

**N K U M B A U N I V E R S I T Y**

**SCHOOL OF BUSINESS ADMINISTRATION**

**END OF JULY 2018 SEMESTER EXAMINATIONS**

**DISTANCE LEARNING PROGRAMME**

**PAPER:**

**QUANTITATIVE METHODS**

**LEVEL:**

**DEGREE**

**DATE:**

**JANUARY 2019**

**TIME:**

3 HOURS



**INSTRUCTIONS:**

1. Do not write anything on the question paper.
2. Attempt any four (4) questions including question Four (No.4) which is compulsory
3. All questions carry marks.
4. Begin each question on a separate sheet of paper.
5. Show all the working and use practical examples to illustrate your points where necessary.
6. Dirty work will be strictly penalized while neat presentations will be rewarded.

**Question One**

A certain farmer in Mayuge district sells four (4) of his products which are Matooke, Pineapples, Cassava and Tomatoes in each of the two towns, Tororo and Entebbe to three (3) classes of customers i.e consumers, wholesalers and retailers in bags as given below:

**Entebbe**

**Product**

**Matooke Pineapples Cassava Tomatoes**

Consumers 4 3 5 2

Wholesalers 3 2 1 6

Retailers 4 6 7 4

**Tororo**

**Product**

**Matooke Pineapples Cassava Tomatoes**

Consumers 2 4 0 2

Wholesalers 7 4 8 4

Retailers 6 3 5 4

In order to sell his produce in these towns, the farmer pays a commission to the salesmen, town managers, and division managers as shown below:

**Salesmen Town manager Division manager**

Entebbe 2% 3% 6%

Tororo 3% 5% 4%

**The selling price per bag is as given below:**

Shs

Matooke 12,000

Pineapples 10,000

Cassava 15,000

Tomatoes 17,000

**Required:**

Using matrix algebra,

1. Determine the total sales in units by product and customer type
2. Determine the difference between the two towns in sales (units) by product and customer type
3. Calculate the total sales in shillings by each town
4. Find the sales in shillings by customer type in each town
5. Compute the amount of commission to be paid to salesmen, town managers and division managers.

**(Total 25 marks)**

**Question Two**

1. Distinguish among Quadratic equation, Quadratic formula, and Quadratic function **(3 marks)**
2. i) Copy and complete the table below for

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| x | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| 2x2 |  |  |  | 0 |  | 8 |  |
| 3x | -9 | -6 | -3 | 0 | 3 | 6 | 9 |
| -5 | -5 | -5 | -5 | -5 | -5 | -5 | -5 |
| y |  |  |  |  |  |  |  |

ii) Using your table in (i) above, draw the curve

iii) Draw the line 3

1. Use your graph to solve the equations

and

**(7 marks)**

1. Sketch a graph of

y = -x² + 4 Using a set of x values as

-3, -2,……………………3 and comment on its shape. **(7 marks)**

d) Determine the x coordinates of the points where the quadratic

function y = 3x² + 5x – 4 crosses the x-axis **(4 marks)**

e) Use Crammer’s rule to solve the following simultaneous equations

2x + 3y = -9

3x + 5y=-13 **(4 marks)**

**(Total 25 marks)**

**Question Three**

1. A random sample of 100 students was taken to find out how many were literate (L), married (M) or had income generating project (P). The findings showed the 47 were literate, 59 were married and 52 had an income generation project.

You are also told that , .

14 of the students were illiterate, un married and without income generating

project.

**Required:**

1. Represent the above information on a Venn diagram.
2. Find the number of students who were:-

* Literate, married and had an income generating project.
* Neither literate nor married. **(10 Marks)**

1. Of the 32 Management lecturers who attended a workshop, 14 teach Accounts (A), 17 teach Finance (F), 22 teach Statistics (S), 9 teach Statistics and Finance but not Accounts, 4 teach Statistics but not Accounts or Finance, 3 teach Accounts but not Finance or Statistics. All the 32 lecturers teach atleast one of the three subjects.

