

2020

STATISTICS — HONOURS — PRACTICAL

Paper : CC-12P

Full Marks : 30

*The figures in the margin indicate full marks.**Candidates are required to give their answers in their own words as far as practicable.*

1. Consider the following data on anxiety score measured at three time points, of three groups of individuals practicing physical exercises at different levels (grp1 : basal, grp2 : moderate and grp3 : high).

id	group	t1	t2	t3
1	grp1	14.1	14.4	14.1
2	grp1	14.5	14.6	14.3
3	grp1	15.7	15.2	14.9
4	grp1	16.0	15.5	15.3
5	grp1	16.5	15.8	15.7
6	grp1	16.9	16.5	16.2
7	grp2	13.7	13.4	12.7
8	grp2	14.7	14.8	13.1
9	grp2	14.9	14.4	13.6
10	grp2	15.1	14.8	13.6
11	grp2	15.8	14.8	14.2
12	grp2	16.4	15.7	14.9
13	grp3	17.5	15.6	14.4
14	grp3	17.6	14.8	13.8
15	grp3	17.8	16.1	14.3
16	grp3	17.9	15.7	13.8
17	grp3	18.4	16.7	15.4
18	grp3	18.5	16.4	15.1

- (a) Test if the anxiety levels differ for individuals with basal and moderate exercise. If the table value is available to you, draw your inference. Else, only write the critical region with the required table value.

Please Turn Over

(b) Consider the data at time point t2. Fit a model to the data allowing anxiety scores at time t2 to depend on exercise group and anxiety score at baseline (ie time t1).

(c) Summarise your conclusions from (b).

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2. Consider the following data on the number of damaged pieces of equipment (out of a total of 6 pieces) and the corresponding launch temperatures (in °F) for space shuttles.

Sl	temp	number
1	53	5
2	57	1
3	58	1
4	63	1
5	66	0
6	67	0
7	67	0
8	67	0
9	68	0
10	69	0
11	70	1
12	70	0
13	70	1
14	70	0
15	72	0
16	73	0
17	75	0
18	75	1
19	76	0
20	76	0
21	78	0
22	79	0
23	81	0

(a) Write down an appropriate regression line for the data, stating all assumptions.

(b) Fit the model identified in (a) to the data.

(c) Interpret the estimated regression coefficients and test for their significance. If the table value is available to you, draw your inference. Else, only write the critical region with the required table value.

(d) Use the above model to predict the expected chance of failure at a temperature of 80.

(e) Suppose you are asked to find the expected chance at a temperature 30. Can you find it? Suggest possible practical problem in finding the expected chance.

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