Name: **Enrolment No:**	UPES UNIVERSITY WITH A PURPOSE

UNIVERSITY OF PETROLEUM & ENERGY STUDIES
DEHRADUN
End-Semester Examination 2021

Program/course	**: MA Economics**	**Semester**	**: II**
Subject	**: Econometrics**	**Max. Marks**	**: 100**
Code	**: ECON 7009**	**Duration**	**: 3 Hrs**
No. of page/s	**: 4**		

SECTION A

1. Each Question will carry 5 Marks
2. Instruction: Answer all the questions by filling the blanks:

Q1	Heteroscedasticity is a _____. a. Problem of time series data b. Problem of cross-sectional data c. Primary data d. Secondary data	**[5]**	**CO1**
Q2	When choosing between regression models it is preferable to choose the one with _____ a. The highest R^2. b. The least number of independent variables. c. The highest F value d. The most number of independent variables.	**[5]**	**CO1**
Q3	When the estimated slop coefficient in the simple regression model $\hat{\beta}_2$, is zero, then _____. a. $r^2 = 0$ b. $r^2 \leq 1$ c. $0 \leq r^2 \leq 1$ d. $r^2 \leq 0$	**[5]**	**CO1**
Q4	$E(Y \mid X_i) = f(X_i)$ is known as _____. a. conditional expectation function b. Cobb-Douglas production function c. sample expectation function d. conditional mean function	**[5]**	**CO1**

<table>
<tr><td>Q5</td><td>The α in a confidence interval given by $\Pr\left(\hat{\beta}_2-\delta\le\beta_2\le\hat{\beta}_2+\delta\right)=1-\alpha$ is known as ___.
a. Confidence coefficient
b. Level of confidence
c. Level of significance
d. Confidence Limit</td><td>[5]</td><td>CO1</td></tr>
<tr><td>Q6</td><td>Systematic component of the equation, $Y_i = E(Y \mid X_i) + u_i$ is _____.
a. u_i
b. Y_i
c. $E(Y \mid X_i)$
d. X_i</td><td>[5]</td><td>CO1</td></tr>
<tr><td colspan="4">SECTION B
1. Each question will carry 10 marks
2. Instruction: Answer all questions</td></tr>
<tr><td>Q7.</td><td>Examine first five assumption of classical linear regression model.</td><td>[10]</td><td>CO2</td></tr>
<tr><td>Q8.</td><td>Illustrate Gauss–Markov theorem with properties of least square estimators.</td><td>[10]</td><td>CO2</td></tr>
<tr><td>Q9</td><td>The ANOVA table of one regression result is given below.
The critical value of F(1, 16) = 2.4904 and α = 5%.
<table>
<tr><td>Source</td><td>SS</td><td>Df</td><td>MSS</td></tr>
<tr><td>Model</td><td>326765512</td><td>1</td><td></td></tr>
<tr><td>Residual</td><td>167697811</td><td>16</td><td></td></tr>
<tr><td>Total</td><td>494463323</td><td>17</td><td></td></tr>
</table>
Compute
(i) Mean sum of squares, (ii) F- statistics, and (iii) State the overall significance of the model.</td><td>[10]</td><td>CO2</td></tr>
<tr><td>Q10.</td><td>The VIF of regression considering Hydroelectricity Consumption (Million tonnes oil equivalent) as dependent variable is given. Analyses both VIF and TOL and discuss about presence of multicollinearity in the model.
<table>
<tr><td>Variable</td><td>VIF</td><td>1/VIF</td></tr>
<tr><td>GDP</td><td>260.14</td><td>0.003844</td></tr>
<tr><td>CO2</td><td>249.21</td><td>0.004013</td></tr>
<tr><td>COP</td><td>3.72</td><td>0.268896</td></tr>
<tr><td>FDI</td><td>3.44</td><td>0.290332</td></tr>
<tr><td>Mean VIF</td><td>129.13</td><td></td></tr>
</table></td><td>[10]</td><td>CO3</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
</table>

Q11.	Consider the following regression output: FDI : Foreign direct investment, net inflows (% of GDP) CC : Coal Consumption (Million tonnes oil equivalent) OC : Oil Consumption (Million tonnes) GDP : GDP (constant 2010 US$)	**[10]**	**CO3**

Source	SS	df	MS	Number of obs =	40
				F(3, 36) =	32.14
Model	22.042701	3	7.34756699	Prob > F =	0.0000
Residual	8.22985362	36	.228607045	R-squared =	0.7281
				Adj R-squared =	0.7055
Total	30.2725546	39	.776219348	Root MSE =	.47813

FDI	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
CC	-.0131586	.008983	-1.46	0.152	-.031377	.0050598
OC	.0168128	.0073668	2.28	0.028	.0018723	.0317534
GDP	1.83e-12	1.42e-12	1.29	0.205	-1.04e-12	4.70e-12
_cons	-.3090215	.2600202	-1.19	0.242	-.836367	.2183239

a) Interpret coefficient of CC and OC.
b) Test the hypothesis that OC does not affect FDI. Which test do you use? And why?

