JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2025

PhD – I Semester (For 256802)

COURSE CODE (CREDITS): 21P1WHS132 (3) MAX. MARKS: 35

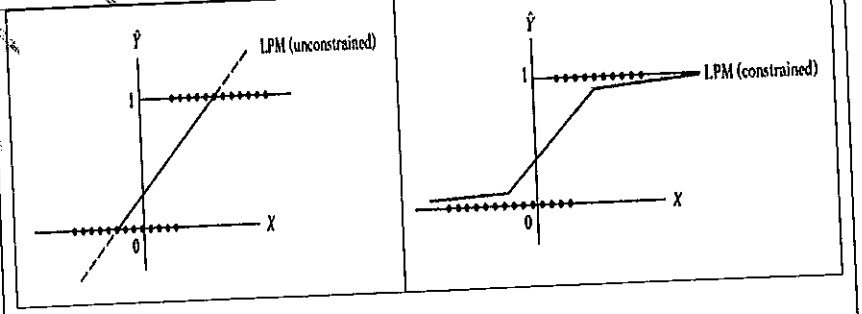
COURSE NAME: ECONOMETRICS

COURSE INSTRUCTORS: ASA MAX. TIME: 2 Hours

Note: *(a) All questions are compulsory.*

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

(c) Use of Calculator is allowed.

Q.No	Question	CO	Marks
Q1	Suppose the true model is: $\mathbf{Y = \alpha_0 + \alpha_1 X_i + \alpha_2 X_i^2 + \alpha_3 X_i^3 + e_{1i}}$; unfortunately, your model is: $\mathbf{Y = \alpha_0 + \alpha_1 X_i + \alpha_2 X_i^2 + e_{2i}}$. What changes do you expect in your result and how do you identify this problem? What solution measures you'll adopt?	4	4+3 = 7
Q2	Consider the following "true'' (Cobb–Douglas) cost function for a firm: $\mathbf{\ln C_i = \alpha_0 + \alpha_1 \ln Q_i + \alpha_2 \ln W_{1i} + \alpha_3 \ln W_{2i} + u_i}$; where C = total cost, Q = output, W_1 = wage rate of skilled labor, W2 = wage rate of unskilled labor, u_i = error term. However, suppose the researcher estimates the following (misspecified) regression: $\mathbf{\ln C_i = \beta_0 + \beta_1 \ln Q_i + \beta_2 \ln W_{1i} + u_i}$ Assume you have cross-sectional data on all variables, and classical OLS assumptions hold except for omission of W_2 **a)** Are the OLS estimators unbiased? Specifically, are $E(\hat{\beta}_1) = \alpha_1, \quad E(\hat{\beta}_2) = \alpha_2$? **b)** Suppose it is known that W2 is an irrelevant input, i.e., $\alpha_3 = 0$. Will it change your answer?	4	3+4 = 7
Q3	 What do you understand with these two figures? Discuss.	5	4

Q4	A researcher studied data from 72 cities to understand factors influencing whether a city has a high traffic congestion level (vs. low congestion). She estimated the following logit model: $\ln \hat{O}_i = -1.452 + 0.018D_i + 0.231G_i - 0.604P_i$ where, O_i = odds of high congestion, D_i = population density, G_i = annual population growth rate, P_i = % of resident using public transport. p-values of intercept, D, G and P are as 0.042, 0.031, 0.007 and 0.016 respectively. **a)** How would you interpret the coefficients? **b)** Which coefficients are individually statistically significant? **c)** What is the effect of a one-percentage-point increase in public transport use on the odds? **d)** What is the effect of a one-percentage-point increase in population growth on the odds?	**5**	**2x4 = 8**
Q5	What are the special features of (a) cross-section data, (b) time series data, and (c) panel data?	**1**	**4**
Q6	What is meant by a fixed effects model (FEM)? Since panel data have both time and space dimensions, how does FEM allow for both dimensions?	**3**	**5**