INDIAN INSTITUTE OF TECHNOLOGY KHARAGPUR

End-Spring Semester Examination 2022-23

Date of Examination: **Session: (FN/AN):** **Duration: 3 hrs.** **Full Marks:** 50

Subject No.: EM20204 **Subject:** Statistics for Economics

Department/Center/School: Humanities & Social Sciences

Specific charts, graph paper, log book etc., required

Special Instructions (if any):

The paper contains five questions each containing 10 marks. Answer all questions.

Question 1

Consider the following dataset

X_1	X_2
3	9
4	11
8	4
13	5
7	14
0	6

a. Find the two principal components
b. What proportion of the total variance is captured by the first Principal Component.

[10 marks]

Question 2

Discuss in details the Probit and Logit Models.

[10 marks]

Question 3

Discuss how to confirm whether a particular independent variable is significant or not using interval estimation in case of Ordinary Least Square Regression.

[10 marks]

Question 3

What are the desirable properties of a point estimator?

Construct an example of an estimator which is:

a. biased but consistent.
b. biased and inconsistent.

[3 + 7 = 10 marks]

Question 5

Consider the regression model: $y_i = bx_i + e_i$, $1 \leq i \leq n$, where x_i's are fixed non-zero real numbers and e_i 's are independent random variables with mean zero and equal variance. Consider estimators of the form $\sum_{i=1}^{n} a_i y_i$ (where a_i's are non-random real numbers) that are unbiased for b. Show that the least squares estimator of b has the minimum variance in this class of estimators.

[10 marks]