31	34	42	41
32	35	39	37
34	32	38	38
35	30	41	39
32	34	37	40
30	35	38	41
34	36	39	
35	32	40	
36	31	41	
32	38	40	
31		42	
30		39	
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Assuming normality, test whether the (i) variances and (ii) means of the scores obtained from the customers of products A and B are equal or not at $\alpha = 0.02$.

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- (b) The Municipal Corporation has considered past data of a city on water consumption in 16 randomly selected weeks of the previous summer and the average temperature in the corresponding week. On the basis of the following data, compute the rank correlation coefficient between temperature and water consumption.

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Weeks	Temperature (in °C)	Water Consumption (in million litres)
1	37	150
2	38	160
3	39	168
4	35	145
5	34	140
6	33	142
7	36	155
8	40	165
9	41	167
10	42	167
11	44	175
12	43	185
13	45	180
14	32	170
15	45	162
16	31	172

3. A steel rod manufacturing company produces 8 metre long steel rods. The company has four machines which manufacture steel rods in three shifts. The following data are organised by machines and shifts obtained through a random sample process :

Machines	Length of the iron rod		
	Shift 1	Shift 2	Shift 3
1	8·12	8·11	8·04
	8·01	8·12	8·06
	8·05	8·06	8·11
2	7·98	7·88	7·89
	7·89	7·77	7·96
	7·99	7·95	7·98
3	8·22	8·24	8·17
	8·25	8·20	8·19
	8·26	8·18	8·16
4	7·79	7·88	7·73
	7·75	7·77	7·74
	7·73	7·72	7·71

Determine whether there is any significant difference in the average length of the iron rods manufactured by shifts or by machines at $\alpha = 0.05$. If there is any significant difference, do pairwise testing.

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