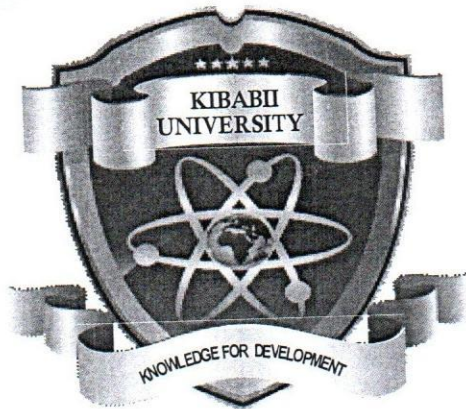# KIBABII UNIVERSITY

KNOWLEDGE FOR DEVELOPMENT

UNIVERSITY EXAMINATIONS

SPECIAL/SUPPLEMENTARY EXAM

2019/2020 ACADEMIC YEAR

FIRST YEAR FIRST SEMESTER

FOR THE DEGREE OF MASTER OF BUSINESS ADMINISTRATION

COURSE CODE: MBA 804

COURSE TITLE: QUANTITATIVE ANALYSIS

DATE: 04/02/2021   TIME: 11.00AM – 4.00PM

INSTRUCTIONS TO CANDIDATES

- Answer question ONE (compulsory) and any other THREE questions
- Question ONE attracts 40 marks
- Time allowed is THREE hours
- All other questions attract equal marks (20 marks)

QUESTION ONE

a) Suppose you have the following Research Question

- To what extent does weight of a car in pounds predict miles per gallon in a U.S. dataset of 398 models of cars?

i) Are the two variables discrete or continuous?

ii) Are the two variables nominal, ordinal, interval or ratio scales?

iii) Which statistical procedure could we use to test the research question?

iv) What is the null hypothesis?

v) What is your expectation?

b) The regression SPSS output of the above question was as below. Use it to answer the following questions

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.807[a]	.651	.650	4.622

a. Predictors: (Constant), Vehicle Weight (lbs.)

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	15794.632	1	15794.632	739.503	.000[a]
	Residual	8457.943	396	21.358		
	Total	24252.575	397			

a. Predictors: (Constant), Vehicle Weight (lbs.)

b. Dependent Variable: Miles per Gallon

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	45.492	.841		54.110	.000
	Vehicle Weight (lbs.)	-.007	.000	-.807	-27.194	.000

a. Dependent Variable: Miles per Gallon

i)   How much variance in Miles Per Gallon is explained by Car Weight?

ii) Is this variance explained significantly different to 0?

iii) What is the constant

iv) What is the slope?

v)   Is the slope statistically significant?

vi) Write out the model regression equation

vii) What is the standardised regression coefficient for vehicle weight?

viii) If a car weighed 1000 pounds, what would be the predicted miles per gallon?

ix) What is the standard error of the estimate?

x)   What would be the approximate 95% confidence interval of our prediction

(C) The probability transition matrix of the switching probabilities, consider that two brands G and X share the market in the ratio of 60% to 40% respectively of customers. If in every week 70% of G's customers retain the brand but 30% switch to product x where as 80% of X's customers retain brand but 20% percent switch to brand G. Analyse the exchange in share market per week.

QUESTION TWO

Describe how quadratic equations can be used in decision making.

The demand for a commodity is given by $p = 400 - q$. The average total cost of producing the commodity is given by

$$ATC = \frac{1000}{q} + 100 - 5q + q^2$$

where p is the price in shillings and q is the quantity in kilograms.

Required

What does $\frac{1000}{q}$ in the ATC equation represent economically? (1 mark)

Determine the output that leads to maximum profit and the profit at the level of output. (9 marks)

Alpha industries sells two products, X and Y, in related markets, with demand functions given by:

$$P_x - 13 + 2X + Y = 0$$

$$P_y - 13 + X + 2Y = 0$$

The total cost, in shillings, is given by:

$$TC = X + Y$$

Required:

Determine the price and the output for each good which will maximize profits. (7 marks)

(Total: 20 marks)

QUESTION THREE(20 marks)

An insurance company takes a keen interest in the age at which a person is insured. Consequently a survey conducted on prospective clients indicated that for clients having the same age the probability that they will be alive in 30 years time is $\frac{2}{3}$. This probability was established using the actuarial tables. If a sample of 5 people was insured now, find the probability of having the following possible outcomes in 30 years

All are alive
At least 3 are alive
At most one is alive
None is alive
At least 1 is alive

QUESTION FOUR

construction company has a £1 million contract to complete a building by 31 March 1995, but is experiencing delays due to the complex design. The managers have to make a decision now whether to continue as at present, or to employ specialist-engineering consultants at a cost of £200000.

If the company continues as at present, it estimates there is only a 30% chance of completing the building on time, and that the delay could be one two or three months,

with equal probability. If the building is late, there are penalties for each month's delay (or part of a month).

The managers believe that if they employ specialist-engineering consultants, their chances of finishing the building on time will be trebled. But if the building is still late, it would only be one or two months late, with equal probability.

Required

To draw a tree diagram to represent this decision problem, using squares for decision points, circles for random outcomes, and including probabilities revenues and penalties;To analyse the tree using expected value techniques:

To write a short report for the managers, with reasons and comments, recommending which decision to make.

QUESTION S FIVE (20 Marks)

A project has the following activities and costs. You are required to prepare the least cost schedules for all possible durations from *normal time – normal cost* to *crash time – crash cost.*

Activity	Preceding Activity	Duration days	Crash time	Cost (Shs).	Crash cost	Cost slope
A	-	4	3	360	420	60
B	-	8	5	300	510	70
C	A	5	3	170	270	50
D	A	9	7	220	300	40
E	B,C	5	3	200	360	80