



Samoa School Certificate

AGRICULTURAL SCIENCE

2020

QUESTION and ANSWER BOOKLET

Time allowed: 3 Hours & 10 minutes

INSTRUCTIONS

1. You have 10 minutes to read **before** you start the exam.
2. Write your **Student Education Number (SEN)** in the space provided on the top right hand corner of this page.
3. **Answer ALL QUESTIONS.** Write your answers in the spaces provided in this booklet.
4. If you need more space, ask the Supervisor for extra paper. Write your SEN on all extra sheets used and clearly number the questions. Attach the extra sheets at the appropriate places in this booklet.

STRANDS		Page	Time (min)	Weighting
STRAND 1:	AGRICULTURE IN SAMOA	2	13	7
STRAND 2:	SOILS	4	18	10
STRAND 3:	FARM MANAGEMENT, ECONOMICS AND MARKETING	6	32	18
STRAND 4:	CROP PRODUCTION	9	50	28
STRAND 5:	ANIMAL PRODUCTION	14	54	30
STRAND 6:	TOOLS EQUIPMENT AND FACILITIES	19	13	7
TOTAL			180	100

Check that this booklet contains pages 2-21 in the correct order and that none of the pages are blank.

YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION

1. An important part of an ecosystem is described as the 'biotic community'. Define biotic community.

	SL 1

2. From your class discussions and activities, state an important benefit to the lives of the Samoan people that is obtained from farming.

	SL 1

3. Identify and describe the type of ecosystem shown in the photo below.



Photo of an ecosystem

	SL 2

4. Explain how you can use the process of '**culling and selection**' to improve the production of milk.

SL 3

5. Define soil erosion.

SL 1

6. State TWO methods that can be carried out to determine soil fertility also known as soil fertility evaluation.

SL 2

- 7.



Banana and peanut intercropping

In relation to soil fertility, explain why intercropping is more efficient and therefore a better farming practice than mono cropping.

SL 3

8.



Crops grown under coconuts on a hillside.

Discuss FOUR conservation farming practices that can be used on the farm to control soil erosion caused by water.

SL 4

9. Define '*marginal cost*'.

SL 1

10. Explain the meaning of the '*gross margin*' of a farm business activity.

SL 3

11. Define fixed cost.

SL 1

12. The total cost of a farm business is made up of variable costs plus fixed costs. In your own words, explain the differences between the variable costs and the fixed costs.

SL 3

13. In your own words, define the break-even point of the farm business.

SL 1

14. Describe TWO purposes of keeping records of a farm business such as egg production.

SL 2

15. Describe the best point of production.

SL 2

16. A farmer is planning to use a piece of land to grow taro to sell at the market. The information in the table below was provided by the Ministry of Agriculture based on research showing the number of taro packets produced if the different rates of NPK fertilizer are to be applied to the soil. The cost of the fertilizer is \$3 per kilogram (\$3/kg) and the selling price of the taro packet at the market is \$20 per packet (\$20/packet). The column for Gross Income (GI) and the first two rows for Variable Cost (VC) and Gross Margin (GM) columns have been filled out for you. Study the table and then answer the questions below.

Gross Margins for fertilizer use on taro

Options	NPK fertilizer applied to soil in kg	Number of taro packets produced	Gross Income (at \$20 per packet) (GI) \$	Variable Cost (at \$3 per kg) (VC) \$	Gross Margin (GM) \$
A	0	160	3,200	0	3,200
B	200	280	5,600	600	5,000
C	400	390	7,800		
D	600	410	8,200		
E	800	430	8,600		

- (a) Use your knowledge from your studies to fill out the remaining spaces in the Variable Cost (VC) and Gross Margin (GM) columns in the table;
- (b) Study the information shown on the table then write down the option (from Options A, B, C, D and E) that the farmer should select to use on the farm in order to make the most money. Discuss the reason for your selected option.

SL 4

17. In your own words, define the term ***‘marketing channel’*** or draw a diagram to show this process.

SL 1

STRAND 4:

CROP PRODUCTION

Weighting 28

18. Agroforestry is now being promoted as a good farming practice. Explain what agroforestry is and discuss TWO reasons why it is a good farming practice in countries such as Samoa. You may use cocoa farming as an example to help your explanation.

SL 4

19. Define phloem.

SL 1

20. Define xylem.

SL 1

21. Why is the spongy mesophyll spongy?

SL 1

22. Define stomata.

SL 1

23. Describe the main function of leaves and how its structure helps carry out this function.

SL 2

24. Write down a vegetative propagation method.

SL 1

25. Explain at least THREE purposes of pruning to promote plant growth, especially for tree crops.

SL 3

26. Discuss and give examples of TWO ways that can be used to manipulate plant growth and help improve plant production.

SL 4

27. Apart from water and carbon dioxide plants also need macro and micro nutrients for plant growth and development. Explain the MAIN DIFFERENCE between macro and micro nutrients and give ONE example of each.

