Name:	
Enrolment No:	**UPES**

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2019

Course: Basic Econometrics   **Semester: III**
Course Code: ECON2001

Programme: BA (Hons.) Economics (Sep Energy Economics)   **Time: 03 hrs.**
Max. Marks: 100

Instructions: Answer **all** the questions from <u>Section A</u>, **Four** questions from <u>Section B</u>, **Two** questions from <u>Section C</u> and <u>Section D</u> is **compulsory.**

SECTION A (10*2 = 20 marks)

S. No.	Explain the following concepts (Answer should be precise and short).	Marks	CO
Q 1	Best Linear Unbiased Estimator	2	1
Q 2	Type I error	2	1
Q 3	Heteroscedasticity	2	1
Q 4	Degree of freedom	2	1
Q 5	Log-linear regression model	2	2
Q 6	Perfect multicollinearity	2	1
Q 7	Nominal variable	2	1
Q 8	Residual sum of squares (RSS)	2	2
Q 9	Regression through origin	2	2
Q 10	Standardized variable	2	1

SECTION B (4*5 = 20 marks)

Q11	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	3
Q12	Describe different types of data used in analysis. Give example for each type of data structure.	5	2
Q13	What is heteroscedasticity problem in a regression model? What are its consequences?	5	3
Q14	What are the reasons for the presence of a stochastic disturbance term in a regression model?	5	2
Q15	How dummy variable is useful in regression analysis? How do you interpret the coefficients including the intercept term in the following regression model?	5	3

	$wage_i = \alpha + \beta_1 Edu_i + \beta_2 D_i + \varepsilon_i$, 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 ε represents the random error term.		

<div align="center">

SECTION-C (2*15 = 30 marks)

</div>

Q16	Consider the following regression model. $$Y_i = 28.25 + 0.65X_i$$ Standard error (3.52) (0.04) R Square = 0.96 where Y and X represent monthly consumption and income respectively. Both the variables are measured in thousand rupees. Interpret the above-mentioned results. Does income significantly influence expenditure in the given sample?	**15**	**3**
Q17	Discuss the assumptions of classical linear regression model in detail.	**15**	**2**
Q18	Describe White's heteroscedasticity test for the following regression model. $$Y_i = \alpha + \beta_1 X_i + \beta_2 P_i + \varepsilon_i$$ where α represents the intercept and ε denotes the random error term.	**15**	**3**

<div align="center">

SECTION-D (30 marks)

</div>

Q19	Estimate the following regression model using the ordinary least squares (OLS) method. $Y_t = \alpha + \beta X_t + \varepsilon_t$ where Y_t and X_t represent crude oil demand and gross domestic product (GDP) respectively. Both the variables are measured in constant prices. α represents the intercept and ε_t denotes the random error term. **Data**		

Year	Y (Rs. crores)	X (Rs. crores)
2009	45	95
2010	46	115
2011	52	130
2012	64	145
2013	68	150
2014	75	165
2015	86	177
2016	87	182
2017	96	195
2018	105	205

(a)	Estimate the coefficients of the regression model.	15	4
(b)	Comment on the statistical significance of the independent variable. Perform hypothesis testing to check whether GDP is a significant determinant of crude oil demand.	15	4