

CHUKA



UNIVERSITY

UNIVERSITY SUPPLEMENTARY/SPECIAL EXAMINATIONS.

FOURTH YEAR EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE IN AGRIBUSINESS MANAGEMENT AND BACHELOR OF SCIENCE IN AGRICULTURAL ECONOMICS

AGEC 415/AGBM 416: OPERATIONS RESEARCH

STREAMS: BS.c AGEc & AGBM Y4

TIME: 2 HOURS

DAY/DATE: TUESDAY 24/07/2018

8.30 A.M - 10.30 A.M

INSTRUCTIONS:

- Answer **Question ONE** and any other **TWO** Questions
- Do not write anything on the Question paper.

- (a) Discuss any five qualities of a good business model that can be used in decision making. [10 Marks]
- (b) The process of Operations Research involves several systematic major steps which are followed when solving problems. Discuss the steps. [10 Marks]
- (c) A manager of a computer servicing has obtained five jobs to be done immediately. He has selected five of his best technicians to do the job. The profit made by each technician in doing the jobs in hundred of shillings is as follows;

TECHNICIANS	JOBS				
	A	B	C	D	E
1	26	22	25	24	26
2	22	25	28	27	27
3	27	28	26	29	28
4	26	22	23	24	25
5	29	23	28	29	27

Required:

Assign the technicians the different jobs so as to maximize the profits of doing the jobs and determine the maximum profits. [10 Marks]

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2. (a) Discuss any five advantages using the network analysis in project management. [5 Marks]
- (b) A company plans to start a project whose activities have been listed as follows;

Activity	Preceding activity	Duration in Days
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. [5 Marks]
- (ii) Determine the critical path and the project duration. [5 Marks]
- (iii) Calculate Total Float, Free Float and Independent Floats for the activities. [5 Marks]
3. (a) Discuss any five limitations of using the linear programming technique in solving business problems. [5 Marks]
- (b) A production line can be set to produce either product B or C. The table below shows the details of the products;

Products	Labour (Min)	Materials (Kgs)	Testing (Min)
B	60	4	6
C	30	8	8

In a week only 50 hours of labour and 560 Kgs of material are available. Owing to the cost and availability the testing equipment must be used for at least 10 hours. The current orders required at least 20 units of product B. Contribution from each unit of B is Kshs.24 and each unit of product C is Kshs.24

Required:

- (i) Formulate the problem as a linear programming mode.
- (ii) Write the problem above in standard form.
- (iii) Determine the Entering Variable, Leaving Variable and the Pivot element.

[15 Marks]

4. (a) State and explain any five benefits of using the Reorder level system in managing inventories. [5 Marks]

(b) Jambo Ltd uses item X_{30} in its production process. The following information relates to the company's demand and lead times for the item X_{30} for a period of time;

	Minimum	Normal	Maximum
Lead Time in days	6	8	12
Demand in units/day	70	80	105

The calculated Economic Order Quantity (EOQ) is 300 units.

Required:

- (i) Reorder Level
- (ii) Minimum Stock Level
- (iii) Maximum Stock Level
- (iv) Average Stock Level

[15 Marks]

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