Name:
Enrolment No:

UPES
UNIVERSITY WITH A PURPOSE

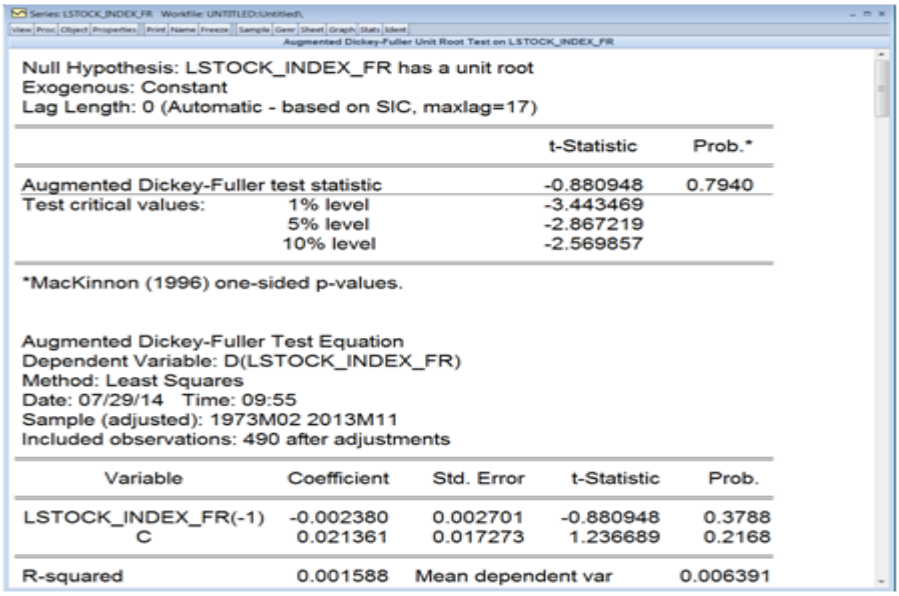
UNIVERSITY OF PETROLEUM & ENERGY STUDIES

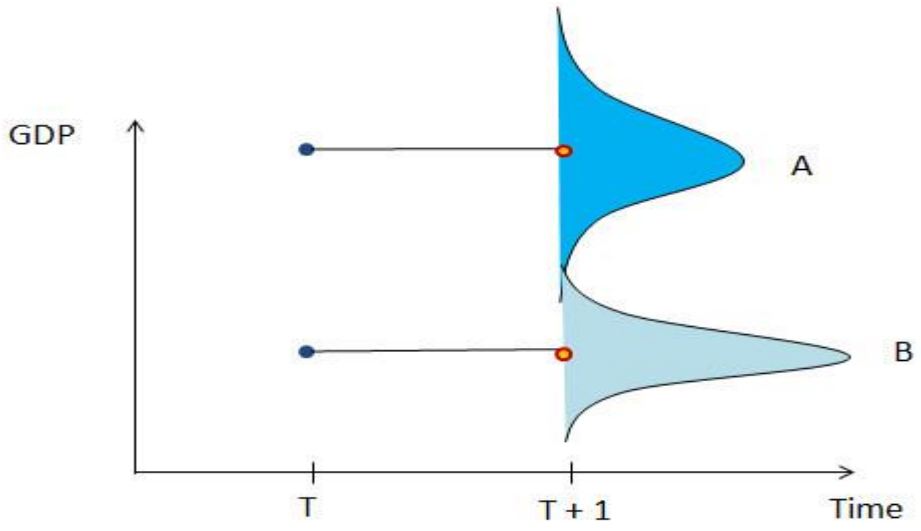
End Semester Examination (Online) – December, 2020

