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MINISTRY OF EDUCATION

**FIJI SCHOOL LEAVING CERTIFICATE
EXAMINATION**

2011

AGRICULTURAL SCIENCE

MINISTRY OF EDUCATION**FIJI SCHOOL LEAVING CERTIFICATE EXAMINATION – 2011****EXAMINER'S REPORT****AGRICULTURAL SCIENCE****INTRODUCTION****GREETINGS FROM THE FSLC AGRICULTURAL SCIENCE EXAMINERS - 2011.**

This report intends to provide a summary of the general performance of the candidates who sat for the paper in 2011. It is our sincere hope that the information contained in this report will be disseminated to schools and most importantly to students as early as possible so that teachers and students could work on the weaknesses or problem areas and prepare for better work in future.

Approximately 2200 students sat for the examination paper. The analysis of the paper was taken from a random sample of 120 scripts. A fair distribution of questions from the various topics covered in the prescription was chosen.

The overall candidates' performance was below average. Despite repeated reminders in previous examiner's reports, candidates were still making similar mistakes especially with essay writing which resulted in mark losses. This problem raises the question whether these reports are ever sighted and read by the teachers and if the contents are disseminated to the students or not.

It is recommended that teachers preparing the candidates at this level understand the prescription well and make sure that the demands of the objectives are met.

It is hoped that the various observations stated below will provide assistance to the teachers teaching the subject in common areas of weaknesses found in the answers.

The examination blueprint is also tabled to provide the teachers with the assessment skills which were intended for each question in the paper.

FSLC EXAMINATION PAPER BLUE PRINT
2011

TOPICS/ CONTENT AREA	FORM 5		FORM 6		Mark Allocation TOTAL	Mark Allocation TOTAL ROUNDED OFF	E S S A Y	NUMBER OF QUESTIONS/MARK ALLOCATION				Tot 100%	
	No. of Periods	Weight	No. of Periods	Weight				Multiple Choice (30%)	Section B (50%)	Section C (20%)			
1. SOIL SCIENCE	29	5.06	20	3.63	8.69	9		2	1	2	4	9%	
2. CROP PRODUCTION	45	7.86			7.86	8		3		5		8%	
3. CROP PROTECTION			35	6.36	6.36	6			3		3	6%	
4. LIVESTOCK PRODUCTION	82	14.32	45	8.18	22.49	22		5	3	9	5	22%	
5. FARM MACHINERY	10	1.74	25	4.54	6.28	6		1	1	2	2	6%	
6. FARM MANAGEMENT	30	5.24	40	7.27	12.51	13		2	3	3	5	13%	
7. ORNAMENTAL HORTICULTURE	33	5.76	30	5.45	11.21	11		2	2	3	4	11%	
8. FORESTRY			25	4.5	4.5	5			2		3	5%	
<i>ESSAY</i>												20%	
TOTAL	229		220			80%	20%	15 %	15 %	24 %	26 %	20%	100

COMMENTS ON SPECIFIC QUESTIONS

SECTION A (MULTIPLE CHOICE)

All candidates correctly followed the instructions given for answering this section. In this section the overall performance (i.e. >10) was about 35% and marks ranged from 6 to 26 out of 30.

The following questions were poorly done – Q6, 7, 9, 17, 19, 21, 22, 24, 26, 27 and 28.

The correct answers for this section are shown in the marking scheme:

SECTION B (SHORT ANSWERS)

QUESTION 1

In this question marks ranged from 0 – 10.

- (a) (i) Majority of the candidates managed to answer this question correctly.
- (ii) Well answered. Many candidates provided the correct answer.

- (b) Poorly answered. However, a common answer included mulching and terracing for which candidates lost marks.
- Fairly answered. Candidates were confused between open and closed systems.
- (c) (i) Well answered. Common answers included Fungi.
- (ii) Poorly answered. Many candidates provided fungi as the answer which was incorrect.
- (d) (i) Fairly answered. Common answers included producers which was correct.
- (ii) Fairly answered. Many provided transpiration as the answer which was incorrect.
- (e) (i) Well answered. Most candidates provided the correct answer.
- (ii) Poorly answered. This part was poorly attempted; common answers included water, soil, and temperature.
- (f) (i) Fairly answered. Most candidates provided the correct answer.
- (g) (i) Well answered. Most candidates provided the correct answer to this question.
- (ii) Well answered. This well attempted and common answer included cross pollination.

QUESTION 2

In this question marks ranged from 0 – 10.

