CHUKA   **UNIVERSITY**

UNIVERSITY EXAMINATIONS

SECOND YEAR EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF COMMERCE, PROCUREMENT AND LOGISTICS MANAGEMENT,BACHELOR OF COOPERATIVE MANAGEMENT,BACHELOR OF ENTERPRISE ENTREPRENUERSHIP MANAGEMENT

BCOM 263: OPERATIONS RESEARCH I

STREAMS:Y2S2   **TIME: 2 HOURS**

DAY/DATE: TUESDAY 10/04/2018   **8.30 A.M – 10.30 A.M**

INSTRUCTION:

- **Answer question one and any other two questions**

1.   (a) Operations research uses computers, extensively. Discuss the role of computers is solving operations research problems.   [10marks]

(b) Discuss any five operations research techniques that are used in Kenya. [10marks]

(c) A typing bureau has five typists who can do any of the five jobs that are available. The cost incurred by the typists in doing the jobs is as shown in the table below:

		Job				
		P	Q	R	S	T
TYPIST	A	86	75	65	152	75
	B	90	78	66	132	78
	C	75	66	57	114	69
	D	80	72	60	120	72
	E	75	64	56	112	68

Required:

(a) Allocate the typists one job each so as to minimize the total costs of doing the jobs.

[6marks]

(b) What is the minimum cost of doing the jobs   [4marks]

2.   (a) Discuss any five benefits of using the linear programming technique in solving business problems.   [5marks]

(b) A marketing manager wishes to allocate his annual advertising budget of ksh 200,000 in two printing media houses A and B. The unit cost of a message in media A is ksh 1000 and in media B is ksh 1,500. Media a is a monthly magazine and not more than one advertisement is desired in one issue. At least five message advertisements should appear in media B per year. The effective audience for the unit message advertisement in media A is 40,000 and media B is 55,000.

Required:

(i)   Formulate the problem as a linear programming problem.   [6marks]
(ii)   Write the problem (in one) above in standard form.   [3marks]
(iii)   Determine the leaving variable entering variable and pivot element.

[6marks]

3.   (a) Discuss any five benefit of using the reorder level system in managing inventories.

[10marks]

(b) A company uses 24,000 units of an item per annum. The ordering costs are ksh 120 per order and the carrying costs are 20% per item per annum. The items cost ksh 20 per item when bought in large number. The lead time is about 10 days.

Required :

(i)   Determine the economic order quantity.   [5marks]
(ii)   The number of orders per year.   [2marks]
(iii)   Annual inventory costs.   [3marks]

4.   (a) Discuss the benefits of using network analysis in managing projects.   [5marks]

(b) A project consists of the following activities.

Activity	Preceding activity	Optimistic	Time in most likely	Days pessimistic
A	-	1	1	7
B	-	1	4	7
C	-	2	2	8
D	A	1	1	1
E	B	2	5	14
F	C	2	5	8
G	D and E	3	6	15
H	F and G	1	2	3

Required:

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

(ii)   Determine the critical path and project duration.   [2marks]

(iii)   What is the probability that the project will be completed in ;
        (a) 22 days
        (b) 18 days   [4marks]

(iv)   What project duration will have 95% chance of completion?   [3marks]