Section C

1. Each Question carries 20 Marks.
2. Instruction: Answer the questions

Q12.	In the following multiple regression result, Hydroelectricity Consumption (Million tonnes oil equivalent) is estimated using factors such as Crude oil prices -US dollars per barrel (COP), GDP-constant 2010 US$ (GDP), Foreign direct investment, net inflows -% of GDP (FDI), and Carbon Dioxide Emissions -Million tonnes carbon dioxide (CO2).	**[20]**	**CO4**

Source	SS	df	MS	Number of obs =	40
				F(4, 35) =	97.64
Model	1330.5003	4	332.625074	Prob > F =	0.0000
Residual	119.230714	35	3.40659184	R-squared =	0.9178
				Adj R-squared =	0.9084
Total	1449.73101	39	37.17259	Root MSE =	1.8457

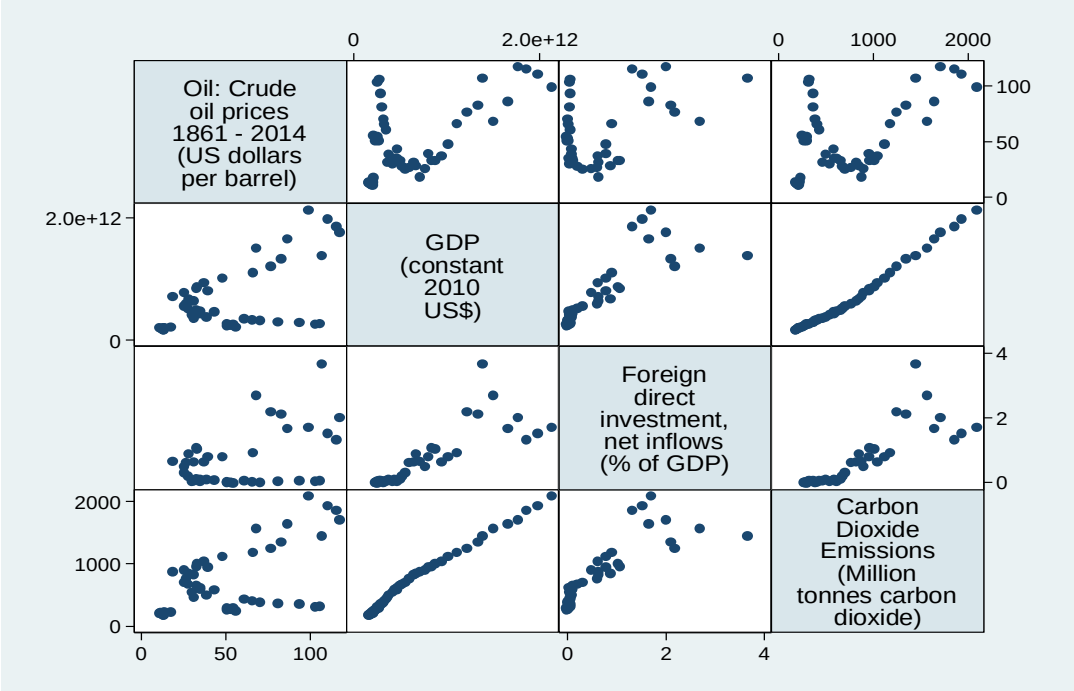
HEC	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
COP	.0163558	.0189821	0.86	0.395	-.0221799	.0548915
GDP	-1.39e-12	8.76e-12	-0.16	0.875	-1.92e-11	1.64e-11
FDI	1.11567	.6225693	1.79	0.082	-.1482133	2.379552
CO2	.0107857	.0091245	1.18	0.245	-.007738	.0293094
_cons	7.397092	1.948615	3.80	0.001	3.441193	11.35299

Interpret the post estimation results and justify whether multicollinearity is present in the model or not.

Post Estimation Tests:

(i) R-square and t-ratio comparison

(ii) Scatter Plot Matrix



(iii) Correlation Matrix

	COP	GDP	FDI	CO2
COP	1.0000			
GDP	0.5130	1.0000		
FDI	0.4598	0.8239	1.0000	
CO2	0.4398	0.9944	0.8271	1.0000