



(Knowledge for Development)

# **KIBABII UNIVERSITY**

## **UNIVERSITY EXAMINATIONS**

**2017/2018 ACADEMIC YEAR  
SECOND YEAR FIRST SEMESTER**

### **SPECIAL/ SUPPLEMENTARY EXAMINATION**

**FOR THE DEGREE OF BACHELOR OF COMMERCE**

**COURSE CODE: BCO 206**

**COURSE TITLE: MANAGEMENT DECISION MODELS**

**DATE: 16/10/2018**

**TIME: 11.30AM – 1.30PM**

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#### **INSTRUCTION TO CANDIDATES**

- 1) The paper contains **FIVE** questions
- 2) Attempt **THREE** questions
- 3) Question **ONE** is Compulsory
- 4) Queuing characteristics are provided
- 5) Show your work clearly.

**TIME: 2 Hours**

*This Paper Consists of 6 Printed Pages. Please Turn Over.* ►

**KIBU** observes **ZERO** tolerance to examination cheating

## QUESTION ONE

- 1 a). A company is considering investing in one of three investment opportunities A, B and C under certain economic conditions. The payoff matrix for this situation is economic condition.

Investment opportunity	1 USD	2 USD	3 USD
A	5000	7000	3000
B	-2000	10000	6000
C	4000	4000	4000

### Required.

- i) Determine the Best investment opportunity using the following criteria

- Maximin (2 marks)
  - Maximax (2 marks)
  - Minimax regret (2 marks)
  - Hurwicz ( $\alpha = 0.3$ ) (4 marks)
- ii) Distinguish between decision making under risk and decision making under uncertainty (5 marks)

b) A retailer must decide whether to build a small or a large facility at a new location. Demand at the location can be either small or large with probabilities estimated to be 0.4 and 0.6 respectively. If a small facility is built and demand proves to be high, the manager may choose not to expand (payoff = shs 223,000) or to expand (payoff = shs 270,000). If a small facility is built and demand is low, there is no reason to expand and the payoff is shs 200,000. If a large facility is built and demand proves to be below, the choice is to do nothing (payoff = shs 40,000) or to stimulate demand through local advertising. The response to advertising may be either modest or sizeable, with their probabilities estimated to be 0.3 and 0.7 respectively. If it is modest, the payoff is estimated to be only shs 20,000; the payoff grows to shs 220,000 if the response is sizeable. Finally if a large facility is built and demand turns out to be high, the payoff is shs 800,000

### Required

Draw a decision tree. Then analyze it to determine the expected payoffs for each decision and node. Which alternative between the small and large facility has higher expected payoff (15 marks)

## QUESTION TWO

2. A Company employs service Engineers based at various locations throughout the country to service and repair their equipment installed in customer's premises. Four requests for services have been received and the company finds that four Engineers are available. The distances each of the Engineers is from the various customers is summarized in the table below and the company wishes to assign engineers to the customers to minimize the total distance to be travelled.

	W	X	Y	Z
Alf	25	18	23	14
Bill	38	15	53	23
Charlie	15	17	41	30
Dave	26	28	36	29

Required

- a) Using Assignment model, assign the engineers to attain the minimum total Distance Travelled (12 marks)
- b) What is the total mileage attained in the final assignment (3 marks)
- c) Briefly compare and contrast between a Transportation problem and an assignment problem as used in linear programming (18 marks)

**QUESTION THREE**

3. A company produces inexpensive tables and chairs. The production process for each is similar in that both require a certain number of hours of carpentry work and a certain number of labour hours of in the painting department. Each table takes 4 hours of carpentry and 2 hrs in the painting shop. Each chair requires 3 hours of carpentry and 1 hour in painting. During the current production period 240 hours of carpentry time and 100 hours of painting time are available. Each table sold yields a profit of shs. 7 and each chair produced is sold for a profit of shs. 5.

Required

- a). Define the term Linear programming (3 marks)
- b). Formulate the above as a linear programming problem (10 marks)
- c). Using the graphical method the optimum number of tables and chairs that should be produced to maximize profit (10 marks)

**QUESTION FOUR**

5. The following represents the activities of a network

Activity	Preceding Activity	Duration (days)
A	-	4
B	A	7
C	A	5
D	A	6
E	B	2
F	C	3
G	E	5
H	B, F	11
I	G, H	7
J	C	4
K	D	3
L	I, J, K	4

Required

- a). Define the terms (6 marks)
  - i) Critical Path and
  - ii) Total Float
  - iii) Free Float
- b). Draw the Network diagram and find the critical path (11 marks)

c). Calculate the Total Floats of the network in question (6 marks)