2013
[July]
ECONOMICS
Techniques of Statistical Analysis

Full Marks: 75; Time: 3 hours
The figures in the margin indicate full marks for the questions

Answer **five** questions, selecting at least **one** from each Credit

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CREDIT – I

1. (a) Explain and examine the three approaches to the concept of probability.

    8

    (b) How permutations are estimated using different formulae under different hypothetical situations? Explain.

    7

2. (a) Write a short note on Poisson distribution.   5

    (b) Derive the formula of standard deviation under binomial distribution.

    10

CREDIT – II

3. (a) From the following data obtain the regression equation of Y on X. Also calculate the standard error of estimate:

X	6	4	8	3	1	5
Y	17	11	18	8	5	15

    5+3

    (b) Explain the concept of Coefficient of Multiple Determination (R^2). What is the main problem associated with it? What adjustment needs to be carried out to remove this problem?

    3+2+2

4. (a) Compute the correlation coefficients, $r_{Y1}, r_{Y2}, r_{12}, r_{Y1.2}$ *and* $r_{Y2.1}$ using the following data:

Y	62	52	68	72	78	58	58	74
X_1	51	44	52	57	62	48	53	61
X_2	7	6	8	8	12	7	9	11

    10

    (b) Define parameter, statistic, estimator, estimate, and simple random sampling.

    5

CREDIT – III

5. Discuss different components of a time series data. Explain the process of decomposition.

10+5

6. Estimate the de-trended values of production of the following time series data using least square method:

Year	2007	2008	2009	2010	2011	2012	2013
Production (in quintals)	10	15	20	25	50	80	100

15

CREDIT – IV

7. What is sampling distribution of sample proportion when sample is taken without replacement? Explain the above taking an example of having 5 balls of which 3 are black and 2 are white.

10

(b) A social organization claiming to be promoters of sex education sought the views of parents from three Indian states of Punjab, Orissa and Nagaland on introducing sex education at the school level. The views of 80 parents selected at random from each of the three states were found as under:

	Nagaland	Odisha	Punjab
In favor	50	20	45
Against	30	60	35

Do the sample data provide enough evidence to support the view that the proportion of parents in favor of introducing sex education in schools is different in all the three states? $\left(Given: At\ 2\deg rees\ of\ freedom, \chi^2_{0.01} = 9.21\right)$

5

8. (a) Define and distinguish between null and alternative hypotheses

5

(b) A sample survey of tax payers belonging to business class and salaried employees yielded the following results:

	Business Class	Salaried Employee
Sample Size	400	420
No. of Tax Defaulters	80	65

Given $z_{0.01} = 2.33$, test the hypothesis that defaulter rate is

(i) The same for the two classes of tax payers, and
(ii) Higher in the business class by 0.03 in comparison to the salaried class.

5+5