

W1-2-60-1-6

**JOMO KENYATTA UNIVERSITY**

**OF**

**AGRICULTURE AND TECHNOLOGY**

**UNIVERSITY EXAMINATIONS 2014/2015**

**SPECIAL/SUPPLIMENTARY EXAMINATION FOR DEGREE OF BACHELOR**

**SMA 2448: OPERATIONS RESEARCH 2**

**DATE: AUGUST 2015 TIME: 2 HOURS**

**INSTRUCTIONS: ANSWER QUESTION ONE AND ANY OTHER TWO QUESTIONS**

**QUESTION ONE**

1. The demand for an item is cost at 50 units per month. The unit cost is Kshs.200 and the cost per order is Ksh.150 and carrying cost is Ksh.20 per unit per year.

Determine the economic order quantity (EOQ) [6 marks]

1. Highlight on any FIVE assumptions of the economic order quantity model [10 marks]
2. (i) Why is the concept of a model basis to the technique of simulation? [4 marks]

(ii) Explain TWO disadvantages and advantages of a simulation. [4 marks]

1. Discuss how dynamic programming differs from linear programming. [6 marks]

**QUESTION TWO 20 MARKS**

Beeser Builders have been awarded a contract ot build an office block. The project has been broken down into a number of activities.

Activity Immediately Production in Total cost

Preceding activities months

A - 8 100

B - 2 25

C A 3 135

D A 7 70

E B 5 160

F CD 9 255

G D 2 30

H DE 4 90

I GH 3 55

The overhead on this project are Ksh.5000 per month.

**Required:**

1. Construct a network diagram for this project and hence determine the minimum project duration and its associated cost. [10 marks]
2. Briefly explain the term dynamic programming and give FOUR applications of dynamic programming. [10 marks]

**QUESTION THREE (20 MARKS)**

1. Calculate the various control levels given the following information:

Normal usage 560 per day

Minimum usage 240 per day

Maximum usage 710 per day

Lead time 15 – 20 days

EOQ 10,000

[5 marks]

1. (i) A company uses 100,000 units per year which cost £3 each. Carrying costs are 1%

per month and ordering costs are £250 per order. What is the EOQ?

(ii) What would be the EOQ if the company made the items themselves on a machine

with a potential capacity of 600,000 units per year? [3 marks]

1. Demand is 5,000 units per year, ordering costs are £100 per order and the basic unit price is £5 carrying costs are 20% p.a. Discounts are available, thus;

1,200 – 1,399 less 10%

1,400 – 1,499 less 15%

1,500 and over less 20%

Where is the most economic quantity to order? [8 marks]

**QUESTION FOUR (20 MARKS)**

1. Explain the role of computers in carrying out simulations. [6 marks]
2. State and explain THREE types of inventory. [6 marks]
3. A company uses 50,000 widgets per annum which are £10 each to purchase, the ordering and handling costs are 15% of purchase price per annum. Calculate the economic order quantity (EOQ) [8 marks]