CHUKA   **UNIVERSITY**

UNIVERSITY EXAMINATIONS

SECOND YEAR EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF COMMERCE, BACHELOR OF PURCHASING, SUPPLIES MANAGEMENT AND BACHELOR OF ENTREPRENEURSHIP AND SMALL BUSINESS MANAGEMENT

BCOM 272/BBAM 272: OPERATIONS RESEARCH I

STREAMS: BCOM, BBAM Y2S2   **TIME: 2 HOURS**

DAY/DATE: MONDAY 13/04/2015   **11.30 AM – 1.30 PM**

INSTRUCTIONS:

Answer Question One and any other Two Questions

1.   (a)   Discuss any five features of operations research.   [5 marks]

       (b)   Operations research is a scientific method that is used to solve problems in phases. Discuss the phases of operations research.   [5 marks]

       (c)   Models guide in solving problems in the society. Discuss any five benefits of using models to solve problems in the society.   [5 marks]

       (d)   Discuss the role of computer and computer packages in solving operation's research problems in Kenya.   [5 marks]

       (e)   A company has machines that can do any of the required jobs with different costs of doing the jobs. The following table shows the costs that each machine will take to do the jobs.

		Jobs				
		A	B	C	D	E
Machine	1	60	20	50	30	60
	2	20	50	80	70	70
	3	70	80	60	90	80
	4	60	20	30	40	50
	5	90	30	80	90	70
	6	40	70	40	60	80

Required:

Assign the machines the jobs, so as to minimize the total costs of doing the jobs and hence determine the minimum cost. [10 marks]

2. (a) Discuss any five objectives of inventory control systems. [5 marks]

(b) Using suitable examples, discuss the principle of dominance as used in game theory. [5 marks]

(c) Kisumu Enterprises Ltd is a company that consumes 10,000 units of a product per annum. The consumption of the product is fairly constant throughout the year. The cost of the item is ksh 120 when purchased in large qualities. The cost of placing and receiving the order is ksh 300. It takes on average 45 days to receive delivery from the date of the order. The carrying cost is estimated to be 20% of the average inventory.

Required:

Calculate
(i) The economic order quantity [6 marks]

(ii) The number of order per year [4 marks]

3. (a) Explain any five differences between CPM and PERT techniques in network analysis. [5 marks]

(b) The following activities relate to a project that is to be implemented soon.

Activities	Preceding activities	Activity duration in months
A	-	9
B	-	4
C	-	7
D	B,C	8
E	A	7
F	C	5
G	E	10
H	E	8
I	D,F,H	6
J	E	9
K	I,J	10
L	G	2

Required:

(i) Draw a network diagram for the project. [6 marks]

(ii)   Determine the critical path and the project duration   [5 marks]

(iii)   Discuss the effect of delaying the following activities on project completion.

      (a)   Activity F by 6 months
      (b)   Activity J by 4 months
      (c)   Activity L by 2 months
      (d)   Activity H by 2 months.   [4 marks]

4.   (a)   Using suitable examples, distinguish between cooperative and non cooperative games.   [4 marks]

(b)   A company produces three products A B and C. The unit contribution of the products are ksh 5, 10 and 8 respectively. Each unit of A requires 3kg of material, 4 machine hours and 2 labour hours. Each unit of product B requires 5 kgs of material, 4 machine hours and 4 labour hours, and each unit of product C requires 2kg of material, 4 machine hours and 5 labour hours. The company has 60kgs of material, 72 machine hours and 100 labour hours available.

Required:

(i)   Formulate the problem as a linear programming problem.   [6 marks]

(ii)   Write the problem in standard form   [4 marks]

(iii)   Draw the initial simplex tableau and show the pivot element, pivot column and pivot row.   [3 marks]

(iv)   Calculate the new values of the new row.   [3 marks]