Question No 01

An economic model is a set of assumptions that describes the behavior of an economy, or more generally, a phenomenon.

An econometric model consists of -a set of equations describing the behavior. These equations are derived from the economic model and have two parts – observed variables and disturbances. -a statement about the errors in the observed values of variables. -a specification of the probability distribution of disturbances.

Key properties, whether they already be widely accepted or have yet to be accepted at all, that a good economic model should possess:

1) Parsimony

 2) Tractability

3) Conceptual insightfulness

 4) Generalizability

 5) Falsifiability

 6) Empirical consistency

 7) Predictive precision

Part (B)

R-squared measures the proportion of the variation in your dependent variable (Y) explained by your independent variables (X) for a linear regression model.

The R-squared is not dependent on the number of variables in the model

Adjusted R-squared adjusts the statistic based on the number of independent variables in the model.

The adjusted R-squared adds a penalty for adding variables to the model that are uncorrelated with the variable your trying to explain

Regression and correlation

Correlation is a statistical measure that determines the association or co-relationship between two variables. Correlation quantifies the strength of the linear relationship between a pair of variables.

Regression describes how to numerically relate an independent variable to the dependent variable regression expresses the relationship in the form of an equation.

Basis for Comparison	Correlation	Regression
Meaning	Correlation is a statistical measure which determines co-relationship or association of two variables.	Regression describes how an independent variable is numerically related to the dependent variable.
Usage	To represent linear relationship between two variables.	To fit a best line and estimate one variable on the basis of another variable.
Dependent and Independent variables	No difference	Both variables are different.

Basis for Comparison	Correlation	Regression
Indicates	Correlation coefficient indicates the extent to which two variables move together.	Regression indicates the impact of a unit change in the known variable (x) on the estimated variable (y).
Objective	To find a numerical value expressing the relationship between variables.	To estimate values of random variable on the basis of the values of fixed variable.

Question 02

Steps involved in methodology econometrics:

Generally econometrics research involves four steps

- Formulation of the maintained hypothesis

i-e the specification of the model

- Testing of maintained hypothesis

Estimation of the model by appropriate econometric method.

- Evaluation of estimates:

Decides on the basis of certain criteria wether the estimates are satisfactory and reliable.

- Testing the forecasting validity of the model

Question 03

Assumption of OLS

1. The regression model is linear in the coefficients and the error term
2. The error term has a population mean of zero
3. All independent variables are uncorrelated with the error term
4. Observations of the error term are uncorrelated with each other
5. The error term has a constant variance (no heteroscedasticity)
6. No independent variable is a perfect linear function of other explanatory variables
7. The error term is normally distributed (optional)

OLS Assumption 1: The linear regression model is "linear in parameters."

When the dependent variable $(Y)(Y)(Y)$ is a linear function of independent variables $(X's)(X's)(X's)$ and the error term, the regression is linear in parameters and not necessarily linear in $X'sX'sX's$.

OLS Assumption 2: There is a random sampling of observations

This assumption of OLS regression says that:

- The sample taken for the linear regression model must be drawn randomly from the population. For example, if you have to run a regression model to study the factors that impact the scores of students in the final exam, then you must select students randomly from the university during your data collection process, rather than adopting a convenient sampling procedure.

  OLS Assumption 3: The conditional mean should be zero.

The expected value of the mean of the error terms of OLS regression should be zero given the values of independent variables. In other words, the distribution of error terms has zero mean and doesn't depend on the independent variables X'sX'sX's. Thus, there must be no relationship between the X'sX'sX's and the error term.

OLS Assumption 4: There is no multi-collinearity (or perfect collinearity).

In a simple linear regression model, there is only one independent variable and hence, by default, this assumption will hold true. However, in the case of multiple linear regression models, there are more than one independent variable. The OLS assumption of no multi-collinearity says that there should be no linear relationship between the independent variables. For example, suppose you spend your 24 hours in a day on three things – sleeping, studying, or playing. Now, if you run a regression with dependent variable as exam score/performance and independent variables as time spent sleeping, time spent studying, and time spent playing, then this assumption will not hold.

OLS Assumption 5: Spherical errors: There is homoscedasticity and no autocorrelation.

According to this OLS assumption, the error terms in the regression should all have the same variance.

OLS Assumption 6: Error terms should be normally distributed.

This assumption states that the errors are normally distributed, conditional upon the independent variables. This OLS assumption is not required for *the validity of OLS method;* however, it becomes important when one needs to define some additional finite-sample properties. Note that only the error terms need to be normally distributed. The dependent variable Y need not be normally distributed.