**Required:**

Find the number of lecturers who teach:

1. All the three subjects
2. Only two of the three subjects
3. At least two subjects **(15 Marks)**

**(Total 25 Marks)**

**Question Four**

1. A firm makes trousers and skirts from cotton, wool and rayon. In order to produce a trouser,1 kg of cotton, 1 kg of wool and 3 kgs of rayon are used up. To produce one skirt, the firm requires one kg of cotton, 2 kgs of wool and 2 kgs of rayon. Available are 60,000 kgs of cotton, 80,000 kgs of wool and 150,000 kgs of rayon. If the contribution margin is shs 60 per trouser and shs 80 per skirt

Required:

To solve using graphical method and interpret your results **(15 marks)**

1. Charles wishes to transport 870 bags of groundnuts from his home to the shelling mill. He has a trailer which can carry 150 bags at a time and a fuso lorry which can carry 60 bags at time. The cost of each journey for trailer is 25,000/= and a Fuso lorry shs. 20,000. The Fuso makes more journeys than a trailer. The amount of money available for transporting groundnuts is shs.220,000.
2. Write down five inequalities representing the above information.
3. Show all the inequalities on the graph by shading out unwanted region.
4. How many journeys should the trailer and Fuso make so as to keep the transport cost as low as possible**? (10 Marks)**

**(Total 25 Marks)**

**Question Five**

**a)**

1. Factorize 13! - 12! **(2 Marks)**
2. Hence simplify (x + 3)2 – (x – 7)2 **(3 Marks)**
3. Simplify hence factorize this expression. **(3 Marks)**
4. Expand(x + 3) (x - 2) (x + 2) **(2 Marks)**

(b)(i)Using clear examples, distinguish between permutations and combinations. **(3 Marks)**

(ii) The Uganda flag has three horizontal layers, Black (B), Yellow (Y) and Red (R). Determine the number of different flags that can be formed by Interchanging the layers. **(4 Marks)**

(iii) 2 lottery tickets are drawn from 20 for first and second prizes.

**Required:**

Find the number of sample points in space S using permutations.

**(3 Marks)**

(iv) A committee of 4 must be chosen from 3 ladies and 4 gents.

Required:

1. in how many ways can 2 gents and 2 ladies can be choses?
2. in how many ways can a committee be chosen? **(5 Marks)**

**(Total 25 Marks)**

**Question Six.**

1. Mathematics is a group of related sciences including arithmetic, algebra, geometry, and calculus necessary for solving a wide range of problems. However, it is a widely held belief that Mathematics is a difficult subject. Consequently, many people tend to hate it yet, in their day-to-day life, they regularly encounter issues that require mathematical approaches. Using your knowledge of Quantitative Methods, assess the relevancy of this statement **(12 marks)**
2. Give in detail the major differences between the quantitative approach and the non-quantitative approach to any subject. **(8 Marks)**
3. What are the merits and demerits of using the quantitative approach to any subject? **(5 Marks)**

**(Total 25 Marks)**

**Nkumba University**

School of Business & Information Technology



**END OF AUGUST 2019 SEMESTER EXAMINATIONS**

**PAPER: QUANTITATIVE METHODS**

**LEVEL: DEGREE/DIPLOMA**

**CAMPUS: MAIN CAMPUS**

**TIME: 3 HOURS**

**STUDY SESSION**: **DISTANCE LEARNING PROGRAMME**

**INSTRUCTIONS**:

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1. **DO NOT WRITE ANYTHING ON THIS QUESTION PAPER**

2. **Each section** has different instructions **so read the instructions** before you attempt any section.

3. Attempt **FOUR (4) Questions** including **QUESTION ONE which is COMPULSORY. All questions carry equal marks.**

4. All rough work must be done on the second last page of the booklet and clearly indicated **“ROUGH WORK”.**

5. Write clearly in **BLUE** or **BLACK** ink and always cite relevant examples and cases were applicable. A pencil can only be used for diagrams.

