



MURANG'A UNIVERSITY OF TECHNOLOGY

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF APPLIED SCIENCES

UNIVERSITY ORDINARY EXAMINATION

2017/2018 ACADEMIC YEAR

EXAMINATION FOR DOCTOR OF PHILOSOPHY IN BUSINESS
ADMINISTRATION

BHR 700: ADVANCED BUSINESS STATISTICS

DURATION: 3 HOURS

DATE: 15TH AUGUST, 2018

TIME: 9.00 A.M. – 12.00 NOON

Instructions to Candidates:

1. Answer **Any Four** questions.
2. Mobile phones are not allowed in the examination room.
3. You are not allowed to write on this examination question paper.

QUESTION ONE

a. Define the following terms.

- i. Orthogonal regression (3 marks)
- ii. Inverse regression (3 marks)
- iii. Response variable (3 marks)

b. The following are results from running a multiple linear regression in SPSS.

Table 1.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.996 ^a	.993	.990	317.329

a. Predictors: (Constant), Salaries, Advert

Table 2

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-867.003	194.310		-4.462	.003
	Advert	11.240	.551	1.228	20.391	.000
	Salaries	-.558	.116	-.290	-4.810	.002

a. Dependent Variable: Sales

- i. Write down the regression equation (2 marks)
 - ii. Discuss the results in tables 1 and 2 (9 marks)
- c. The following are the results from the test of hypothesis for salaries and sales. Interpret the results. (5 marks)

One-Sample Test

	Test Value = 0.05				
	t	df	Sig. (2-tailed)	Mean Difference	
Sales	3.463	9	.007	3563.750	
Salaries	1.587	9	.147	848.250	

QUESTION TWO

- a. Define the following terms.
- i. Null Hypothesis (3 marks)
 - ii. Type I error (4 marks)
 - iii. Two sided alternative (3 marks)
- b. During a quality control exercise, the manager of a factory that fills cans of frozen shrimp wants to check whether the mean weights of these cans conform to specifications i.e. the mean of these cans should be 600 grams as stated on the label of the can. He wants to guard against either over or under filling the cans. A random sample of 50 of these cans is selected and the mean found to be 595 grams. From the past experience the standard deviation of the contents of these bags is known to be 20 grams.
- i. Test at 5% level of significance, whether the weights conform to specifications (5 marks)
 - ii. Repeat the test at 10% level of significance and comment on your results. (5 marks)

QUESTION THREE

- a. Define the following terms.
- b.
- i. Parameter (2 marks)
 - ii. Statistic (2 marks)
 - iii. Standard error (2 marks)
 - iv. Central Limit theorem (4 marks)
- c. The length X (inches) of sardines is a $N(4.62, 0.0529)$ random variable. What population of sardines is:
- i. Longer than 5 inches (5 marks)
 - ii. Between 4.35 and 4.85 inches (5 marks)
 - iii. 90% of the sardines are shorter than what inches? (5 marks)

QUESTION FOUR

- a. The time (in seconds) taken to complete a certain simple task was recorded for each of 15 randomly selected employees at a certain company. The values are given below.
38.2, 43.9, 38.4, 26.2, 41.3, 42.3, 37.5, 37.2, 41.2, 42.3, 31, 50.1, 37.3, 36.7, 31.8
Calculate:
The 95% and the 99% confidence intervals of the population mean time it takes to complete this task (10 marks)

- d. It is believed that the class size for PhD Business management is larger than the class for PhD chemistry. A random sample of 4 business management and 5 chemistry class is selected.

Business: 13 14 27 15

Chem: 28 31 11 18 25

Using Mann-Whitney U test, test the hypothesis:

(15 marks)

Ho: $F(\text{Business})=G(\text{Chem})$ versus

H1: $F(\text{Business})>G(\text{chem})$

QUESTION FIVE

The following is data on expenditure in millions on advertisement and sales of certain company.

Experience	Sales (millions)
10	30
15	50
5	15
30	100
50	250

- a. Obtain the regression equation for the above data (12 marks)
- b. What would be the sales if the company spends 100,000,000 in advertisement (5 marks)
- c. What percentage of sales is explained by advertisement? (8 marks)