- (a) (i) Poorly answered. Most candidates could not provide an example.
- (ii) Poorly answered. Most candidates could not provide an example
- (b) (i) Poorly answered. Most candidates could not provide the right answer. Common answer provided included *black rot*.
- (ii) Poorly answered. Common answer provided included *bacteria*.
- (c) Well answered. Majority of the candidates answered the question correctly.
- (d) (i) Fairly answered. Most candidates managed to provide the right answer.
- (ii) Fairly answered. Most candidates managed to provide the right answer.
- (e) (i) Poorly answered. Most candidates could not provide the correct explanation.
- (ii) Poorly answered. Most candidates could not provide the correct explanation.

- (f) (i) Poorly answered.
- (g) (i) Well answered. Most candidates managed to provide the right answer.
- (ii) Poorly answered. Most candidates could not provide the right answer. Common answers included infectious diseases as well – eg. *TB and Brucellosis*
- (h) (i) Poorly answered. Candidates could not provide the correct answers. Common answers included, *a period of milk secretion*. It is not a period but a process.
- (ii) Poorly answered. Most candidates could not provide the right answer. Common answers included the definition of colostrums.

QUESTION 3

In this question marks ranged from 0 – 10.

- (a) (i) Poorly answered. Candidates could not provide the correct answers. Instead of naming the stages, candidates labelled the parts.
- (ii) Poorly answered. Most candidates could not provide the right answer. Common answers included the *definition of colostrum*.
- (b) (i) Well answered. Candidates were able to provide the correct answers.
- (ii) Fairly answered. Most candidates were able to provide the right answer.
- (c) (i) Poorly answered. Most candidates either left the spaces blank or provided incorrect answers.
- (ii) Poorly answered. Definitions provided were incorrect. Answers were too general like *swelling of stomach*.
- (d) (i) Poorly answered. Most candidates either left the spaces blank or provided incorrect answers.
- (ii) Poorly answered. Most candidates could not name the hormone.
- (e) (i) Well answered. Candidates were able to relate to the question.
- (ii) Poorly answered. Most candidates could not provide the correct answer.
- (f) (i) Poorly answered.
Many candidates lost marks because they did not write the correct function of the spark plug. Many provided partly correct answers.
- (g) Poorly answered. The three stages in this stroke were not well identified by the students. Some mentioned only one stage in the process which caused them to lose marks.
- (h) Fairly answered. Most candidates were able to answer this question correctly.

QUESTION 4**In this question marks ranged from 0 – 10.**

- (a) (i) Well answered. Candidates were able to define the term ‘farm resources.’
- (ii) Well answered. Candidates were able to define the term correctly.
- (b) (i) Fairly answered. Most candidates were able to relate to the question and answered it correctly.
- (ii) Fairly answered. Most candidates were able to relate to the question and answered it correctly.
- (c) (i) Well answered. Most candidates were able to calculate the correct answers.
- (ii) Fairly answered. Most candidates answered the first part correctly but the second part which needed some calculation was incorrect.
- (d) (i) Well answered. Most candidates were able to provide the correct measures to get the full marks.
- (ii) Poorly answered. Many candidates could not clearly list down the first two steps in the decision making process.
- (e) (i) Well answered. Most candidates were able to relate to the question and answered it correctly.
- (ii) Poorly answered. Most candidates were not able to answer the question correctly.
- (f) Fairly answered. Most candidates were able to write at least one reason correctly to get a $\frac{1}{2}$ mark.

QUESTION 5**In this question marks ranged from 0 – 10.**

- (a) Fairly answered. Most candidates were only able to provide one correct characteristic.
- (b) Well answered. Most candidates were able to answer this question correctly.
- (c) Well answered. Most candidates were able to provide two reasons correctly.
- (d) (i) Poorly answered. Most candidates were not able answer this question correctly.
- (ii) Poorly answered. Most candidates were not able to relate to answered it correctly.
- (e) Well answered. Most candidates were not able to state the reasons for maintaining tools correctly.
- (f) Poorly answered. Most candidates could not differentiate between the scion and the stock correctly.

- (g) Fairly answered. Candidates could not really describe the importance of farm planning fully so many of them lost marks.
- (h) (i) Poorly answered. Most candidates were confused with the terms, some gave in wrong answers which included definitions for Sapwood.
- (ii) Fairly answered. Many candidates were able to provide the correct answer.
- (i) Fairly answered. Many candidates were able to provide the correct answer.
- (j) (i) Poorly answered. Most candidates were confused with the terms, some gave in wrong answers which included definitions for Tunnel erosion, Rill erosion, Sheet erosion and Gully erosion.
- (ii) Fairly answered. Many candidates were able to provide the correct answer.

ESSAY QUESTIONS

The most common essay question attempted in this section was question 1 in combination with (2, 3 and 4).