6. Nkumba University examinations are conducted in accordance with the ***Nkumba University Senate General Rules and Regulations 2009***. Breach of the above regulation, irregularity, or any other contravention of the examination regulations will automatically lead to disqualification and/or subsequent disciplinary action by University Senate.

**Question One**

1. A manufacturer makes two products A and B. The cost of making 15 units of product A and 10 units of product B is $ 600. The cost of making 5 units of product A and 8 units of product B is $ 340. The manufacturer makes a profit of 20% and 25% on each of the products A and B respectively.

**Required:**

1. Express the above cost of making one unit of products A and B in form of Simultaneous equations **(2 marks)**
2. Calculate the cost of making one unit of product A and product B

**(4 marks)**

1. Calculate the selling price of one unit of product A and product B

**(4 marks)**

1. A firm makes trousers and skirts from cotton, wool and rayon. In order to produce a trouser, 1 kg of cotton, 1 kg of wool and 3 kg of rayon are used up. To produce one skirt, the firm requires one kg of cotton, 2 kg of wool and 2 kg of rayon. Available are 60,000 kg of cotton, 80,000 kg of wool and 150,000 kg of rayon. If the contribution margin is sh. 60 per trouser and sh. 80 per skirt

Required:

To solve using graphical method and interpret your results (15 marks)

**(Total: 25 marks)**

**Question Two**

a) Write short notes on the following as used in set notation

1. Equivalent and Equal set **(4 marks)**
2. Null set **(2 marks)**
3. Finite and infinite set **(4 marks)**
4. The population of Katabi town council has a choice of three daily newspapers i.e. the New vision (N), the Monitor (M) and Bukedde (B). 40 read N, 35read M, and 60 read B, 7read N and M ,10 read M and Band 4 read N and B , 34read no paper at all , if there are 150 people in the town.

**Required**

1. number of people who read all the three papers
2. number of people who read only one paper
3. number of people who read N and M only
4. Probability that a person chosen at random from this town reads at least two newspapers daily **(15 marks)**

**(Total: 25 marks)**

**Question Three**

Mathematics is a group of related sciences including arithmetic, algebra, geometry, and calculus necessary for solving a wide range of problems. However, it is a widely held belief that Mathematics is a difficult subject. Consequently, many people tend to hate it yet, in their day-to-day life, they regularly encounter issues that require mathematical approaches. **Required**

Using your knowledge of Quantitative Methods, assess the relevancy of this statement

**(Total: 25 marks)**

**Question Four**

1. Using appropriate examples, distinguish between the following:
2. Trail and Lead matrix **(2 Marks)**
3. Identity and zero matrix **(2 Marks)**
4. Unit and square matrix **(2 Marks)**
5. A matrix and elements of a matrix **(2 Marks)**
6. Four students of Nkumba University, Sarah, Joan, Esther and Brenda went for shopping and each girl bought pens, exercise books, and graph books at shs. 400, shs. 1200, and shs. 700 each respectively as follows

|  |  |  |  |
| --- | --- | --- | --- |
| Sarah | 3 pens | 5 exercise books | 4 graph books |
| Joan | 4 graph books | 2 pens | 3 exercise books |
| Esther | 6 exercise books | 3 graph books | 4 pens |
| Brenda | 3 pens | 4 graph books | 5 exercise books |

1. (i) Form a 4x3 matrix for shopping by the four students.

(ii) Form a 3x1 cost matrix for the items bought.

1. Use the matrices in (a) above to find the amount of money spent by each girl. **(17 marks)**

**(Total: 25 marks)**

**Question Five**

(a)Write short notes on the following:

1. Quadratic Equation **(3 Marks)**
2. Quadratic Function **(3 Marks)**
3. Quadratic Formula **(3 Marks)**
4. Copy and complete the table below for y = 2x2 + 3x – 5

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| x | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| 2x2 |  |  |  | 0 |  |  |  |
| 3x | -9 | -6 | -3 | 0 | 3 | 6 | 9 |
| -5 | -5 | -5 | -5 | -5 | -5 | -5 | -5 |
| y |  |  |  |  |  | 11 |  |

