

<b>Name:</b>	
<b>Enrolment No:</b>	

**UNIVERSITY OF PETROLEUM AND ENERGY STUDIES**  
**End Semester Examination, December 2018**

**Course: Basic Econometrics** **Semester: III**  
**Course Code: ECON 2001**

**Programme: BA (H) Energy Economics**

**Time: 03 hrs.** **Max. Marks: 100**

**Instructions:** Answer **all** the questions from Section A, **Four** questions from Section B, **Three** questions from Section C and Section D is **compulsory**.

**SECTION A (10\*2 = 20 marks)**

S. No.	Explain the following concepts in Q 1 to Q 5 (Answer should be precise and short).	Marks	CO
Q 1	Beta coefficients	2	1
Q 2	Unbiased estimator.	2	1
Q 3	Dummy variable trap	2	1
Q 4	Degrees of freedom	2	1
Q 5	Type II error	2	1
Q 6	What is heteroscedasticity?	2	1
Q 7	Let $X$ be a standardized variable. What is the mean and standard deviation of $X$ ?	2	1
Q 8	What do you mean by best estimator?	2	1
Q 9	What is the interpretation of $R$ -Squared in a linear regression model?	2	1
Q 10	What do you mean by statistical significance of an independent variable?	2	1

**SECTION B (5\*4 = 20 marks)**

Q 1	What is the multicollinearity problem in a regression model? What are the consequences of multicollinearity?	5	1
Q 2	Write the function $Y_i = \beta_1 X_i^{\beta_2} e^{u_i}$ as a log-linear model. How do you interpret the coefficients of the log-linear model?	5	2
Q 3	Describe different types of data. Give example for each type of data structure.	5	1
Q 4	What are the possible reasons for heteroscedasticity in a regression model?	5	1
Q 5	Consider the following model: $Y_t = Y_0(1 + r)^t$ where $r$ is the compound (i.e., over time) rate of growth of $Y$ and $t$ is time period.	5	3

	Explain the procedure to compute the compounded annual growth rate ( $r$ ) using log-lin model.																										
<b>SECTION-C (10*3 = 30 marks)</b>																											
Q 1	What are the reasons for the presence of a stochastic disturbance term in a regression model?	<b>10</b>	<b>1</b>																								
Q 2	Discuss the assumptions of classical linear regression model.	<b>10</b>	<b>1</b>																								
Q 3	How dummy variable is useful in regression analysis? How do you interpret the coefficients including intercept term in the following regression model?  $wage_i = \alpha + \beta_1 Edu_i + \beta_2 D_i + \varepsilon_i$ , where $wage$ is hourly wage in rupees, $Edu$ represents years of education, $D$ is a dummy variable that takes value 0 for female and 1 for male and $\varepsilon$ represents the random error term.	<b>10</b>	<b>3</b>																								
Q 4	Describe White's heteroscedasticity test for the following regression model. $Y_i = \alpha + \beta_1 X_i + \beta_2 P_i + \varepsilon_i$ where $\alpha$ represents intercept/constant, $\varepsilon$ denotes the random error term.		<b>2</b>																								
<b>SECTION-D (30 marks)</b>																											
Q 1	Using the ordinary least squares method estimate the regression model: $PC_t = \alpha + \beta GDP_t + \varepsilon_t$ on the following data.  PC and GDP represent petrol consumption and real gross domestic product (both measured in crores of rupees), $\alpha$ represents intercept/constant, $\varepsilon_t$ denotes the random error term.	<b>30</b>																									
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Year</th> <th style="text-align: center;">Petrol consumption (PC) (Rs. crores)</th> <th style="text-align: center;">Real GDP (RGDP) (Rs. crores)</th> </tr> </thead> <tbody> <tr><td style="text-align: center;">2005</td><td style="text-align: center;">45</td><td style="text-align: center;">95</td></tr> <tr><td style="text-align: center;">2006</td><td style="text-align: center;">46</td><td style="text-align: center;">115</td></tr> <tr><td style="text-align: center;">2007</td><td style="text-align: center;">52</td><td style="text-align: center;">130</td></tr> <tr><td style="text-align: center;">2008</td><td style="text-align: center;">64</td><td style="text-align: center;">145</td></tr> <tr><td style="text-align: center;">2009</td><td style="text-align: center;">68</td><td style="text-align: center;">150</td></tr> <tr><td style="text-align: center;">2010</td><td style="text-align: center;">75</td><td style="text-align: center;">165</td></tr> <tr><td style="text-align: center;">2011</td><td style="text-align: center;">86</td><td style="text-align: center;">177</td></tr> </tbody> </table>	Year	Petrol consumption (PC) (Rs. crores)	Real GDP (RGDP) (Rs. crores)	2005	45	95	2006	46	115	2007	52	130	2008	64	145	2009	68	150	2010	75	165	2011	86	177		
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	2012	87	182		
	2013	96	195		
	2014	105	205		
	2015	112	210		
	2016	124	215		
(a)	Estimate the coefficients and their respective standard errors.			<b>20</b>	<b>2</b>
(b)	Comment on the statistical significance of the independent variable. Perform hypothesis testing to show whether the coefficient on GDP is significantly different from zero.			<b>5</b>	<b>3</b>
(c)	Compute $R^2$ and comment on the overall fit of the regression model.			<b>5</b>	<b>3</b>