QUESTION 1

- Maximum marks were attained for this question.
- Most candidates attempted this question with Pawpaw as the most favoured crop followed by Coconut.
- Problems encountered included not answering the question according to the sequence that was asked in the question.
- Some candidates wrote very brief answers and some even listed answers instead of writing it in an essay form.
- A common problem in this question was the lack of knowledge in the cultivation of the crop chosen and most students were not able to fully explain each criteria.
- The students had written the main points without further elaborating on it.
- Students had written marketing and soil requirements, which was not asked in this essay question.

QUESTION 2

- Another popular question but only a handful of students received maximum marks for this question.
- Problems encountered included lack of knowledge on the three processes; discussing wrong examples under the wrong headings
- Students had not fully discussed each process (2 agents for physical, 3 for chemical and 3 for biological).
- A common problem in this question was the lack of knowledge in the chemical processes and students were not able to fully explain each agent.

QUESTION 3

- Another popular question and it was answered well, maximum marks were achieved for this question
- Those candidates who attempted this question showed a good understanding of the question.
- Problems encountered included candidates discussing treatment methods instead of prevention methods
- Discussion of each point in this essay was once again a problem for students.

QUESTION 4

- Another popular question but only a handful of students received maximum marks for this question.
- Problems encountered included candidates failing to discuss the major resources after listing the four resources.
- Some students had written about the importance of capital with all their discussions.

QUESTION 5

- This was the least popular question attempted by students.
- Most candidates were not able to discuss the concepts thoroughly to get full marks.
- Majority of the candidates had listed the criteria but could not fully discuss it to achieve full marks.

5.0 GENERAL COMMENTS AND RECOMMENDATIONS

- All writing on the paper must be neat and legible.
- Some candidates also showed very little knowledge of some of the very basic concepts, so it is recommended that more focus should be applied to achieving the stated objectives in the prescription during the course of Form 5 and 6.
- Teachers should move away from solely relying on past year papers in preparing our students for major examinations.
- Students should plan their essays according to the requirements of the question which is based on the number of points for each section.
- A simple rule of thumb is that discussion should follow after stating each point to get maximum marks.
- Main points discussed in an essay must be highlighted or underlined for easier clarification by the markers during marking.
- Answers must be well structured and written in proper English. A lot of students had a lot of grammatical errors and spelling errors coupled with poor sentencing structures in their essays
- It is therefore recommended that the examiner's report be discussed in detail with the students and be used as an important resource material for teachers in preparing their students for external examinations.

CONCLUSION

The questions for the paper have been selected and phrased to meet the objectives in the prescription. Overall the performance of students was not according to expectation hence for those that have done well have passed.

It is with sincere hope that comments and weaknesses highlighted in this report are discussed with students and considered to ensure similar mistakes are not repeated and thorough content coverage is done.

THE END

Index Number:	ANSWER SCHEME
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MINISTRY OF EDUCATION**FIJI SCHOOL LEAVING CERTIFICATE EXAMINATION 2011****AGRICULTURAL SCIENCE****ANSWER BOOK**

HAND IN THIS ANSWER BOOK TO THE SUPERVISOR BEFORE YOU LEAVE THE EXAMINATION ROOM.

INSTRUCTIONS

1. Write **all** your answers in this **Answer Book**.
2. Write your answer to each question in the appropriate part of this **Answer Book**.
3. Answer **all** the questions with a blue **or** black ballpoint or ink pen. Do **not** use red ink. Use a pencil **only** for drawing.
4. If you use extra sheets of paper, be sure to write clearly the question number(s) being answered and to tie each sheet securely in this **Answer Book** in the appropriate places.
5. Before handing in this **Answer Book**, make sure that your **Index Number** is at the top of this page and inside the back flap.

Marks Gained:

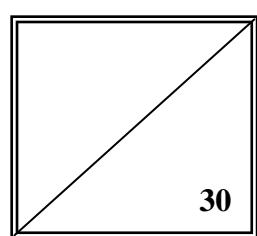
SECTION A

[30 marks]

Circle the letter which represents the best answer.

1	A✓	B	C	D
2	A	B✓	C	D
3	A	B	C	D✓
4	A✓	B	C	D
5	A	B	C✓	D
6	A	B	C✓	D
7	A✓	B	C	D\
8	A	B✓	C	D
9	A✓	B	C	D
10	A	B✓	C	D
11	A	B✓	C	D
12	A	B	C✓	D
13	A	B	C	D✓
14	A✓	B	C	D
15	A	B	C	D✓

16	A	B	C✓	D
17	A	B	C✓	D
18	A	B	C	D✓
19	A	B✓	C	D
20	A	B	C✓	D
21	A	B	C	D✓
22	A	B	C	D✓
23	A✓	B	C	D
24	A	B✓	C	D
25	A✓	B	C	D
26	A	B	C	D✓
27	A✓	B	C	D
28	A	B	C✓	D
29	A	B✓	C	D
30	A	B	C✓	D



12.

