

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2025

PhD Coursework- Semester I

COURSE CODE (CREDITS): 21P1WHS132 (3)

MAX. MARKS: 25

COURSE NAME: Econometrics

COURSE INSTRUCTORS: Bilal Khan, Amit Srivastava

MAX. TIME: 1 Hour 30 Min

Note: (a) All questions are compulsory. (b) The candidate is allowed to make suitable numeric assumptions wherever required for solving problems.

Q. No	Question	CO	Mark
1.	(a) Discuss Multiple Regression Analysis along with its assumptions. Also, mention what does the coefficient of determination (R^2) indicate in a multiple regression model? (b) Why do we use the adjusted R^2 instead of R^2 in multiple regression?	CO 2	3+2= 5
2.	Explain the term 'multicollinearity' with a simple example and mention its consequences.	CO 2	5
3.	Differentiate between the concepts of 'homoscedasticity' and 'heteroscedasticity'. Discuss Goldfeld-Quandt test of detecting heteroscedasticity.	CO 3	5
4.	A researcher wants to analyze the factors influencing the annual sales revenue (Y) of manufacturing firms. The following explanatory variables are considered: • X1: Advertising expenditure (in ₹ million) • X2: Research and Development (R&D) expenditure (in ₹ million) • X3: Number of employees (in hundreds) • X4: Capacity utilization rate (in %) • X5: Capital investment (in ₹ million) • X6: Export ratio (exports as % of total sales) Using a sample of 20 firms, the following regression results were obtained using EViews:		

Dependent Variable: Y (Sales Revenue in ₹ million)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-215.432	85.210	-2.528	0.021
X ₁	12.645	4.225	2.992	0.008
X ₂	3.154	2.842	1.110	0.282
X ₃	8.475	3.205	2.645	0.016
X ₄	1.225	0.562	2.180	0.041
X ₅	-0.854	1.748	-0.489	0.631
X ₆	5.375	1.125	4.776	0.000
Statistic		Value		
R-squared		0.962		
Adjusted R-squared		0.949		
S.E. of regression		18.462		
Answer the following questions:				
(a) Write the estimated regression equation for the model.				
(b) Which explanatory variables are statistically significant at the 5% level? Justify your answer using the t-statistic or p-values.				
(c) Interpret the meaning of coefficients X ₁ , X ₃ , and X ₆ in the context of the study.				
(d) Comment on the explanatory power of the model using R ² and adjusted R ² .				
5.	Provide a detailed understanding of the term 'autocorrelation'. Discuss Durbin-Watson test of detecting autocorrelation.			

2025

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3

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CO
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5