SL 3

28.

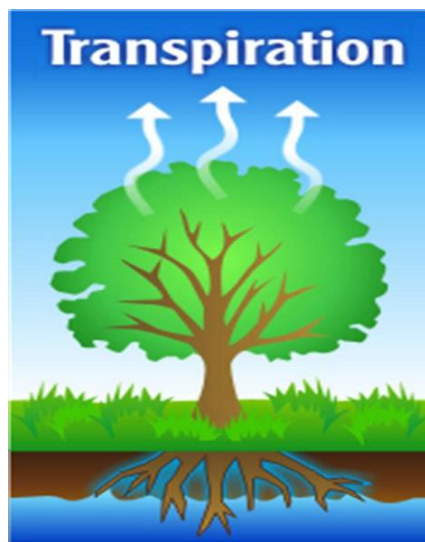


Diagram with arrows indicating water movement in plants

Explain how the process of transpiration causes the upward movement of water in the plant as shown in the diagram.

SL 3

29. Use your own words to define the term Integrated Pest Management.

SL 1

30. Explain the process of storing seeds to keep them in good condition from one season to the next or in other words to prolong their viability.

SL 3

31.

*Local pig breeds*

Most pigs used for pig production in Samoa are local, indigenous or crossbreeds as shown in the photo above. This is because they have certain suitable qualities that exotic or foreign breeds do not have that give them an advantage. One of these qualities is that they are well suited to the local climate. State another quality.

SL 1

32. The main type of pig production method used in Samoa is the traditional or free-range pig farming system using indigenous or local pig breeds. One feature of this system is that pigs are not kept in a fence. Describe TWO other features that are common in this type of pig farming.

SL 2

33. Pig farmers always select or breed pigs that have good traits such as:

- (i) High rate of weight gain;
- (ii) High efficiency of converting food to growth;
- (iii) Good carcass quality.

Explain why these THREE desirable traits are important to the profitability of the pig farm.

SL 3

34. It was the usual normal practice in the past for farmers to castrate male piglets which are being raised for the consumer market. State ONE reason for this.

SL 1

35. Nowadays, castration of piglets is no longer recommended. Describe why.

SL 2

36. The management of a lactating sow will allow her to feed her piglets from her milk for a period of 3 to 5 weeks after the birth of the piglets. After this period, the sow is weaned or removed from her piglets as part of good management in pig production. Explain why this is done.

SL 3

37. As noted in your studies, a freshly killed carcass is an ideal breeding ground for bacteria and therefore hygienic conditions are essential to prevent infections. From what you know about the slaughter and use of pig carcasses during Samoan *fa'alavelave* such as funerals, discuss measures that should be taken to improve meat hygiene in this kind of situation in the villages.

SL 4

38. Give ONE method that a farmer can use to increase production in pig farming.

SL 1

39. Describe TWO advantages of the use of Artificial Insemination to pig farming in a developing country like Samoa.

SL 2

40.



A tick on a pig's ear

Ticks are parasites that live on pigs. State ONE way that it can cause damage to a pig as explained in your class notes.

SL 1

41. Explain what mastitis is.

SL 3

42. Some common diseases that affect pigs in Samoa are Brucellosis and Coccidiosis. Pick ONE disease and discuss it in terms of its cause, symptoms, method of transmission and control.

SL 4

43. State the chemical that is responsible for the acid environment needed for digestion in the stomach of the pig.

SL 1

44. Use your own words to explain the main function of the animal's digestion system.

SL 2

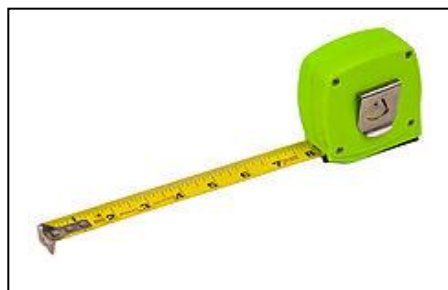
45. What is the main function of a knapsack sprayer?

SL 1

46. If you store a tool that can easily rust, for example to be used for school activities next year, what needs to be done to the tool to make sure that it is kept in good condition.

SL 2

47.



A measuring tape

How can the measuring tape be useful as a farming tool?

SL 1

48.



A mistblower

Explain the maintenance of a mist blower.

SL 3

STUDENT EDUCATION NUMBER									

AGRICULTURAL SCIENCE

2020

(For Scorers only)

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STRAND 6: TOOLS	7			
TOTAL	100			