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**GARISSA UNIVERSITY**

**UNIVERSITY EXAMINATION 2019/2020 ACADEMIC YEAR ONE**

**SECOND SEMESTER EXAMINATION**

**SCHOOL OF BUSINESS AND ECONOMICS**

**FOR THE DEGREE OF BACHELOR OF BUSINESS MANAGEMENT**

**COURSE CODE: BBM 113**

**COURSE TITLE: INTRODUCTION TO BUSINESS MATHEMATICS 1**

**EXAMINATION DURATION: 2 HOURS**

**DATE: 11/12/2020 TIME: 09.00-11.00 AM**

**INSTRUCTION TO CANDIDATES**

* **The examination has FIVE (5) questions**
* **Question ONE (1) is COMPULSORY**
* **Choose any other TWO (2) questions from the remaining FOUR (4) questions**
* **Use sketch diagrams to illustrate your answer whenever necessary**
* **Do not carry mobile phones or any other written materials in examination room**
* **Do not write on this paper**

**This paper consists of FOUR (4) printed pages *please turn over***

**QUESTION ONE (COMPULSORY)**

1. Differentiate between a linear and nonlinear functions **[2 marks]**
2. Given that K{1, 2, 3, 4, 5, 6, 7, 8}is Universal Set

 , and 

 Find

1. B∩ A **[1 mark]**
2. A’ ∩ K **[2 marks]**
3. Solve the following system of equations using matrix inverse. **[4 marks]**

4Y – 2X =1

 Y + 5X = -3

1. Find the roots of X1 and X2  of the following by factor method **[3 marks]**

 3X2  + 12X + 42 = 0

1. State three reasons why a mathematical approach in business analysis is considered to be an effective approach. **[3 marks]**
2. Abdi obtained a 30 years mortgage loan of 10 million at an annual percentage rate (APR) of 16%. What would be his monthly payment  **[4 marks]**
3. Use the information below to verify the necessary operations

 i = 1 2 3 4 5 6 7 8

 Xi = 25 19 6 27 23 34 29 41

 5

1. ∑ **[2 marks]**

 i=2

 8

1. ∏ **[2 marks]**

 i=3

1. Identify three types of nonlinear functions with their respective general models of representation**. [5 marks]**
2. Find the determinant of the following matrix. **[3 marks]**

 

**QUESTION TWO**

1. Discuss the following terms by giving examples
2. Order or dimension of matrix **[2 marks]**
3. Disjoint sets **[2 marks]**
4. Subset **[2 marks]**
5. Universal set **[2 marks]**
6. Solve the following system of equations by using Cramer’s Rule. **[12 marks]**

$$x+ y+ z=9$$

$$2x+5 y+7 z=12$$

$$2x+ y- z=5$$

**QUESTION THREE**

1. Safaricom (Kenya Ltd) surveyed 400 of its customers to determine the way they learned about the new Jibambie tariﬀ. The survey shows that 180 learned about the tariﬀ from radio, 190 from television, 190 from newspapers, 80 from radio and television, 90 from radio and newspapers, 50 from television and newspapers, and 30 from all three forms of media.
2. Draw a Venn diagram to represent this information  **[6 marks]**
3. Using your Venn diagram (together with the Inclusion-Exclusion Principle where need be), determine
4. The number of customers who learned of the tariﬀ from at least two of the three media. **[3 marks]**
5. The number of customers who learned of the tariﬀ from exactly one of the three media. **[3 marks]**
6. The number of customers who did not learn of the tariﬀ any of the three media. **[3 marks]**
7. Solve the simultaneous equations by eliminating or substitution**. [5 marks]**

$2x+6y=8$
$2x+8y=20$

**QUESTION FOUR**

1. Define the term Transpose of a matrix and give an example **[3 marks]**
2. A group operates a chain of filling station in each of which are employed cashier, attendants and mechanics

 Type of filling station

 

 Number of filling station

 

1. How many various types of staff are employed in Nairobi, Mombasa and Kisumu  **[10 marks]**
2. Discuss the properties of matrix addition  **[7 marks]**

**QUESTION FIVE**

1. In a class of 30 students, 15 study Marketing and 18 studies Finance and 2 studies neither. How many students study both Marketing and Finance **[6 marks]**
2. A manufacturer makes two products  and. The first requires 5 hours for processing, 3 hours for assembling and 4 hours for packaging. The second requires 2 hours for processing, 12 hours for assembling and 8 hours for packaging. The plant has 40 hours available for processing, 60 hours for assembling and 48 hours for packaging. The profit margin for is ksh.7 and for it is ksh.21

**Required:**

1. Express the data in equations and inequalities necessary to determine the output mix that will maximize profits. **[14 marks]**