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**SUPPLEMENTARY EXAM JULY 2005**

**UNIVERSITY OF SWAZILAND**

**SUPPLEMENTARY EXAMINATION PAPER**

**PROGRAMME: DEGREE IN AGRICULTURE (AEM OPTION) IV**

**COURSE CODE: AEM 402**

**TITLE OF PAPER: QUANTITATIVE AND RESEARCH METHODS**

**TIME ALLOWED: TWO AND A HALF (2.5) HOURS**

**INSTRUCTION: ANSWER ALL FOUR (4) QUESTIONS**

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THE CHIEF INVIGILATOR**

**SECTION A: RESEARCH METHODS**

**QUESTION ONE**

- (i) Explain the operation of a quota sampling and why quota sample is a non-probability sample .

**(10 Marks)**

- (ii) Swaziland Meat Commission, a manufacturer of processed meats, was planning to enter Kenyan Market. Before the final decision about launching its products, management decided to test market the products in two cities. After reviewing the various cities in terms of external criteria such as demographics, shopping characteristics, and so on, the research department settled on the cities of Nairobi and Mombasa. Critically evaluate the type of sampling method that was used

**(15 Marks)**

**QUESTION TWO**

A certain car dealer in Manzini has contracted you to conduct a survey to determine what proportion of new car owners continue to have their car serviced at the dealership after the warranty period ends. The dealer estimates that 30 percent of customers do so. It wants to be 95 percent confident of the results. Remember that at 95 percent confidence interval,  $Z$  is 1.96

- a. What sample size is needed? **(10 Marks)**
- b. What sample size would be required if the company wanted to be accurate within one percent and still be 95 percent confident of the results? **(10 Marks)**
- c) Explain how and why your two answers in question '1a' and '1b' differ. **(5 Marks)**

**SECTION TWO: QUANTITATIVE METHODS****QUESTION THREE**

Use the simplex algorithm to solve the following system of equations and inequalities. Determine the shadow prices of the inputs (requirements) of the constraints. Also, recommend one of the inputs you would select and explain why if there is limited capital to employ a unit of only one of the two inputs.

$$\text{Maximize Gross Margin (GM)} = 100Y_1 + 200Y_2$$

Subject to:

$$\begin{aligned} Y_1 + Y_2 &\leq 500 \text{ ha (Land constraint)} \\ 2Y_1 + 6Y_2 &\leq 1200 \text{ hr (Labor constraint)} \end{aligned}$$

$$Y_1, Y_2 \geq 0$$

**(25 Marks)**

**QUESTION FOUR**

Consider the following information concerning a transportation problem:

Origin	Destination				Supply
	Matsapha	Manzini	Malkerns	Mbabane	
Big Bend	3	2	7	6	5000
Steki	7	5	2	3	6000
Simunye	2	5	4	5	2500
<b>Destination Demand</b>	6000	4000	2000	1500	13500

- a. Develop a linear programming model for minimizing the transportation cost.

**(10 Marks)**

- b. Use the minimum-cost method to find an initial solution to the transportation problem.

**(15 Marks)**