

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

RESIT/SPECIAL EXAMINATION

EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF COMMERCE

BCOM 263/BCOM 272/BBAM 272: OPERATIONS RESEARCH I

STREAMS:

TIME: 2 HOURS

DAY/DATE: THURSDAY 25/07/2018

8.30 A.M. – 10.30 A.M.

INSTRUCTIONS:

1. (a) The process of Operations Research involves systematic major steps which are followed when solving problems. Discuss the steps. (10 marks)
- (b) Using suitable examples, distinguish between Cooperative and non-Cooperative games in a competitive business environment. (10 marks)
- (c) A manager of a computer serving company 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 hundreds of shillings is as follows;

| PRODUCTS | JOBS | | | | |
|----------|------|----|----|----|----|
| | A | B | C | D | E |
| 1 | 16 | 12 | 15 | 14 | 16 |
| 2 | 12 | 15 | 18 | 17 | 17 |
| 3 | 17 | 18 | 16 | 19 | 18 |
| 4 | 16 | 12 | 13 | 14 | 15 |

| | | | | | |
|---|----|----|----|----|----|
| 5 | 19 | 13 | 18 | 19 | 17 |
|---|----|----|----|----|----|

REQUIRED

Assign the operators the different jobs so as to maximize the profits of doing the jobs and the maximum profits. (10 marks)

2. (a) Discuss any Five advantages of the CPM technique in network analysis. (5 marks)
- (b) A company plans to start a project whose activities have been listed as follows;

| Activity | Preceding 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.
- (ii) Determine the critical path and the project duration (15 marks)

3. (a) Discuss the assumptions in the calculation of the Economic Order Quantity (EOQ) (5 marks)

(b) A company has provided the following data in respect of its raw materials:

| | |
|---------------------|-----------------|
| Maximum consumption | 12,000 per week |
| Normal consumption | 9,000 per week |
| Minimum consumption | 6,000 per week |
| Reorder period | 4-6 weeks |
| Reorder quantity | 60,000 units |

Calculate

- (i) The Re-order level
- (ii) Minimum stock level
- (iii) Maximum stock level
- (iv) Average stock level

(15 marks)

4. (a) Discuss five benefits of using linear programming technique in solving business problems. (5 marks)

(b) A manufacturing company produces three products A, B and C using three machine centres I, II and III. Each product involves operation of the machine centres. The time requires for each operations for each of the products is as follows:

| Product | Machine Centres | | | Profit per unit |
|------------------|-------------------|------------------|------------------|-------------------|
| | I | II | III | |
| A | 10 | 7 | 2 | 120 |
| B | 2 | 3 | 4 | 30 |
| C | <u>1</u> | <u>2</u> | <u>1</u> | <u>10</u> |
| Available | <u>100</u> | <u>77</u> | <u>80</u> | <u>160</u> |

Required

- (i) Formulate the problem as a linear programming problem. (6 marks)
 - (ii) Write the problem in standard form. (3 marks)
 - (iii) Determine the Entering Variables, Leaving Variable and the Pivot element. (6 marks)
-