

**W1-2-60-1-6**

**JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY**

**UNIVERSITY EXAMINATIONS 2014/2015**

 **YEAR 3 SEMESTER II EXAMINATION FOR THE DEGREE OF BACHELOR OF BUSINESS INFORMATION TECHNOLOGY/YEAR 2 SEMESTER II BACHELOR OF COMMERCE**

**HBC 2210: OPERATIONS RESEARCH**

**DATE: April 2015 TIME: 2 HOURS**

**INSTRUCTIONS: Answer Question One and Any Other Two Questions**

**QUESTION ONE (30 marks) – Compulsory**

1. What is operations research? Mention any six Operations Research Techniques and tools. (4marks)
2. Explain four factors that have enhanced the use of operation research models in a big way in Kenyan organizations. (8marks)

**QUESTION FOUR**

1. Two oil companies COC and TOC are operating in the city and are trying to increase their market share at the expense of the other. COC is considering possibilities of decreasing the price, giving free soft drinks on shs 3,000 purchases of oil or giving away a T-shirt with each 40 litre purchase. Obviously TOC cannot ignore this and comes out with its own programme to increase its share in the market. The payoff matrix from the view point of increasing or decreasing market shares is given in the table below:

 TOC

 Decrease price Free soft drinks on T-shirts with each

 shs 2,000 purchases 40 litre purchase

COC

Decrease price 4 5 -3

Free soft drinks 3 5 6

T-shirt with each

40 lts Purchase -3 4 -4

Determine:

1. The optimum strategies for the two oil companies. (7marks)
2. The value of the game. (3marks)
3. Arrival rate of telephone calls at a telephone booth is according to poison distribution with an average arrival rate of 0.1 calls per unit of time. A telephone call is assumed to be exponentially distributed with a mean service rate of 0.3 calls per minute.

Determine;

1. The probability that a person arriving at the Telephone booth will have to wait. (2marks)
2. The average number of calls in the queuing system (2marks)
3. The number of calls actually waiting in the queue (2marks)
4. The average amount of time each call actually spends in the queuing system. (2marks)
5. The average amount of time a call spends in the queue. (2marks)