



**PAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY**

FACULTY OF MANAGEMENT SCIENCES

DEPARTMENT OF ACCOUNTING, ECONOMICS AND FINANCE

QUALIFICATION: BACHELOR OF ECONOMICS	
QUALIFICATION CODE: 12BECO	LEVEL: 7
COURSE CODE: ECM712S	COURSE NAME: ECONOMETRICS
SESSION: JAN 2019	PAPER: THEORY
DURATION: 3 HOURS	MARKS: 100

SUPPLEMENTARY/ SECOND OPPORTUNITY EXAMINATION QUESTION PAPER	
EXAMINER(S)	MR EDEN TATE SHIPANGA MR PINEHAS NANGULA
MODERATOR:	DR R. KAMATI

INSTRUCTIONS
<ol style="list-style-type: none">1. Answer ALL the questions.2. Write clearly and neatly.3. Number the answers clearly.

PERMISSIBLE MATERIALS

1. PEN,
2. PENCIL
3. CALCULATOR

THIS QUESTION PAPER CONSISTS OF 4 PAGES (Including this front page)

Question 1 [25 marks]

WEEKLY FAMILY INCOME X, \$

X→ Y↓	80	100	120	140	160	180	200	220	240	260
Weekly family consumption	55	65	79	80	102	110	120	135	137	150
expenditure Y, \$	60	70	84	93	107	115	136	137	145	152
	65	74	90	95	110	120	140	140	155	175
	70	80	94	103	116	130	144	152	165	178
	75	85	98	108	118	135	145	157	175	180
	-	88	-	113	125	140	-	160	189	185
	-	-	-	115	-	-	-	162	-	191

1. Given the table above compute the following:
 - (a) The conditional mean (5)
 - (b) The unconditional mean (2)
2. With proper examples draw a distinction between mathematical and econometric model? (2)
3. State what the abbreviation TSS stands for and briefly explain what message does it convey about regression analysis? (3)
4. Describe the various components of the function $Y_i = E(Y | X_i) + \mu_i$. (3)
5. Given $\sum \hat{u}_i^2 = \sum (Y_i - \hat{\beta}_1 - \hat{\beta}_2 X_i)^2$ derive the normal equations and eventually the estimation equations for $\hat{\beta}_1$ and $\hat{\beta}_2$? (10)

QUESTION 2[25 marks]

1. State the two distinct features of the interceptless model. (5)
2. One of the “consequences of error of measurement in the regressand is increased variance of the estimators”. Formulate a scenario and provide proof of this statement. (5)
3. Convert the following intrinsically functions into linear equations.
 - (a) $Y_t = e^{\beta_1 + \beta_2 X_t + u_t}$ (5)
 - (b) $Y_t = \frac{1}{1 + e^{\beta_1 + \beta_2 X_t + u_t}}$ (5)
 - (c) $Y_t = \beta_1 + \beta_2 \left(\frac{1}{X_t}\right) + u_t$ (5)

Question 3 [25 marks]

1. Consider a two-variable model where consumption as a regressand and income as a regressor.
 - (a) Name the parameter that can be used to measure the spread of the values from their expected values? (3)
 - (b) Suppose, a researcher is interested in measuring the strength of the relationship between consumption and income, name the parameter one can use to quantify this relationship? (2)
2. Assuming a three-variable model $Y_t = \alpha_1 + \alpha_2 X_2 + \alpha_3 X_3$, where α_2 and α_3 are partial regression coefficients. You have been asked in a job interview to briefly describe the meaning of the two parameters in this context. (5)

3. Given the regression output below answer the questions that follow. Where NFA net foreign asset
Dependent Variable: LNM2 is money supply, both in natural log.

Method: Least Squares

Sample(adjusted): 2006:02 2016:12

Included observations: 155 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.009936	0.003298	3.012688	0.0030
LNNFA	0.211279	0.023192	9.110164	0.0000
R-squared	0.351681	Mean dependent var	0.012806	
Adjusted R-squared	0.347444	S.D. dependent var	0.050598	
S.E. of regression	0.040874	Akaike info criterion	3.543841	
Sum squared resid	0.255611	Schwarz criterion	-.504571	
Log likelihood	276.6477	F-statistic	82.99509	
Durbin-Watson stat	2.353923	Prob(F-statistic)	0.000000	

- Write out the regression equation estimated in this study. (2)
- Interpret the estimated function in (a). (3)
- Identify the regressors and regressand. (2)
- What is the value of the coefficient of determination? (2)
- How many parameters are in this model? (1)
- What type of regression model is this? (2)
- What does the abbreviation OLS stand for? (3)

QUESTION 4 [25 marks]

Given the following information on weekly family income (X) and weekly family consumption (Y)

Y	X
60	80
70	100
84	120
93	140
107	160
115	180
136	200
137	220
145	240
152	260

- Estimate the regression line from the given sample observations? (10)
- Compute the variance of the estimated residuals? (5)
- Work out the following RSS, ESS, TSS, $\text{var}(\hat{\beta}_2)$ and $\text{se}(\hat{\beta}_2)$? (10)

QUESTION 5 [25 marks]

1. Interpret the intercept and slope coefficients of the following regression. $\hat{Y}_i = 56.1 - 1.7 X_i$ where Y=% of vote received by the incumbent president and X= unemployment rate (in percentage points) (4)
2. Interpret the intercept and slope coefficients of the following regression. $\ln \hat{Y}_i = 3.5 + 1.35 \ln X_i$ where Y= GNP (in millions of \$) X= Government spending (in mills. of dollars) (4)
3. Interpret the intercept and slope coefficients of the following regression. $\hat{Y}_i = -1.8 + 45.8 \ln X_i$ where Y=inflation rate (%) and X= wage rate (in N\$) (4)
4. Interpret the intercept and slope coefficients of the following regression. $\ln \hat{Y}_i = 4.1 + 0.05 T$ where Y=GDP (in mill. of dollars) and T=time trend (T=1,2,3,... representing years) (4)
5. Interpret the intercept and slope coefficients of the following compound growth rate of $\ln \hat{Y}_i = 4.1 + 0.05 T$ where Y=GDP (in mill. of dollars) and T=time trend (T=1,2,3,... representing years) (4)
6. Write the expression that represents a regression that estimate the average salaries of two group of teacher (a graduate and none graduate) interpret it and graph it. (5)

[Total marks 100]

END