(iii) Few applications of 'F' test

(iv) An example of perfect multicollinearity

(v) Omission of an important variable

[This question paper contains 8 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 4964 **J**

Unique Paper Code : 2924000036

Name of the Paper : Basic Econometrics (GE)

Name of the Course : **B.A. (H) Business Economics**

Semester : VI

Duration : 3 Hours Maximum Marks : 90

Instructions for Candidates

1. Write your Roll. No. on the top immediately on receipt of this question paper.
2. Attempt **any five** questions, all questions carries equal marks
3. Use of **simple calculator** is allowed
4. If any assumption is made while solving a problem, the same must be stated clearly and a note must be mentioned after the answer.

1. (a) What do you understand by the term 'relaxation of assumptions of Classical Least Square Regression Model' Identify assumptions which can be relaxed with minimum impact on the results obtained with respect to slope and intercept of the model.

(b) Which of the following statements are correct. Give reason in 2-3 sentences for the same

(i) The Problem of Multicollinearity does not exist in a 'two variable linear model'

(ii) If the error terms are serially correlated, the intercept and slope coefficients are still efficient in simple linear regression model

(iii) For each qualitative regressor, the number of dummy variables introduced must be one less than the categories of that variable.

(iv) In a regression line, there are always as many points above the fitted line as there are below it. (6,12)

(iv) Using 'p' show how will you re-specify the equation for the removal of autocorrelation (3,3,3,4)

(b) What is the difference between R^2 and Adjusted R^2 (5)

5. (a) What do you understand by the terms: Intercept and Slope Dummy, Dummy Trap and Interactive Dummy. Explain using your own example

(b) What do you understand by the term 'Structural Change'. Show how this kind of a change can be modelled with the help of dummy variables.

(4,4,4,6)

6. Write short notes (with explanations by giving your own illustrations wherever possible) on any **three** of the following:- (6 x 3=18)

(i) Turning Point under a Quadratic Model

(ii) Lin-Log and Log-Lin Models

P.T.O.

(v) Does the model suffer from multicollinearity, how would you determine the same

(3,4,3,3,5)

4. (a) A model was fitted between Demand for a Management Programme in terms of number of applications and the percentile obtained in entrance exam and following are the results for a 5 year (60 month period); $R^2 = 0.956$, d computed (DW) = 1.88

The Final equation was $\ln DD._{mgt} = 6.3 - 1.544 \ln_{percentile} + u_t$

S.E (0.27) (0.089)

(DW table at 5 %, dL = 1.383, dU = 1.45 for n= 60)

(i) Why do you think researcher applied the log to the variables and what kind of model is being considered

(ii) Interpret the slope coefficient

(iii) Comment on calculated values of 'd' and 't' and compute 'p'(coefficient of autocorrelation)

2. (a) Information was collected on the daily changes in rupee (Distribution A) and daily changes on NSE Nifty 50 Stock Index (Distribution B) for a six month period (150 days) and following are the summarized results

	Distribution A	Distribution B
Mean	22.66	11.53
Standard Deviation	6.19	8.11
Skewness	0.25	0.78
Kurtosis	2.11	5.24

Determine which of the above distribution is normally distributed. (6)

(b) Consider the model where demand for housing in different locations in a city (DD_H) for 2024 is found to be a function of different variables:

$DD_H = \beta_1 + \beta_2$ Locality's Population Density $+\beta_3$ Price Per Sq. ft $+ \beta_4$ Family Income on an average of locality residents $+ \beta_5$ Av. Distance from Metro Station $+ \beta_6$ Class of Employment $+ \beta_7$ Tax Benefits on Housing loan $+ \beta_8$ Av. PM 2.5 levels in locality;

n (no. of localities) = 38, $R^2 = 0.94$

P.T.O.

(a) How would you test the hypothesis $\beta_3=\beta_5 = \beta_8 = 0$

(b) Researcher found that although R^2 in the model was high but two important variables; Price Per Sq. ft and Av. Distance from Metro Station were insignificant. He considered this as an econometric problem of inclusion of irrelevant variables. Do you think researcher was correct in identifying the problem. Give your own viewpoint.

(c) Researcher then decided to take corrective action by removing these two variables from the model. Assuming he was allowed to do so, what should be the right approach while removing any variable from the model.

(d) Researcher's friend pointed out that the model was giving such results as the fitted model was having problem of heteroscedasticity, do you think the comment of his friend was correct. Given reason. (3,3,3,3)

3. Suppose monthly Demand for two air purifying plants; Snake Plant(SP) and Peace Lily (PL) in Delhi NCR during the last ten year period (monthly data) has been modelled as

Sales $SP_t = \beta_1 + \beta_2$ Price $SP_t + \beta_3$ Price $PL_t + u_t$ and the results are as under

Sales SP_t= 9111 -3152 Price SP_t+ 2853 Price PL_t, $R^2 = 0.971$,
Computed '$t_{slope\ coeff}$' (-6.34) (0.88)

(i) What kind of relation the researcher has in mind while fitting the above equation.

(ii) Interpret the two slope coefficients. Do they have the correct sign, are the two statistically significant (you make consider table 't' for relevant df as '2')

(iii) Interpret R^2

(iv) Is there any irrelevant variable in the model. Comment

P.T.O.