SECTION B

QUESTION 1

- a. (i) Crumb / granular **(½ mark)**
(ii) A horizon **(½ mark)**
- b. -correcting nutrient deficiencies
-proper land management(proper cropping practices, soil nutrient management, proper crop protection, development of good soil tilth)
-identifying and correcting soil pH **(1 mark)**
- c.

Managed	Natural
Disturbed by man	Balanced ecosystem
Accelerated erosion	Less erosion due to vegetative cover
Open ecosystem	Closed ecosystem
Fertilizer added as nutrients lost as products	Nutrients fully recycled
Pests controlled by man	Pests naturally controlled
Gas exchange occurs naturally between organisms	There is an unbalanced gas exchange
Climatic factors like temperature (in nursery) are controlled by men	Natural climate
Water added or removed	Natural moisture content

(2 marks)
- d. (i) Fungus/Yeast **(½ mark)**
(ii) Bacteria **(½ mark)**
- e. (i) Autotrophs/producers **(½ mark)**
(ii) Heat/respiration **(½ mark)**
- (f) (i) It is the ability of a seed to delay germination due to some features **(½ mark)**
(resting stage for seeds)
- (ii) Hard seed coat
Waxy testa
Presence of inhibitors **(1 mark)**

13.

- (g) **Translocation** is the movement of sucrose and other organic materials from one place to another within the plant body, primarily through the phloem *while Storage* is when excess food is stored in special areas of the plant which is programmed in the lifecycle of a plant eg seeds, roots, stem, leaves
- (h) (i) X- self pollination
Z- cross pollination **(1 mark)**
- (ii) Hermaphrodites **(½ mark)**

QUESTION 2

- (a) (i) Soil cultivation , Crop isolation, Crop rotation, Tillage methods, Fertilizer, Water management, Sowing and harvesting dates, Sanitation, Management of crop plants, Trap crops, Mulching, Pruning **(½ mark)**
- (ii) Eradication, Quarantine, Certification **(½ mark)**
- (b) (i) Fruit rot/basal end rot **(½ mark)**
- (ii) Fungus **(½ mark)**
- (c) 1. Hardy in nature
2. Fast growing
3. Very competitive with the crops
4. Furthermore they produce seeds in large numbers which also spread very quickly through wind, water, animals, humans, birds, farm tools and machinery.
5. They are highly adaptable to adverse weather conditions.
6. Weeds also have the ability to remain viable for up to 20 – 30 years. **(1 mark)**
- (d) (i) Housing:
1. Protects the animals from adverse weather conditions **(½ mark)**
2. Restricts movement of animals which increases production. **(½ mark)**
3. For ease of supplementary feeding
4. Prevents predators and thieves.
- (ii) Fencing:
1. Proper management of pasture. **(½ mark)**
2. Prevents deterioration of soil structure and maintains the quality of pasture, which increases production. **(½ mark)**

14.

- (e) (i) Breed
 Breeds with high average production are usually selected by farmers. This will increase the production of the farm.
 For example Pigs - LandRace, Largewhite
 Goats – Anglo Nubian, Boer
 Dairy – Jersey, Friesian
 Beef – Limousine, Santa Gertrudis, Brahman (1 mark)
- (ii) Pedigree
 It is a list of an individual animal's ancestors, usually only those of the five closest generations. Retaining a pure breed line or pedigree can be maintained by back crossing. That is the female is mated back to its ancestor male and the resultant offspring will be more productive than the parent. (1 mark)
- (f) 1. health status/disease
 2. level of nutrition
 3. climate/weather (1 mark)
- (g) (i) infectious disease
 mastitis, TB, Brucellosis, etc (½ mark)
 (ii) non-infectious disease
 Anaemia, Milk fever (Hypo calcaemia), etc (½ mark)
- (h) (i) **lactation:**
 secretion of milk from udder (½ mark)
 (ii) **after-birth:**
 expulsion of remainder of the placenta 1-2 hours after parturition (½ mark)

QUESTION 3

- (a) (i) A: Gestation/pregnancy (½ mark)
 C: Ovulation (½ mark)
 (ii) . -Prevents pathogens from entering the uterus
 -contracts rhythmically during parturition so as to expel the mature foetus.
 -It connects the uterus to the vagina
 -provides support for the developing uterus (½ mark)

Goats	Dairy/Beef	Pigs
Identification	Identification	Identification
Castration	Dehorning	Remove milk teeth
	Colostrum feeding	Cut-off naval cord
Drenching	Cut off and dip naval joint in Iodine/ Remove mucus from nostrils.	Introduction to concentrates
Milk feeding if mother dead	Removing extra teats/ Drenching	Give Iron Injection

15.