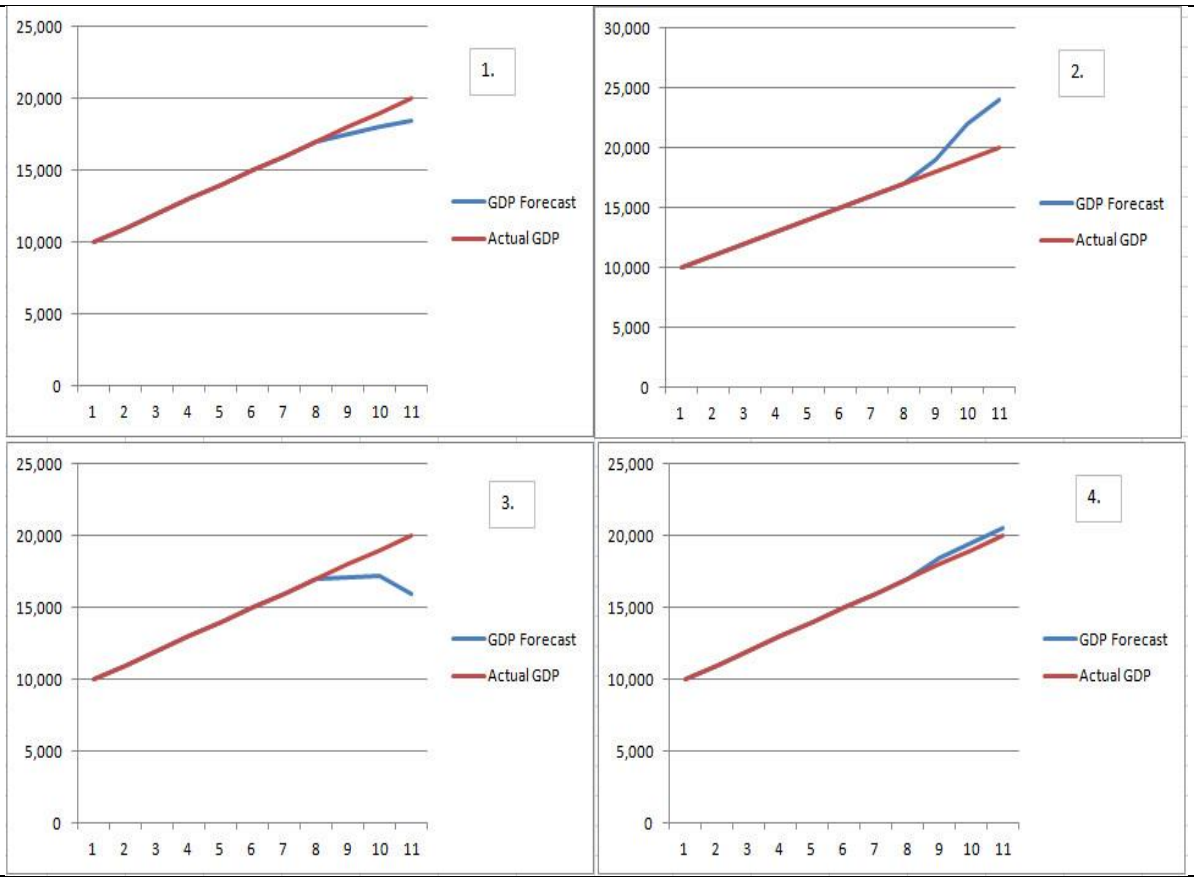
Program: MA(EE) **Semester: III**
Subject/Course: Business Modelling in Energy Sector **Max. Marks: 100**
Course Code: OGET8007 **Duration: 3 Hours**

Section-A

1. **Each question will carry 5 marks**
2. **Select the correct answer(s)**

S.No.	Question	Marks	COs
1	Which of the following are sources of forecast uncertainty? Select all that apply: A. Error term in the DGP B. Stochastic exogenous variables C. An unknown DGP D. Unknown parameters in the DGP E. Measurement errors in exogenous variables F. Model misspecification G. Poor data quality H. Poor parameter estimation	5	CO 1
2	**True or False**: In general, the more exogenous variables we must forecast to obtain a forecast for the dependent variable, the greater the uncertainty of our forecast.	5	CO 2
3	 Null Hypothesis: LSTOCK_INDEX_FR has a unit root Exogenous: Constant Lag Length: 0 (Automatic - based on SIC, maxlag=17) t-Statistic Prob.* Augmented Dickey-Fuller test statistic -0.880948 0.7940 Test critical values: 1% level -3.443469 5% level -2.867219 10% level -2.569857 *MacKinnon (1996) one-sided p-values. Augmented Dickey-Fuller Test Equation Dependent Variable: D(LSTOCK_INDEX_FR) Method: Least Squares Date: 07/29/14 Time: 09:55 Sample (adjusted): 1973M02 2013M11 Included observations: 490 after adjustments Variable Coefficient Std. Error t-Statistic Prob. LSTOCK_INDEX_FR(-1) -0.002380 0.002701 -0.880948 0.3788 C 0.021361 0.017273 1.236689 0.2168 R-squared 0.001588 Mean dependent var 0.006391 You are provided the EViews output for an Augmented Dickey-Fuller (ADF)-test (below). According to the test: A. The null hypothesis of unit root is rejected; the variable has a stochastic trend. B. The null hypothesis of unit root is rejected at 10% significance level; the variable is	5	CO 1

