MASENO UNIVERSITY

UNIVERSITY EXAMINATIONS 2015/2016

FOURTH YEAR SECOND SEMESTER EXAMINATIONS FOR THE DEGREE OF BACHELOR OF ARTS IN ECONOMICS WITH INFORMATION TECHNOLOGY

MAIN CAMPUS AND CITY CAMPUS

AEC 422: OPERATIONS ANALYSIS II

Date: 21st April 2016 Time: 8.30 - 10.30 am

INSTRUCTIONS:

- Answer question ONE and any other TWO questions.

Q1. a) Explain the following concepts briefly

Q1. a) Explain the following concepts briefly:

i) Directed graphs [3 Marks]

ii) A circulation [3 Marks]

iii) Flow vector [3 Marks]

b) Set up the model transport network problem as a minimal cost flow paradigm.

[8 Marks]

c) Vizuri Manufacturers have 3 factories in three locations in Kisumu, Mombasa and Nakuru. During the last month the total production of wheelbarrows each plant has been 70, 100 and 80 units respectively. The manufacturer wants distribute 90 units to an outlet in Kitale, 40 to Machakos, 60 to Meru and 60 to Narok. The unit production and distribution costs from each factory to each outlet are given below. Using the following information set a linear program and a network diagram for b) [13 Marks]

Factories	Distribution Centres				Availability (Units)
	Kitale	Machakos	Meru	Narok	
Kisumu	8	6	10	9	70
Mombasa	9	12	13	7	100
Nakuru	14	9	16	5	80
Requirements (units)	90	40	30	30	[250]

Q2. A group of Kenya Hikers are on a mission to Mt. Everest. They face a challenge on how much they can pack to reach the peak.

a) Explain basic characteristics of the dynamic programming problem.

[4 Marks]

b) The group is determining how to choose among several items that they can pack and how many of each item to take. Each of them can carry up

to 10kg in their backpacks. Consider the following 3 possible items

to 10kg in their backpacks. Consider the following 3 possible items whose weights and values are summarized below.

Item	Weight (Kg)	value
Food pack	6	14
Large bottle of water	8	16
Tent	12	22

Each member of the group can carry more than one of each item on behalf of the group. How many of each item should one of them carry to maximize the total value while not exceeding his carrying capacity of 10 kg?

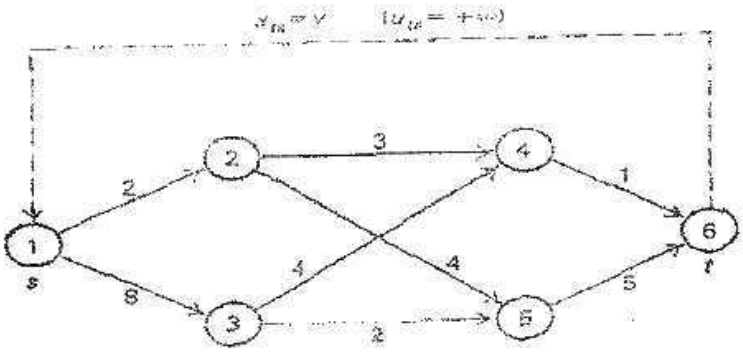
i) Set up the problem and high the steps of dynamic programming.

[8 Marks]

ii) Solve the problem using stages of dynamic programming.

[8 Marks]

Q3. Given the following network graph.



i) What type of network problem that the diagram represents?

[5 Marks]

ii) Characterize the model identified in (i) above. [15 Marks]

4. Kenya Data Handlers firm maintains banks of hard drives in 3 separate locations for security reasons, with probabilities of failures

4. Kenya Data Handlers firm maintains banks of hard drives in 3 separate locations for security reasons, with probabilities of failures dependent on the location. They have two back up hard drives available, and the firm wishes to determine where to install them to minimize overall probability that all three locations will fail simultaneously. The estimated probabilities of failure are summarized in the table below.

		Location		
		A	B	C
Backup drives assigned	0	0.20	0.30	0.40
	1	0.10	0.20	0.25
	2	0.05	0.10	0.15

i) Formulate the solution strategy. [8 Marks]

ii) Solve the problem faced by the firm to minimize failure. [12 Marks]

Q5 a) Characterise the logic of Bayesian inference. [8 Marks]

b) Using an example discuss the Bayesian network analysis. [12 Marks]