

**JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY**

**UNIVERSITY EXAMINATION 2014/2015**

**FOURTH YEAR FIRST SEMESTER EXAMINATION FOR THE DEGREE OF  
BACHELOR OF BUSINESS ADMINISTRATION**

**ABA 402 QUANTITATIVE METHODS IN BUSINESS II**

**INSTRUCTIONS.**

The paper consists of **FIVE** questions.

Answer question **ONE (Compulsory)** and **ANY** other **TWO** questions.

**QUESTION ONE (30 MARKS)**

- a) State and explain any three areas of applications of linear programming in business decision making? (6 marks)
- b) Explain any three advantages and disadvantages of Linear Programming (6 marks)
- c) A furniture manufacturer produces 3 products; ordinary chairs, executive chairs and office tables. All these use raw materials, machine processing time and manual labour as shown in the table below;

	Raw materials (cubic feet)	Machine Processing Time (hours)	Manual Labour Time ( hours)
Ordinary Chairs	12	5	2
Executive Chairs	15	8	3
Office Tables	18	6	5

The estimated profit from ordinary chairs, executive chairs and office tables are sh. 150, sh. 200, and sh. 250 respectively.

If  $300\text{ft}^3$  of Raw materials, 188 hours of machine time and 200 hours for labour are available.

Required;

- i. Formulate a Linear Programming model
- ii. Using Simplex Method, solve the L.P. model, analyse the solution and advice the manufacturer how to maximize on the daily production. (18 marks)

**QUESTION TWO (20 MARKS)**

A manufacturing company wants to determine the intelligence levels of a sample of eight (8) of its employees on its production line by giving them an aptitude test. The test results with their subsequent average daily outputs were as follows.

Employee	Units of output (Y)	Aptitude test results (X)
A	30	06
B	49	09
C	18	03
D	42	08
E	39	07
F	25	05
G	41	08
H	52	10
Totals	296	56

(a) Determine its appropriate straight line regression equation; and interpret it.(10 marks)

(b) Using your equation in (a) above, calculate;

- i. The employee output that can be produced by an employee with aptitude score of 05. (3 marks)
- ii. The standard error of estimate. (7 marks)

**QUESTION THREE (20 MARKS)**

a) Describe the term “Degeneracy” as used with Transportation Problems. (3 marks)

b) Explain the difference between the balanced and unbalanced transportation model. (4 marks)

c) State any three methods used find initial feasible solutions to a transportation model (3 marks)

d) Wheat is harvested in the Mid West and stored in grain elevators in three different cities – Kansas City, Omaha, and Des Moines. These grain elevators supply three flour mills, located in Chicago, St. Louis, and Cincinnati. Grain is shipped to the mills in railroad cars, each of which is capable of holding one ton of wheat. Each grain elevator is able to supply the following number of tons of wheat to the mills on a monthly basis.

Grain Elevator	Supply
1. Kansas City	150
2. Omaha	175
3. Des Moines	275
Total	600 tons

Each mill demands the following number of tons of wheat per month.

Mill	Demand
A. Chicago	200
B. St. Louis	100
C. Cincinnati	300
Total	600 tons

The cost of transportation of one ton of wheat from each grain elevator to each mill differs according to the distance and rail system as shown below.

Grain elevator	Mill		
	A. Chicago	B. St. Louis	C. Cincinnati
1. Kansas City	\$ 6	\$ 8	\$ 10
2. Omaha	\$ 7	\$ 11	\$ 11
3. Des Moines	\$ 4	\$ 5	\$ 12

**Required;**

Formulate the L.P transportation model.

Set up the transportation tableau for this problem and determine the initial solution that will minimize the cost of transportation using the minimum cell cost method. (10 marks)

**QUESTION FOUR (20 MARKS)**

- a) Describe the following important variables that are present in most practical queuing situations.
  - i. Average arrival rate (2 marks)
  - ii. Average service rate (2 marks)
  - iii. Traffic intensity (2 marks)
- b) Jumbo Shoe Repairers employs 6 operators who can, on average, repair the heels of 5 shoes in an hour. If the average number of customers requiring service is 20 per hour, calculate the traffic intensity. (4 marks)
- c) Briefly but clearly explain the fundamental elements of a queuing process. (10 marks)

**QUESTION FIVE (20 MARKS)**

- a) Describe the advantages and disadvantages of using simulation to investigate business problems compared with the use of mathematical formulae. (6 marks)
- b) Discuss the steps in simulation model construction (6marks)
- c) Outline and explain any five importances of quantitative models in business today. (8 marks)