

MAASAI MARA UNIVERSITY

**REGULAR UNIVERSITY EXAMINATIONS**

**2016/2017 ACADEMIC YEAR**

**THIRD YEAR SECOND SEMESTER**

**SCHOOL OF BUSINESS AND ECONOMICS**

**BACHELOR OF ARTS ECONOMICS**

**COURSE CODE: ECO 315**

**COURSE TITLE:** **QUANTITATIVE METHODS II**

**DATE: 7TH JULY 2017 TIME: 0830 – 1030 HRS**

**INSTRUCTIONS TO CANDIDATES**

Answer Question **ONE** and any other **THREE** questions

*This paper consists of* ***FOUR***  *printed pages. Please turn over.*

**QUESTION ONE**

Briefly, define the following terms:

a) Queue jockeying [**5 marks**]

b) Degenerate solution [**5 marks**]

c) Slack variable [**5 marks**]

d) Dynamic programming [**5 marks**]

e) Gantt Chart [**5 marks**]

**QUSTION TWO**

Solve the following linear programming problem graphically.  **[15 Marks]**

**Maximize Z = 100X1 + 50X2**

**Subject to:**

**4X1 + 6X2≤24**

**X1≤4**

**X2≤4/3**

**X1, X2≤0**

**QUESTION THREE**

The arrival rate of customers at a banking counter follows Poisson distribution with a mean of 45 per hour. The service rate of the counter clerk also follows Poisson distribution with a mean of 60 per hour.

a) What is the probability of having 0 customers in the system (p0)? [**3 Marks**]

b) What is the probability of having 5 customers in the system (p5)? [**3 Marks**]

c) What is the probability of having 10 customers in the system (p10)? [**3 Marks**]

d) Find **Ls**, **Lq**, **Ws** and **Wq**. [**6 Marks**]

**QUESTION FOUR**

The annual demand of an item in a leading supermarket in Kenya is 9000 units. Its annual carrying cost is 15% of the purchase price of the item per year, where the purchase price is Shs 20 per unit. The ordering cost is Shs 15 per order. Presently the order size of the item is the average monthly demand of that item.

a) Find the economic order quantity [**8 Marks**]

b) Compare its cost with the present ordering system and find the corresponding cost advantage if it exists. [**7 Marks**]

**QUESTION FIVE**

The table below summarizes the details of a project involving 14 activities

|  |  |  |
| --- | --- | --- |
| **Activity** | **Immediate Predecessor(s)** | **Duration (months)** |
| A | - | 2 |
| B | - | 6 |
| C | - | 4 |
| D | B | 3 |
| E | A | 6 |
| F | A | 8 |
| G | B | 3 |
| H | C,D | 7 |
| I | C,D | 2 |
| J | E | 5 |
| K | F,G,H | 4 |
| L | F,G,H | 3 |
| M | I | 13 |
| N | J,K | 7 |

a) Construct the critical path method (CPM). [**5 marks**]

b) Determine the critical path and project completion time. [**5 Marks**]

c) Compute total floats and free floats for non-critical activities. [**5 Marks**]

**//END**