Name: **Enrolment No:**	

UPES

End Semester Examination, December 2024

Course: Financial Econometrics **Semester: III**

Program: MBA (Finance Management) **Time: 03 hrs.**

Course Code: FINC8009 **Max. Marks: 100**

Instructions:

- This is a CLOSE BOOK exam.
- All questions are mandatory.
- The use of laptops, internet access, mobile phones, and other electronic devices is strictly prohibited during the exam.
- Use of unfair means will result in immediate disciplinary action.

SECTION A
10Qx2M=20Marks

S. No.	Statement of question.	Marks	CO
Q 1.1	What is the primary consequence of multicollinearity in OLS regression? a) It reduces the overall model fit b) It inflates the standard errors of coefficient estimates c) It increases the Durbin-Watson statistic d) It makes the dependent variable unstable	**2**	**CO1**
Q 1.2	What is the primary implication of omitted variable in OLS regression? a) It leads to a decrease in R-squared value b) It makes the standard errors of coefficients biased c) It makes the OLS coefficient estimates bias d) It results in higher heteroscedasticity	**2**	**CO1**
Q 1.3	Which test is commonly used to detect autocorrelation? a) Breusch-Pagan test b) Augmented Dickey-Fuller test c) Durbin-Watson test d) Variance Inflation Factor (VIF)	**2**	**CO1**
Q 1.4	Which of the following tests is used to detect heteroscedasticity? a) Durbin-Watson test b) Breusch-Pagan test	**2**	**CO1**

	c) Variance Inflation Factor (VIF) d) Goodness of Fit		
Q 1.5	Autocorrelation is most commonly observed in which type of data? a) Cross-sectional data b) Panel data c) Time series data d) Experimental data	**2**	**CO1**
Q 1.6	In a multivariate OLS regression, which test is used to check the overall significance of the model? a) t-test b) F-test c) Wald test d) Breusch-Pagan test	**2**	**CO1**
Q 1.7	In an OLS regression, if R^2= 0.85, what does this indicate? a) 85% of the variance in the dependent variable is explained by the independent variables b) The model has 85% accuracy c) 85% of the independent variables are significant d) The residuals are 85% correlated	**2**	**CO1**
Q 1.8	Which of the following indicates multicollinearity in OLS? a) High R-squared value b) Low Variance Inflation Factor (VIF) c) High Variance Inflation Factor (VIF) d) Errors correlated with independent variables	**2**	**CO1**
Q 1.9	When adding irrelevant predictors to a regression model, the adjusted R2: a) Always increases b) Always decreases c) Increases only if the predictors improve the model d) Remains unchanged	**2**	**CO1**
Q 1.10	In a regression model, if the F-statistic is very large, it implies that: a) All the coefficients are statistically insignificant b) At least one of the coefficients is statistically significant c) The residuals are normally distributed d) The R-squared value is 0	**2**	**CO1**

<table>
<tr><td colspan="4">SECTION B
4Qx5M= 20 Marks</td></tr>
<tr><td>Q</td><td>Write a short-notes on the followings</td><td></td><td></td></tr>
<tr><td>2</td><td>Serial Autocorrelation</td><td>5</td><td>CO2</td></tr>
<tr><td>3</td><td>State the difference between Parameter and Estimates</td><td>5</td><td>CO2</td></tr>
<tr><td>4</td><td>Cross-sectional data</td><td>5</td><td>CO2</td></tr>
<tr><td>5</td><td>Population regression curve</td><td>5</td><td>CO2</td></tr>
<tr><td colspan="4">SECTION-C
3Qx10M=30 Marks</td></tr>
<tr><td>Q</td><td>Statement of question</td><td></td><td></td></tr>
<tr><td>6</td><td>Describe in detail the assumptions involved in estimation of simple linear regression model through OLS.</td><td>10</td><td>CO3</td></tr>
<tr><td>7</td><td>What happens to the OLS estimator, when it is estimated in the presence of high multicollinearity in the model.</td><td>10</td><td>CO3</td></tr>
<tr><td>8</td><td>The following table contains the birthweight of 10 babies and their mothers' education level.
<table>
<tr><th>Id No.</th><th>Birthweight (in ounces)</th><th>Mother education (in years)</th></tr>
<tr><td>1</td><td>109</td><td>12</td></tr>
<tr><td>2</td><td>133</td><td>12</td></tr>
<tr><td>3</td><td>129</td><td>12</td></tr>
<tr><td>4</td><td>126</td><td>12</td></tr>
<tr><td>5</td><td>134</td><td>12</td></tr>
<tr><td>6</td><td>118</td><td>14</td></tr>
<tr><td>7</td><td>140</td><td>14</td></tr>
<tr><td>8</td><td>86</td><td>14</td></tr>
<tr><td>9</td><td>121</td><td>17</td></tr>
<tr><td>10</td><td>129</td><td>18</td></tr>
</table>
Estimate the relationship between birthweight and mother-education using OLS; that is, obtain the intercept and slope estimates in the equation
$$birthweight = \beta_0 + \beta_1\, mother\ education + u_i$$
Comment on the direction of the relationship. Explain the interpretation of intercept. How much higher is the baby's weight predicted to be if the If mother education increases by 10 years?</td><td>10</td><td>CO3</td></tr>
</table>

SECTION-D 2Qx15M= 30 Marks			
Q	Statement of question		
9	Consider an equation to explain salaries of CEOs in terms of annual firm sales, return on equity (roe, in percentage form), and return on the firm's stock (ros, in percentage form): $\log(salary) = \beta_0 + \beta_1 \log(sales) + \beta_2 roe + \beta_3 ros + u$ (i) In terms of the model parameters, state the null hypothesis that, after controlling for sales and roe, ros has no effect on CEO salary. State the alternative that better stock market performance increases a CEO's salary. The following equation was obtained by OLS using CEOSAL1 data: $\log(salary) = 4.32 + .280 \log(sales) + .0174\, roe + .00024\, ros$ (.32) (.035) (.0041) (.00054) $N = 209,\ R^2 = .283$ (ii) Explain the interpretation of coefficient of **sales** and **roe** in the above model. (iii) Test the null hypothesis that sales have no effect on salary against the alternative that sales has a positive effect. Carry out the test at the 5% significance level. ***($t_c = 1.645$)*** (iii) By what percentage is salary predicted to increase if ros increases by 50 points? Does ros have a practically large effect on salary? (iv) Test the null hypothesis that ros has no effect on salary against the alternative that ros has a positive effect. Carry out the test at the 5% significance level. ***($t_c = 1.645$)*** (v) Would you include ros in a final model explaining CEO compensation in terms of firm performance? Explain.	**15**	**CO4**
10	Explain the mechanism involved in doing the Durbin Watson D-test to detect autocorrelation in a series. In studying the movement in the production workers' share in the value added (i.e., labor's share) for 30 years, the following models were considered by a researcher. Check the serial correlation in model A and model B? Model A: $labour\ share = 0.4529 - 0.0041t$ $R^2 = 0.5284$ (d = .8252) **(D_L = 1.352, D_U =1.489)**	15	**CO4**

	Model B: $labour\ share\ = 0.4786 - 0.0127t + .0005\ t^2$ $R2\ = 0.6629, \quad d\ = 1.82$ **(D_L = 1.284, D_U =1.567)** Or, What do you understand by RUN? Explain the steps involved in RUN test to detect the autocorrelation in time-series. Apply the test to the following sequence of residuals obtained from daily stock returns to assess whether the series exhibits randomness or autocorrelation. +, +, +, −, −, −, −, −, +, +, +, +, −, −, +, + −, +, +		