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Name of the College (Please tick, symbol is given)	:	**SOE**		**SOB**	✓	**SOL**	
Program	:	**MBA (AVM)**					
Semester	:	**II**					
Name of the Subject (Course)	:	**Econometrics**					
Course Code	:	**ECON8001**					
Name of Question Paper Setter	:	**Jagadish Prasad Sahu**					
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Note: Please mention additional Stationery to be provided, during examination such as Table/Graph Sheet etc. else mention "NOT APPLICABLE": **Statistical Tables**							

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Roll No: ----------

UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, May 2018

Program: MBA (AVM) | **Semester – II**
Subject (Course): Econometrics | **Max. Marks : 100**
Course Code: ECON8001 | **Duration: 3 Hrs**
No. of page/s: 3

Instructions:
Answer all the questions of **Section A** (each carrying 2 marks), **Four** questions from **Section B** (each carrying 5 marks), **Three** Questions from **Section C** (each carrying 10 marks) and **Section D** (30 marks) is compulsory**.**

Section A (20 Marks) (10*2)

Q1. What is the key idea behind regression analysis?

Q2. What is type I error?

Q3. If X and Y are independent random variables and a and b are constants, give the formula for the variance of aX + bY.

Q4. If X and Y are not statistically independent random variables, give the formula for the variance of X + Y.

Q5. If X and Y are independent random variables, find expectation of the product XY.

Q6. If a and b are constants, find expectation of (aX + b).

Q7. If X and Y are independent random variables, what is the covariance between the two?

Q8. State the formula for correlation coefficient ρ (rho).

Q9. What is the property of any standardized variable? State the probability density function (PDF) of a standardized variable Z.

Q10. What are the properties of a normal distribution?

SECTION B (Total: 20 Marks) Answer Any Four Questions (4*5)

Q1. Describe different types of data. Give precise definition for each type.

Q2. 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?

Q3. Derive the OLS estimators for the regression model $Y_i = \beta_1 + \beta_2 X_i + u_i$.

Q4. What is multicollinearity problem in a regression model? What are the consequences of multicollinearity?

Q5. What is the usefulness of a dummy variable in a regression model? How do you interpret the coefficient β_3 in the following regression model?

$$wage_i = \beta_1 + \beta_2 Education_i + \beta_3 D_i + u_i$$

where, wage is hourly wage in rupees, $Education$ is years of education, *D* is a dummy variable that takes value 0 for female and 1 for male.

Q6. What are the different types of variables used in regression analysis?

SECTION C (30 Marks) Answer Any Three Questions (3*10)

Q1. Discuss the assumptions of classical linear regression model.

Q2. What are the properties of OLS estimators?

Q3. What is heteroscedasticity? What are the sources/causes of heteroscedasticity? Explain White's heteroscedasticity test.

Q4. Consider the equation $Y_t = Y_0(1 + r)^t$, where Y_t is GDP at time *t*, Y_0 is initial GDP, *r* is the compound (i.e., over time) rate of growth of *Y* and *t* is time measured in years (i.e. *t* is the trend variable taking values 1, 2, 3 etc.)

Explain how to compute *r* (i.e. compound rate of growth of *Y*) using a semilog (Log-Lin) model.

SECTION D (30 Marks)

Q1. Using the following data estimate a regression model of the form $Y_t = \beta_1 + \beta_2 X_t + \varepsilon_t$.

(a) Estimate the parameters of the model.

(b) Estimate the standard error of the respective parameter.

(c) Interpret the results.

(d) Compute t-statistics for the intercept and slope coefficient. Do the hypothesis testing whether return on market portfolio significantly affects return on fund-A?

(e) State the level of significance (p-value) at which you reject/ not reject the null hypothesis.

Data:

Year	Return on Fund-A (%), Y	Return on Market Portfolio (%), X
2008	67.5	19.5
2009	19.2	8.5
2010	−35.2	−29.3
2011	−42.0	−26.5
2012	63.7	61.9
2013	19.3	45.5
2014	3.6	9.5
2015	20	14
2016	40.3	35.3
2017	37.5	31