# MASENO UNIVERSITY

## UNIVERSITY EXAMINATIONS 2016/2017

## FOURTH YEAR FIRST SEMESTER EXAMINATION FOR DEGREE OF BACHELOR OF BUSINESS ADMINISTRATION WITH INFORMATION TECHNOLOGY

## MAIN CAMPUS

### ABA 402: QUANTITATIVE METHODS II

Date: 28th November, 2016

Time: 3.30 - 6.30pm

**INSTRUCTIONS:**
- Answer Question ONE (Compulsory) and any other TWO.

## QUESTION ONE (30 MARKS)

a) Consider the information on a transportation schedule below:
   Sources are: $A_1=60$, $A_2=35$, $A_3=40$, Requirements are: $B_1=22$, $B_2=45$, $B_3=20$, $B_4=18$, $B_5=30$ the unit cost of transportations are: $C_{11}=4,C_{12}=1,C_{13}=3,C_{14}=4,C_{15}=4$, $C_{21}=2,C_{22}=3,C_{23}=2,C_{24}=2,C_{25}=3,C_{31}=3,C_{32}=5,C_{33}=2,C_{34}=4,C_{35}=4$.
   Required:

   The solution using Vogel's Approximations Method                                    (8 marks)

b) Briefly describe the variations of the assignment problems.

                                                                                        (8 marks)
c) O'Hagan Bookworm Booksellers buys books from two publishers. DuffinHouse offers a package of 5 mysteries and 5 romans novels for Kshs. 50,000, and Gorman Press offers a package of 5 mysteries and 10 romance novels for Kshs. 150, 000. O'Hagan wants to buy at least 2,500 mysteries and 3,500 romance novels, and he has promised Gorman (who has influence on Senate Textbook Committee) that at least 25% of the total number of packages he purchases will come from Gorman Press.
   Required:

   i.   Using graphical method, how many packages should O'Hagan order from each publisher in order to minimize his cost and satisfy Gorman?     (4 marks)
   ii.  What will the novels cost?                                                       (4 marks)

d) Highlight the main objectives of Network Analysis.                                    (6 marks)

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## QUESTION TWO (20 MARKS)

At a certain airport, it takes exactly 5 minutes to land an airplane, once it is given the signal to land. Although incoming planes have scheduled arrival times, the wide variability in arrivals produces an effect which makes the incoming planes appear to arrive in a Poisson fashion at an average rate of 6 per hour. This produces occasional stack-ups at the airport which can be dangerous and costly.

Required:

Under these circumstances, how much time will a pilot expect to spend circulating the field waiting to land?

## QUESTION THREE (20 MARKS)

Information of a transportation schedule is as below: Sources are: $A_1=60$, $A_2=50$, $A_3=90$, Requirements are: $B_1=52$, $B_2=68$, $B_3=80$, the unit cost of transportations are: $C_{11}=30, C_{12}=27, C_{13}=14, C_{21}=18, C_{22}=17, C_{23}=25, C_{31}=20, C_{32}=21, C_{33}=29$.

Required:

| | | |
|---|---|---|
| i. | Determine the optimal solution using Northwest corner rule. | (10 marks) |
| ii. | Determine the optimal solution using Least Cost Method. | (10 marks) |

## QUESTION FOUR (20 MARKS)

A Company wishes to allocate its monthly promotional budget of Kshs. 10,000 among three advertising media, i.e Doordarshan, Zee TV and CNN. The number of prospective buyer reached by a single advertisement in each of the three media is 50,000, 100,000 and 75,000 while the cost per advertisement is Kshs. 800 Kshs. 1000 and Kshs. 750 respectively. The Company Board has decided that it will not release more than 10, 20, and 10 advertisements on Doordarshan, Zee TV and CNN respectively.

Required:

What should be the advertisement plan if the Company wants to maximize the total audience coverage?

(20 marks)

## QUESTION FIVE (20 MARKS)

Suppose that there are six people applying for five jobs, and it is desired to fill each job with exactly one person. The costs for filling the jobs with six people are given in the following table:

| | Job1 | Job2 | Job3 | Job4 | Job5 |
|---|---|---|---|---|---|
| Person 1 | 27 | 23 | 22 | 24 | 27 |
| Person 2 | 28 | 27 | 21 | 26 | 24 |
| Person 3 | 28 | 26 | 24 | 25 | 28 |
| Person 4 | 27 | 25 | 21 | 24 | 24 |
| Person 5 | 25 | 20 | 23 | 26 | 26 |
| Person 6 | 26 | 21 | 21 | 24 | 27 |

Required:

Determine the optimal assignment plan to minimize the cost.

(20 marks)