

SL No of QP :6190

Unique Paper code : **2923060043**

Name of the Paper : **Financial Econometrics**

Name of the Course : BMS

Semester : VI

Duration: **3 Hours**

Maximum Marks: **90**

Instructions for Candidates:

- (i) Write your Roll No. on the top immediately on receipt of this question paper.
- (ii) Attempt any five questions in all.
- (iii) All questions carry equal marks.
- (iv) Use of Simple calculators are allowed.

Question-1

- a) Explain the classical linear regression model.
- b) Discuss how OLS estimation can be problematic when applied to financial time series data.
(10 + 8 marks)

Question-2

- a) Derive and interpret the ARCH(1) model.
- b) Describe the steps involved in estimating an ARCH model and testing for ARCH effects.
(10 + 8 marks)

Question-3

- a) Discuss the limitations of applying OLS to financial time series data. (8 marks)
- b) The following regression output was obtained from modelling daily returns (in %) of a stock:

$$R_t = 0.5 + 0.8R_{t-1}$$

With standard errors:

- Intercept: 0.2
- Coefficient: 0.1

- i) Interpret the model.
- ii) Test the significance of the lagged return at the 5% level.
- iii) What does this model suggest about market efficiency? (10 marks)

Question-4

- a) Discuss the concept and importance of forecasting in financial econometrics.
- b) Compare and contrast univariate vs. multivariate time series forecasting methods.

(10 + 8 marks)

Question-5

- a) What is a Vector Autoregression (VAR) model? Discuss its application in financial modeling.
- b) How would you determine the optimal lag length in a VAR model?

(12 + 8 marks)

Question-6 Attempt any 3

- a) Define cointegration. How is it different from correlation?
- b) Describe the Engle-Granger two-step method for testing cointegration.
- c) Explain the concept of an Error Correction Model (ECM) and its relationship with cointegration.
- d) How can cointegration be useful in modeling long-term relationships in finance (e.g., stock indices, interest rates)?

(6 x 3 = 18 marks)

Question-7

- a) What is a unit root? Explain why testing for unit roots is important in financial econometrics. (6 marks)
- b) Given the following ADF regression result for the time series Y_t

$$\Delta Y_t = 0.2 - 0.75Y_{t-1} + U_t$$

The standard error of the coefficient on Y_{t-1} is 0.25.

- i) Conduct a t-test for stationarity at the 5% significance level (use critical value = -2.9).
- ii) State the null and alternative hypotheses.
- iii) What transformation would you suggest based on the result? (12 marks)