1. Using your table, draw the curve: y = 2x2 + 3x – 5.
2. Draw the line y = x - 3
3. Use your graph to solve the equations

2x2 + 3x – 5 = 0

**(Total: 25 marks)**

**Question Six**

1. i) Evaluate 7! 2! 5! **(3 marks)**

ii) Factorize 13! - 12! **(2 Marks)**

iii) Hence simplify (x + 4)2 – (x – 8)2 **(2 Marks)**

1. A committee of 4 must be chosen from 3 women and 4 men. Calculate.
   * 1. The number of ways in which a committee can be chosen. (use combination)
     2. In how many ways 2 men and 2 women can be chosen. (use both permutation and combination) **(8 marks)**
2. The Uganda flag has tree horizontal layers, black (B), yellow(Y) and red (R). How many different flags can be formed by interchanging the layers?

**(10 marks)**

**(Total: 25 marks)**

**Nkumba University**

School of Business & Information Technology



**END OF AUGUST 2019 SEMESTER EXAMINATIONS**

**(From Wednesday 13th November 2019 to Friday 29th December 2019)**

**PAPER: QUANTITATIVE METHODS**

**LEVEL: DEGREE/DIPLOMA**

**CAMPUS: MAIN CAMPUS**

**TIME: 3 HOURS**

**STUDY SESSION**: **DAY PROGRAMME**

**INSTRUCTIONS**:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Question One**

1. Nkumba University has organized a study tour for 90 students. Two types of vehicles are needed; taxis and Costas. The maximum capacity of the taxi is 15 passengers while that of the Costa is 30 passengers.

The number of taxis will be greater than the number of Costas. The number of taxis will be less than five (5). The cost of hiring a taxi is Shs. 60,000 while that of a Costa is Shs. 100,000.

There is only Shs. 600,000 available.

**Required:**

1. write six inequalities for the above information
2. Represent the inequalities graphically
3. Find from your graph the number of taxis and Costas which are full capacity that must be ordered so that all the students are transported **(12 marks)**
4. A small shop is preparing for the holiday season. The owners must decide on how many cakes of deluxe mix and standard mix to prepare from the available materials of peanuts and raisins.

Available information is such that:

Standard mix cake should be made of 3kgs of raisins and 3kgs of peanuts. A deluxe mix cake, on the other side should contain 4kgs of raisins and 2kgs of peanuts. Available in the shop are 12,000kgs of raisins and 9000kgs of peanuts. No more materials are expected in the holiday season. Each standard mix cake has a contribution margin of Shs.5,000. on the contrary, the deluxe contribution margin is Shs.9,000

**Required:**

To prepare the optimum solution graphically and interpret the results.

**(13 marks)**

**(Total: 25 marks)**

**Question Two**

1. A random sample of 50 students was taken to find out how many were literate L married M or income generating project P. the findings showed that 25 were literate, 13 were married and 15 had an income generating project.

n(LnMnP’) = 2

n(LnPnM’) = 2.

3 of the students were illiterate, unmarried and without income generating project.

**Required:**

Find the number of students who were:-

1. Literate, married and had an income generating project.
2. Neither illiterate nor married. **(10 marks)**
3. Nkumba University operates a guild canteen where students can freely go and have lunch. In a day, a sample of 68 students was served with three types of source, that is: Beef (B), Chicken (C) and Fish (F). 2 of the students do not eat any of the three types of source of Beef (B), Chicken (C) and Fish (F). 25 students eat beef and chicken, 19 eat beef and fish while 23 eat chicken and fish. 38 students eat fish. Some students eat all the three types of source. The numbers of students who eat only one of the source are equal.

**Required:**

Determine the number of students who eat:

1. All the three types of source
2. Beef
3. chicken
4. If a student is selected at random, find the probability that the student eat

* Only one type of source
* At most two types of source **(15 marks)**

**Bk (Total, 25 marks)**

**Question Three**

1. The Cambridge international Dictionary of English (1995) defines mathematics as the ‘’*study of numbers, shapes and* *space using reason and normally a special system of symbols and rules of organizing them’’* *(p.874)* this definition suggest that math’s has such branches as:
2. Arithmetic
3. Algebra
4. Geometry
5. Statistics
6. Calculus **(15 marks)**
7. In your own words, what does each of these terms mean?

