

CHUKA



UNIVERSITY

## UNIVERSITY EXAMINATIONS

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

**BCOM 263: OPERATIONS RESEARCH 1**

**STREAMS: Y2S2**

**TIME: 2 HOURS**

**DAY/DATE: TUESDAY 6 /07/ 2021**

**11.30 AM – 1.30 PM**

#### INSTRUCTIONS:

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

1. (a) Operations Research uses models in solving problems. State and explain any Five advantages of using Mathematical models in solving problems. [10 Marks]
- (b) The process of Operations Research involves systematic steps which are followed when solving problems. Discuss the steps. [10 Marks]
- (c) A manager of a computer servicing company has obtained five jobs that appear to be similar and need to be done immediately. He has selected five of his best technicians to do the jobs. The time in minutes that each technician can take to complete a particular job is as shown in the following table:

TECHNICIANS	TIME IN MINUTES OF DOING EACH JOB				
	A	B	C	D	E
1	116	112	115	114	116
2	112	115	118	117	117
3	117	118	116	119	118
4	116	112	113	114	115
5	119	113	118	119	117

**REQUIRED**

Assign the operators the different jobs in an optimal manner. [10 Marks]

2. (a) Discuss any Five differences between the CPM and PERT techniques of project management. [10 Marks]

(b) A company plans to start a project whose activities have been listed as follows;

<u>Activity</u>	<u>Preceding activity</u>	<u>Duration in Months</u>
A	-	2
B	-	3
C	A	4
D	A,B	3
E	C,D	8
F	C	3
G	E	2
H	F,G	3

**REQUIRED**

(i) Draw a Network diagram for the project  
 (ii) Determine the critical path and the project duration (10 Marks]

3. (a) Discuss any Five reasons that explain why organizations keep a lot of stocks of different classes of inventories. [10 Marks]

(b) A company requires a part X at the rate of 1500 units per week. Each unit costs £6 when purchased from the current supplier. The ordering cost associated with placing an order with the current supplier is £3700. The interest rate is assumed to be 6% per year and the warehousing costs associated with storage and maintenance are £10 per unit per year. The company operates on 52 weeks per year.

**REQUIRED:**

- (i) The Economic order quantity
  - (ii) Number of orders per year
  - (iii) Total inventory costs per year [10 Marks]
4. (a) Discuss Five benefits of using Linear programming technique in solving Business problems. [5 Marks]
- (b) ABC company manufactures and sells two products  $P_1$  and  $P_2$ . Each unit of product  $P_1$  requires two hours of machine time and one hour of skilled labour hours of skilled labour time. Each unit of product  $P_2$  requires one hour of machine time and two hours of skilled labour time. The machine capacity is limited to 600 machine hours and labour time is limited to 650 hours. Only 300 units of product  $P_1$  can be sold in the market. It is assumed that all what is produced is sold immediately.

**Required**

- i. Develop a suitable linear programming model to determine the optimal product mix
  - ii. Write the problem in 1 above in standard form
  - iii. Identify the Entering variable, Leaving Variable and the pivot element
  - iv. Determine the new values of the new pivot row [15 Marks]
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