	stationary. C. The null hypothesis of unit root is not rejected at 1, 5 or 10% level of significance; the variable is non-stationary D. I don't know.		
4	Fill in the Blanks in order as per the following question. The options are (**Forecast Error, Bias, Standard error, Mean squared error, Root Mean Squared Error, Mean Absolute Percentage Error**) **Measures of Forecast Accuracy** / **Equations** / **Measures of Forecast Accuracy** / **Equations** $\hat{y}_t - y_t$ | $\sqrt{\frac{1}{f}\sum_{i=1}^{f} FE_t^2}$ $\frac{1}{f}\sum_{t-1}^{f} FE_t$ | $\frac{1}{f}\sum_{i=1}^{f} \lvert FE_t \rvert$ $\sqrt{\frac{1}{f}\sum_{t-1}^{f} (FE_t - BIAS)^2}$ | $\frac{1}{f}\sum_{i=1}^{f} \left\lvert \frac{FE_t}{y_t} \right\rvert$ $\frac{1}{f}\sum_{i-1}^{f} FE_i^2$	5	CO 2
5	Which of the following forecasts of GDP has the smaller error variance?  	5	CO 1
6	Which of the following graphs display an optimistic bias relative to the actual outcome? Select all that apply:	5	CO 1

Section-B

1. **Each question will carry 10 marks**
2. **Instruction: Write short/ brief notes**

7.	What are the different test available for stationarity test?	10	CO 2
8.	Explain the steps in Forecasting.	10	CO 2
9.	What are the different types panel data models?	10	CO 2
10.	What is data envelopment analysis? Explain its uses in the energy sector.	10	CO 3
11	Write the expression for the AR(2) model. Derive Mean and variance of the AR(2) Model.	10	CO 3

Section-C

1. **Each question carries 20 Marks.**
2. **Instruction: Write long answer.**

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What is ARIMA modelling? Explain whether it can be used for Energy Demand Forecasting.

Or

Compare the output of the two models given below. Which model you will prefer and why?

Model-1

Dependent Variable: C01
Method: Panel Least Squares
Date: 12/09/20 Time: 17:00
Sample: 2000 2014
Periods included: 15
Cross-sections included: 6
Total panel (balanced) observations: 90

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1158559.	360592.7	3.212930	0.0018
Q	2026114.	61806.95	32.78134	0.0000
PF	1.225348	0.103722	11.81380	0.0000
LF	-3065753.	696327.3	-4.402747	0.0000

R-squared	0.946093	Mean dependent var	1122524.
Adjusted R-squared	0.944213	S.D. dependent var	1192075.
S.E. of regression	281559.5	Akaike info criterion	27.97750
Sum squared resid	6.82E+12	Schwarz criterion	28.08860
Log likelihood	-1254.988	Hannan-Quinn criter.	28.02230
F-statistic	503.1176	Durbin-Watson stat	0.236118
Prob(F-statistic)	0.000000		

Model-2

Dependent Variable: C01
Method: Panel Least Squares
Date: 12/09/20 Time: 17:00
Sample: 2000 2014
Periods included: 15
Cross-sections included: 6
Total panel (balanced) observations: 90

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1158559.	360592.7	3.212930	0.0018
Q	2026114.	61806.95	32.78134	0.0000
PF	1.225348	0.103722	11.81380	0.0000
LF	-3065753.	696327.3	-4.402747	0.0000

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CO 4

R-squared	0.946093	Mean dependent var	1122524.	
Adjusted R-squared	0.944213	S.D. dependent var	1192075.	
S.E. of regression	281559.5	Akaike info criterion	27.97750	
Sum squared resid	6.82E+12	Schwarz criterion	28.08860	
Log likelihood	-1254.988	Hannan-Quinn criter.	28.02230	
F-statistic	503.1176	Durbin-Watson stat	0.236118	
Prob(F-statistic)	0.000000			