UNIVERSITY OF PETROLEUM & ENERGY STUDIES
DEHRADUN
End-Semester Examination 2020

Program/course	**: MBA OG**	**Semester**	**: II**
Subject	**: Econometrics**	**Max. Marks**	**: 100**
Code	**: MBCE 702**	**Duration**	**: 3 Hrs**
No. of page/s	**: 4**		

SECTION A

1. Each Question will carry 5 Marks
2. Instruction: Select the correct answer(s)

Q1	Econometrics means _____.				**[5]**	**CO1**
	a.	Statistical measurement	c.	Functional measurement		
	b.	economic measurement	d.	All the above		

Q2	Which of the following statements is true concerning the population regression function (PRF) and sample regression function (SRF)?	**[5]**	**CO1**
	a. The PRF is the estimated model		
	b. The PRF is used to infer likely values of the SRF		
	c. Whether the model is good can be determined by comparing the SRF and the PRF		
	d. The PRF is a description of the process thought to be generating the data.		

Q3	When the estimated slop coefficient in the simple regression model $\hat{\beta}_2$, is zero, then				**[5]**	**CO1**
	a.	$r^2 = 0$	c.	$0 \leq r^2 \leq 1$		
	b.	$r^2 \leq 1$	d.	$r^2 \leq 0$		

Q4	$u_i = Y_i - E(Y \mid X_i)$ is known as _____.	[5]	CO1
	a. deviation of an expected Y_i around its mean value c. deviation of an individual X_i around its expected value		
	b. deviation of an individual Y_i around its maximum value d. deviation of an individual Y_i around its expected value		
Q5	If coefficient of determination $r^2 = 1$ for a regression model, then _____.	[5]	CO1
	a. it is a perfect fit model c. $X = Y$		
	b. $X \le Y$ d. $E(Y) = E(X)$		
Q6	In confidence interval estimation, $\alpha = 5\%$, this means that this interval includes the true β with probability of _____.	[5]	CO1
	a. 5% c. 105%		
	b. 95% d. 100%		

SECTION B

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

Q7.	Calculate F-value from the ANOVA table given below and describe its use in regression analysis.	[10]	CO2
	Source SS df		
	Model 5564.44289 6 Residual 487.629289 32		
	Total 6052.07218 38		
Q8.	Formulate one Petroleum Production Function, write down its functional form and econometric specification for the following variables: Q : Petroleum Production C : Crude Oil K : Capital Z : Land L : Labour	[10]	CO2

Q9	Oil consumption (oc) is estimated as given below using- crude oil price (p); crude oil import (im); crude oil export (ex); per capita GDP (pgdp); and carbon emission (co2).	[10]	CO2

Source	SS	df	MS		Number of obs =	35
Model	7938423.38	5	1587684.68		F(5, 29) =	371.34
Residual	123989.991	29	4275.51694		Prob > F =	0.0000
					R-squared =	0.9846
					Adj R-squared =	0.9820
Total	8062413.37	34	237129.805		Root MSE =	65.387

oc	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
p	-3.834641	.8662552	-4.43	0.000	-5.606331	-2.06295
im	.6252913	.0466814	13.39	0.000	.5298171	.7207655
ex	-.1236515	.0271815	-4.55	0.000	-.1792438	-.0680591
pgdp	.0050046	.0024767	2.02	0.053	-.000061	.0100701
co2	1.122187	.2407524	4.66	0.000	.6297929	1.614581
_cons	1068.624	161.3615	6.62	0.000	738.6027	1398.645

(a) Identify Explained Sum of square (ESS), residual sum of square (RSS) and show that Total sum of square (TSS)= ESS+ RSS.
(b) Identify R^2 and interpret it.
(c) Identify intercept of the model and interpret it.

Q10.	In the following multiple regression result, Gas Production – tonnes (Million tonnes oil equivalent) (GP) is estimated using factors such as:	[10]	CO3

- GDP per capita (constant 2010 US$) (GP),
- Domestic credit provided by financial sector (% of GDP) (DCF),
- Energy imports, net (% of energy use) (EIM),
- Foreign direct investment, net inflows (% of GDP) (FDIP),
- Gross capital formation (annual % growth) (GCFR), and
- Industry, value added (annual % growth) (IVAR).

Source	SS	df	MS		Number of obs =	39
Model	5564.44289	6	927.407148		F(6, 32) =	60.86
Residual	487.629289	32	15.2384153		Prob > F =	0.0000
					R-squared =	0.9194
					Adj R-squared =	0.9043
Total	6052.07218	38	159.265057		Root MSE =	3.9036

GP	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
GDPP	-.0156572	.0127679	-1.23	0.229	-.0416646	.0103502
DCF	.4852146	.1718355	2.82	0.008	.1351971	.8352321
EIM	1.44941	.3663004	3.96	0.000	.7032801	2.195539
FDIP	-.7732869	1.427769	-0.54	0.592	-3.681557	2.134983
GCFR	.0577847	.0779678	0.74	0.464	-.1010305	.2165998
IVAR	.2376649	.2601368	0.91	0.368	-.2922164	.7675462
_cons	-19.63859	4.848213	-4.05	0.000	-29.51408	-9.763103

(i)   Test the hypothesis that all the explanatory variables are impacting dependent variable individually.
(ii) Test the hypothesis that all the explanatory variables are impacting dependent variable jointly.

Q11.	From the regression result of crude oil production function, p-values are given below. Prepare a table as given below and state at what level independent variables are affecting crude oil production significantly.		[10]	CO3

Crude Oil Production	p > |t|	Write down only Level of Significance
Price of Crude Oil	0.001	
Per Capita GDP	0.002	
Refinery Throughputs	0.052	
Proved Reserves of Crude Oil	0.345	
Population	0.124	
Carbon Emission	0.564	

Section C

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

Q12.	Write a report on the following results:	[20]	CO4

In the following multiple regression result, Carbon Emission (co2) is estimated using factors such as:

- oil consumption (oc),
- per capita GDP (pgdp),
- import of goods and services (om), and
- export of goods and services (ox).

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  Source |       SS       df       MS              Number of obs =      34
---------+------------------------------           F(  4,    29) =  342.91
   Model | 1020938.61      4  255234.652           Prob > F      =  0.0000
Residual | 21585.3769     29  744.323342           R-squared     =  0.9793
---------+------------------------------           Adj R-squared =  0.9764
   Total | 1042523.99     33  31591.6359           Root MSE      =  27.282

      co2 |     Coef.   Std. Err.      t     P>|t|     [95% Conf. Interval]
----------+----------------------------------------------------------------
       oc |  .1308342   .0144843     9.03    0.000     .1012106    .1604579
     pgdp | -.0136371   .0045878    -2.97    0.006    -.0230202   -.0042539
       om |   .014613   .0102785     1.42    0.166    -.0064089    .0356349
       ox | -.0092261   .0176469    -0.52    0.605    -.0453181    .0268659
    _cons |  294.4371   170.1929     1.73    0.094    -53.64647    642.5206
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