



# The Co-operative University of Kenya

**END OF SEMESTER EXAMINATION AUGUST-2019**

**EXAMINATION FOR THE DIPLOMA IN CO-OPERATIVE MANAGEMENT**  
**(YR I SEM II)**

**UNIT CODE: DUCU 1104**

**UNIT TITLE: FOUNDATIONS OF MATHEMATICS**

**DATE: 14<sup>TH</sup> AUGUST, 2019**

**TIME: 9:00 AM – 11:00 AM**

**INSTRUCTIONS:**

- Answer question **ONE (compulsory)** and any other **TWO** questions

**QUESTION ONE**

- (a) In a survey of 100 student it was found that 50 used the college library, 40 had their own library and 30 borrowed books. 20 used both college library and their own books, 15 borrowed books and used their own. Whereas 10 used borrowed books and used college library. Assuming that all the student study.
- Find the number of students that use both college library, borrowed books and their own. (5 marks)
  - If the number of student using no books at all is 10 and the number of students using all the books is 20, show that the information is inconsistent. (10 marks)
- (b) Jack rented a house whose rent was increased each year with a constant rate. He paid 10,000 in the 12<sup>th</sup> year of his stay. Also the total amount he paid the landlord for the 12 years was 90, 000. Determine the initial rent on the first year and the fixed rate of the rent increase. (10 marks)
- (c) A part firm keeps a component parts used to make up each product and products made each day are represented by the following matrix.

Days	product 1	product 2	
Mon	0	1	
Tue	2	3	
Wed	3	2	
Thur	1	1	
Fri	1	0	
Parts used	A	B	C
1	3	2	1
2	1	4	2

Using matrix multiplications find a matrix that describes the number of component parts used on each day of the week. (5 marks)

## QUESTION TWO

A company produces a product which it sell at sh.55 per unit .Each unit cost of the firm is sh.23 in variable expenses and fixed cost on an annual basis is sh.400,000.If x equals to the number of units produced and sold during the year. (20 marks)

- Formulate a linear total cost function
- Formulate a liner revenue function
- Formulate a linear total profit function.
- What is the annual profit if 10,000 units are produced and sold during the year?
- What level of output is required in order to earn zero profit(breakeven point)

## QUESTION THREE

- (a) A company has two products x& y that need to undergo through two processes before they are final products .the first process A has a maximum capacity of 32,000 hours and process B has a maximum capacity of 29,000 hours .Each unit of x requires 2hours of process A and 1.5 hours process B, while each unit of Y requires 1 hour in process A and 1.5 hours in Process B.

The company seeks to make a maximum use of plant capacity .Compute the units of x &y that should be produced to ensure the maximum capacity is fully employed and there is no idle time in either of the process. (13 marks)

- (b) If sh.400, 000 is to grow to 750,000 over a 10 year period. At what rate of interest must it be invested, given the interest is compounded annually. (7 marks)

## QUESTION FOUR

A company has 7 senior and 5 junior officers. They want to form a legislative committee. In how many ways will they choose a 4-officer committee be formed so that it is composed of

(20 marks)

- Any 4 officers
- 4 senior officers
- 3 senior officers and 1 junior officers
- 2 senior and 2 junior officers
- At least 2 senior officers

## QUESTION FIVE

- (a) A retailer receives a shipment of 10,000 kgs of rice that will be used over a 5-month period at a constant rate of 2000 kilograms. Per month. The cost of the storage is ksh 1 per kilogram per month. How much will the retailer pay in storage over the next 5 months? (10 marks)
- (b) A clock strikes twice the number on the hour hand .How many strikes will it make in 8 hours. (10 marks)