

**ZU/WI/7/EXM/6**

**ACADEMIC YEAR 2016/2017**

**SPECIAL EXAMINATION FOR THE BACHELOR OF BUSINESS MANAGEMENT AND ADMINISTRATION**

**BBAM 222: QUANTITATIVE TECHNIQUES**

**DATE: APRIL, 2017 TIME: 2 HOURS**

**Instructions: Answer Question 1 and Any Other Two Questions.**

**QUESTION ONE {Total marks 30}**

1. Inspect the following matrices and comment on them (3 marks)
2. $A=\left\{\begin{matrix}6&7&8\\3&1&2\\4&5&6\end{matrix}\right\}$ $B=\left\{\begin{matrix}6&7&0\\3&1&2\\4&5&6\end{matrix}\right\}$ $C=\left\{\begin{matrix}1&0&0\\0&5&0\\0&0&5\end{matrix}\right\}$
3. Explain three elements to be taken into account while multiplying matrices (3 marks)
4. Using relevant examples, explain two rules of addition (4 marks)
5. Differentiate the following using the first principle rule
6. $y=2x^{2}-(8x+5)$ (5 marks)
7. Using relevant examples explain five rules of integration (5 marks)
8. Wanyonyi is a supplier of Sugarcane and Maize meal. On a certain day he bought 4 stokes of sugarcane and 3 Kgs of Maize meal and spent a total of Sh. 34. The following day he bought 2 stokes of sugar cane and 4 Kgs of Maize meal and spent a total of Sh.32. Using matrix method compute the unit price of each of the product. (4 marks)
9. A company is hiring people to work in its plant. For the job the people will perform, efficiency experts estimate that the average cost (C) of performing the task is a function of the number of people hired, x specifically,

$$C=f\left(x\right)=0.002x^{2}-5lnx+60$$

 Required:

1. Determine the number of people who should be hired to minimize the average cost (3 marks)
2. What is the minimum average cost? (3 marks)

**QUESTION TWO {Total marks 20}**

1. Hodari electronic company limited stores and sells electronic equipment at three outlets. The following table shows the average number of pieces of electronic equipment sold at each outlet per week

|  |  |  |  |
| --- | --- | --- | --- |
| **Equipment**  | **Kasarani** | **Majengo** | **Kitusuru** |
| **PS** | 150 | 170 | 40 |
| **TV** | 60 | 140 | 80 |
| **Radio** | 40 | 60 | 130 |

The following table shows the number of units of service components required for each of pieces of equipment that is sold

|  |  |  |  |
| --- | --- | --- | --- |
| **Service component**  | **PS** | **TV** | **Radio** |
| **CP** | 20 | 40 | 50 |
| **RS** | 20 | 80 | 60 |
| **Dd** | 50 | 30 | 20 |

The following table shows the cost per unit of service component sold during the week

|  |  |  |  |
| --- | --- | --- | --- |
| **Service component** | **Cp** | **Rs** | **Dd** |
| **Cost per Unit (Sh.)** | 120 | 200 | 100 |

**Required:**

1. Find the total number of service component required in average during the week at:
2. Kasarani (2 marks)
3. Majengo (2 marks)
4. Kitisuru (2 marks)
5. Find the total cost of all the three service component required in average during the week (6 marks)
6. Solve the following simultaneous equation using matrix method (10 marks)

$$3x+2y+5z=32$$

$$2x+3y+4z=29$$

$$4x+3y+5z=37$$

**QUESTION THREE {Total marks 20}**

1. Explain four areas of application of Markovian process. In each use an example (8 marks)
2. Suppose safaricom airtime is beind sold by three suppliers, CU, JK and KK. Assuiming that at the beginning of January 2017 there was a sample 3000 buyers of safaricom airtime, and they were distributed equally among the three suppliers. During the month the shifting pattern of customers were observe and the following data was recorded at the end of the month: it was found that those who were being supplied by CU, 600 continued to be supplied by CU, 150 shifted their supplier to JK and the rest to KK. Of those who were being supplied by JK, 300 shifted their loyality to CU, and 200 to KK. And of those who were being supplied by KK, 200 shifted to CU and another 200 to JK. Assuiming that this shifting pattern persist into the future establishpercentage market share for the three suppliers of safaricom airtime:
3. End of January 2017 (3 marks)
4. End of february 2017 (3 marks)
5. In the long run (6 marks)

**QUESTION FOUR {Total marks 20}**

1. Expain at least two assumptions for a linear programming (4 marks)
2. State three requirements for a linear programming problems (3 marks)
3. Explain three requirement for in-put and out-put analyisis (3 marks)
4. Kakuzi industries operates two businesses, that is Pinaple product and Banana product. To produce Sh. 1 million of output of pinaple product requires Sh. 0.15 of input from from Pinaple product andSh. 0.1 of input fromt from Banana product. On the other hand to produce Sh. 1 million of output requires Sh. 0.05 input from from Pinaple product and Sh. 0.2 input from Banana product itself. The external demand for the two businesses next month is estimated to be Sh. 250 million and Sh. 400 million for Pinaple and Banana respectively

Required:

1. What would be the required total output from the two businesses next month (6 marks)
2. Distribute the output in (i) above among the users (4 marks)