

VF DAGRI Past Papers



Sir Arthur Lewis Community College
Division of Agriculture
End of Semester II Examination
Academic year 2002-2003
Associate Degree Programme in Agriculture
Course: Mathematics 2 **AGM512**



Date : Thursday May 15 2003

Duration 2 ½ hours

M/b

Instructions answer all Questions

1. (a) A member is required to have a minimum of 20% of a loan amount saved as shares in the credit union if the loan is secured by a mortgage. If there is no mortgage, he must have at least 1/3 of the loan saved as shares with the credit union. What level of shares does a farmer need to secure a loan of \$67545
(i) without a mortgage (ii) with a mortgage.

- b. For sweet potato production a common fertilizer recommendation is 48 kg nitrogen /ha and 108 kg P₂O₅/ ha. Determine the quantities of calcium ammonium nitrate ^(26% N) and super phosphate 18% P₂O₅ which should be applied to a sweet potato plot measuring 30 m wide by 50m long.

2. The miticide- insecticide VertimecTM is recommended at a rate of 0.75 - 1.5L/ha. To improve efficacy 250 ml of paraffinic oil is added per 100 l of spray mixture used. Using a lever operated knapsack sprayer and specific nozzle a farmer determines that one (1) gallon of water adequately covers 12 m² of the crop.
(a) If the minimum rate ^{is used} determine the quantity of VertimecTM needed to treat two greenhouses of the crop each measuring 9.4 m X 30 m.
(b) At the maximum rate how much of the Vertimec is applied per 4 gallon sprayer.

- (c) How much paraffinic oil is needed for the entire job.
3. An implement is driven by a 2 stroke engine which requires a gas - oil mixture consisting of 2.5% oil. How much gasoline must be poured into 4 L of a 4.8% gas-oil mixture to produce a new mixture which is suitable for the engine.
4. A student has to prepare a fertilizer blend which can supply 6% calcium by weight. He has decided to mix a 12-12-17 N-P-K fertilizer which supplies no calcium with Calcium Ammonium Nitrate which contains 26 % nitrogen and 12% calcium.
- (a) What quantity of each fertilizer is needed to produce 175 lbs of the blend.
- (b) What weights of nitrogen and potassium are supplied by the blend.
- (c) If the crop area requires 28 lb of potassium (K_2O), should potassium sulphate (50% K_2O) be used to supplement the blend? If so how much?
5. (a) What do we mean by the term quantitative variable.
- (b) List two types of quantitative variables and give examples of each.
- (c) Compare the range and the standard deviation as measures of spread.

In order to study the yield of a soya variety, the plants were grown spaced out and the yield measured. The yield data (in grams) is presented below. Note that the yield figures are the mid class values of the class intervals.

Yield of spaced soybean plants - source: Steel and Torrie 1980

Yield (g) mid class	3	8	13	18	23	28	33	38	43	48	53	58	63	68
# of plants	7	5	7	18	32	41	37	25	22	19	6	6	3	1

- (a) Complete the frequency table to include the class intervals, cumulative frequency % and other information for the calculations requested below.
- (b) Calculate the mean yield per plant and indicate the mode.
- (c) Calculate the median.
- (d) plot the cumulative frequency % curve and determine the *inter-quartile range*.
- (e) Indicate two possible uses of that type of data for this and other crops.
- (f) Given the applications you have mentioned in part (e), which measure of central tendency is most useful for this data set. Explain fully referring to numbers or proportions etc.

- 8 Three retail outlets offered new fertilizers on the market. An extension officer tested these on his farm. He applied the fertilizes randomly to 24 one-acre plots ensuring that each fertilizer was applied independently to only 8 plots. The numbers of standard boxes harvested from each plot are given below.

Fertilizer A	Fertilizer B	Fertilizer C
72	58	60
69	41	58
75	53	53
58	47	67
64	45	55
68	52	65
71	47	59
67	57	63

- Calculate the mean Yield realized for each fertilizer
- Calculate the standard deviation of the plot yields from each fertilizer.
- Recommend two fertilizers in order of choice. Give reasons for your answer.
- To what extent can the extension officer recommend your first choice to other farmers in the country.

