**GARISSA UNIVERSITY**

**SCHOOL OF BUSINESS AND ECONOMICS**

**BBM 113: BUSINESS MATHEMATICS 1**

**END SEMESTER EXAMINATION**

**MAY/AUG 2021**

**INSTRUCTIONS**

**ANSWER QUESTION ONE AND ANY OTHER TWO QUESTIONS.**

**QUESTION ONE 30 MARKS (COMPULSORY)**

1. (a) i) Define the following terms i) Business ii) Business mathematics (4marks)

ii)State and explain the importance of studying business mathematics in Business courses ( 4marks)

 (b) Given that matrix A = 2 2

 k 3 is singular , Find the value of k. (3marks)

(c) i) Differentiate between Sets and Subset (4marks)

. ii) Suppose *H* = {cat, dog, rabbit, mouse}, *F* = {dog, cow, duck, pig, rabbit}, and *W* = {duck, rabbit, deer, frog, mouse}.Find

a) (H ⋂ F) (2marks)

1. (H ⋂ F) ⋃ W ) (3marks)
2. (H ⋃ W) (2marks)

(d) In a certain city, if today is sunny, tomorrow will be sunny 80% of the time. If today is cloudy, tomorrow will be 60% of the time. Supposing today is sunny, what is the probability it will be cloudy the day after tomorrow (5marks)

(e) A company has fixed costs of $7,000 for plant and equipment and variable costs of $600 for each unit of output.
What is total cost at varying levels of output? (3marks)

**QUESTION TWO (20MARKS)**

2). Assume that for a closed economy E = C + I + G, where E is total expenditure, C is expenditure on consumption of goods, I is expenditure on investment on goods and G is Government spending. For equilibrium, we must have E = Y, where Y is the total income received. For a certain economy, it is given that C = 15 + 0.90 Y, I = 20 + 0.05 Y, and G = 25. Find

i) The equilibrium values of Y, C and I.(10marks)

ii) How will these change if there is no Government spending? (10marks)

**QUESTION THREE (20MARKS)**

3) i).If A = {x: x is an even natural number} and B = {y: y is a natural number}, using relevant examples determine a subset.(4marks)

ii) Given the following matrix

 A 2 3 and B -4 5 Find

 3 1 2 6

1. A – B (3marks) ii) A + B (3marks)

 iii) AB (4marks) iv) determinant of B2 (6marks)

**QUESTION FOUR (20MARKS)**

A farmer has recently acquired a 110 hectares piece of land. He has decided to grow Wheat and barley on that land. Due to the quality of the sun and the region’s excellent climate, the entire production of Wheat and Barley can be sold. He wants to know how to plant each variety in the 110 hectares, given the costs, net profits and labor requirements according to the data shown below:

|  |  |  |  |
| --- | --- | --- | --- |
| Variety | Cost (Price/Hec) |  Net Profit (Price/Hec) |  Man-days/Hec |
| Wheat | 100 |  50 |  10 |
| Barley | 200 |  120 |  30 |

The farmer has a budget of Kshs 10,000 and availability of 1,200 man-days during the planning horizon. Find the optimal solution and the optimal value.(20marks)

**QUESTION FIVE (20MARKS)**

5). In analysing switching by Business Class customers between airlines the following data has been obtained by British Airways (BA):

 Next flight by

 BA Competition

Last flight by BA 0.85 0.15

 Competitor 0.10 0.90

Given that the last flight by a Business Class customer was by BA the probability that their next flight by BA is 0.85. Business Class customers make 2 flights a year on average. Currently BA have 30% of the Business Class market. What would you forecast BA's share of the Business Class market to be in percentage after two years? (20marks)