UG/5th Sem/STAT(H)/Pr/19

2019

B.Sc. (Honours)

5th Semester Examination

STATISTICS

Paper - DSE 1-P

Statistical Quality Control

Full Marks : 20 Time : 3 Hours

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

Answer *all* questions

1. The following table gives the results of daily inspection of dowel pin plates for picking up plates with surface defects. Construct the control chart for fraction defective and number of defectives and comment on the state of control.

Number inspected	Number of defectives
502	18
530	13

[Turn Over]

Number inspected	Number of defectives
480	13
510	15
540	21
520	17
580	28
476	10
570	23
520	10
510	15
536	22

(8)

2. The product of a manufacturing industry is submitted for acceptance in lots of size 2000. From past experience, the fraction defective is known to be $p = 0.01$. Samples of size n are inspected and if the number of defectives exceeds c, the remaining articles of the lot are also inspected, otherwise the whole lot is accepted. From the following plans, choose the best (the criterion to be suggested by you) one:

   (i) $n = 50, c = 0$

   (ii) $n = 80, c = 1$ (7)

3. Laboratory Note Book. (2)

4. Viva-voce. (3)

Econometrics

Full Marks : 20 Time : 2 Hours

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

Answer *all* questions

1. From a sample of 10 observations, the following results were obtained :

$\Sigma y_i = 1110$, $\Sigma x_i = 1700$, $\Sigma x_i y_i = 205500$

$\Sigma x_i^2 = 322000$, $\Sigma y_i^2 = 132100$

with correlation coefficient r = .9758.

But it was further found that two points of observations were recorded wrongly as

y	x
90	120
140	220

instead of

y	x
80	110
150	210

due to some mistake.

What will be the effect of this error on r ? Obtain correct r. (3+3=6)

[Turn Over]

2. In a regression of average salary (s) on the number of employees (N) for a random sample of 30 firms, the following regression results were obtained :

(i) $S = 7.5 + .009\ N,\ R^2 = .90$

(ii) $\frac{S}{N} = .008 + 7.8\left(\frac{1}{N}\right),\ R^2 = .99$

(a) How do you interpret the two regressions ?

(b) Can you relates the slopes and intercepts of the two models ? (5)

3. When a 3rd degree polynomial regression fitted to a dataset (x_i, y_i), i = 1(1)10, the following results were obtained :

$$y_i = 141.77 + 61.48\ x_i - 12.96 x_i^2 + 194 x_i^3$$

where the corresponding t-statistic are

6.37, 4.78, .99 and .06 respectively with $R^2 = .9983$.

It was further observed that the correlation matrix was

	x_i	x_i^2	x_i^3
x_i	1	.97	.93
x_i^2		1	.99
x_i^3			1

(a) Would you drop the variables x_i^2 and x_i^1 from the model ?

(b) If you drop them, what will happen to the value of the coefficient of x_i ? (4)

4. Practical Note Book. (3)

5. Viva-voce. (2)