In your own words and thus without citing any source (you do not have any) discuss.

1. Any four reasons why people ( hopefully excluding yourself) leave school either hating or fearing Mathematics
2. Any four pieces of advice (e.g. to Mathematics teachers) on how to alleviate the status quo. **(10 marks)**

**(Total: 25 marks)**

**Question Four**

1. Using appropriate examples, distinguish between the following:
2. Trail and Lead matrix **(2 Marks)**
3. Identity and zero matrix **(2 Marks)**
4. Unit and square matrix **(2 Marks)**
5. A matrix and elements of a matrix **(2 Marks)**
6. Use both Crammer’s Rule and Elimination methods to solve the following simultaneous equations:

2x + 3y = -9

3x + 5y = -13 **(5 Marks)**

1. Given that = Find the value of x and y **(5 Marks)**
2. Mayo sells shirts of different sizes, that is: Small (S), Medium (M) and Extra-large (XL). The table below shows his sales for 3 days

|  |  |  |  |
| --- | --- | --- | --- |
| SIZE | DAY | | |
| MONDAY | TUESDAY | Wednesday |
| S | 2 | 2 | 1 |
| M | 7 | 4 | 1 |
| XL | 3 | 5 | 3 |

He sells each shirt at Shs. 47,000 for S, Shs. 55,000 for M and Shs. 66,000 for XL

**Required:**

Use the matrices to calculate the total income from the shirts.

**(7 Marks)**

**(Total, 25 marks)**

**Question Five**

1. Solve the equations:

x2 + 4y2 = 4

y = x – 1 **(4 marks)**

1. Copy and complete the table below. **(3 marks)**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| x | -20 | -1.5 | -1.0 | -0.5 | 0.0 | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 |
| -2x2 | -8 |  |  |  | 0 |  |  |  |  |  | -13 |
| 3x | -6 |  |  |  | 0 |  |  |  |  |  | 9 |
| 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| y | -8 |  |  |  | 6 |  |  |  |  |  | -3 |

1. Use the completed table to draw a graph of y = 6 + 3x -2x2 for

-2 x 3 **(4 marks)**

1. on the same graph, Draw a line y = 2x and use the graph to solve the equation y = 6 + x – 2x2 **(4 marks)**

(d) The cost-quantity relation for some hypothetical company has

established to be **C = q2 – 17q + 42**

you are to plot this relation thus:

1. With reasons, state the nature of the relation.
2. State the vertical intercept of the relation.
3. Determine its break-even quantities
4. Determine its optimal point(s)
5. Considering the co-efficient of q2, what can you deduce about the nature of this relation?
6. Using all the above, systematically sketch the relation.
7. As an economically-literate student, interpret the shape of the relation graphed. **(10 Marks)**

**Question Six**

1. Using clear illustration, distinguish between permutations and combinations. **(3 marks)**
2. Factorize 3(16!) + 14! **(2 marks)**
3. Factorize - **(3 marks)**
4. i) How many different ways can 4 red, 5 yellow and 3 blue bulbs be arranged in a string of Christmas tree lights with 12 sockets?

**(3marks)**

ii) From a group of 4 men and 5 women, how many committee of size 3 are possible with

* No restriction
* 1 man and 2 women? **(3 marks)**

1. Three persons Queen (Q), Rex (R) and Sofia (S) want to take photos in pairs. Use
2. A tree diagram **(3 marks)**
3. A computation to determine how many such photos they can form by permutation. **(3 marks)**

f) A combination of 4 must be chosen from a committee of 3 women and 4 men.

**Required**

1. In how many ways can a committee be chosen?
2. In how many ways can 2 men and 2 women be chosen?

(Hint: use both Permutations and combinations) **(5 marks)**