(b)	(i)	Introduction to pasture	Milk feeding	Ensure colostrums intake
		Vaccination	Vaccination	vaccination
		Weighing	Weighing	Weighing
			Castration of young male calves	castration

(ii)

(1 mark)

Goats	Dairy	Pigs
tail wagging,	tail wagging,	tail wagging,
swollen vulva,	swollen vulva,	swollen vulva,
mounting behavior,	mounting behavior,	mounting behavior,
decrease in milk yield if lactating,	decrease in milk yield if lactating,	decrease in milk yield if lactating,
general increase in activity/restlessness	general increase in activity/restlessness	general increase in activity/restlessness
Lack of appetite	Lack of appetite	Lack of appetite
Mucus discharge from vulva	Mucus discharge from vulva	Mucus discharge from vulva

(1 mark)

- (c) (i) the digestion and usage of complex carbohydrates that make up the bulk of the cell walls of plants by microbes in the rumen are able to use cellulose, hence digest it **(½ mark)**
- (ii) build up of gas(methane and carbon dioxide) in the rumen of cattle especially after they are fed a high legume pasture **(½ mark)**

- (d) (i) Stimulates the growth of follicles and ova in the ovary **(½ mark)**
(ii) oestrogen **(½ mark)**

- (e) (i) Ruminant animal **(½ mark)**
(ii) Microbes in rumen manufacture microbial protein, as they are killed in the abomasums, protein is released. **(½ mark)**

- (f) (i) Ignites the fuel and air mixture to give power, forcing the piston downwards in a reciprocate motion. **(1 mark)**

- (g) Power stroke:
1. Compressed air and fuel mixture is ignited when a spark is released by the spark plug.
2. Power is produced, pushing the piston down to B.D.C.
3. Both the inlet and outlet valves are closed. **(1½ mark)**

- (h)
- Keep the right amount of oil in the system.
 - Use the recommended kind of oil only.
 - Change the oil filter at the recommended time.
 - Keep fittings tight so that there is no leakage. **(1 mark)**

QUESTION 4

- (a) (i) Farm resources: available means for production on a farm used to produce farm products. Eg/ Land, Labour (½ mark)
- (ii) Short term goals: goals that the farmer wants to achieve in a short time. (½ mark)
- (b) (i) 1. measure quantities, weight or number
 2. enables decisions to improve the standard of the stock or farm management
 3. enables calculations of profit and production
 4. to compare results with standards. Standards can be results from past or from government or research stations. (½ mark)
- (ii) Advantage: gives birth to twins (½ mark)
 Disadvantage: difficult birth (½ mark)
- (c) (i)

	DALO	CASSAVA
Gross Margin	6,000	5,700

(1 mark)
- (ii) . $6000/110 = \$54.54/\text{man day}$ for dalo
 $5,700/70 = \$81.4/\text{man day}$ for cassava (1 mark)
- Reason: Choose cassava because it gives \$81.40 per man-day compared to dalo which gives \$54.54. (½ mark)
- (d) (i) 1. Avoid using the planting materials (½ mark)
 2. Seek proper advice before using the materials (½ mark)
- (ii) 1. Recognition of problem (½ mark)
 2. Observation (½ mark)
- (e) (i) 1. Daughter plants identical to parent plant and carry the same characteristics and traits.
 2. Fast to grow, establish and flower. (1 mark)
- (ii) Planting roses from seeds can result in many variations to the new plants and therefore many varieties of roses with different colours could emerge in the rose garden making it attractive. (1 mark)

17.

(f)

- Compost provides the environment suitable for plant roots to grow in and the soil organisms to survive.
- Compost also contain more humus which give raise to soil colloids and hold on better to more soil nutrients favoring the plants that grow .
- Compost improves the texture and structure of the soil.
- Compost improves the water retention ability of the soil.

(1 mark)

QUESTION 5

- (a) 1. Easy to establish
2. Does not grow too tall **(1 mark)**
- (b) Is to grow, keep plants, shrubs or trees for the purpose of transplanting or as grafting stocks. **(1 mark)**
- (c) 1. Removes unwanted leaves and branches.
2. Encourages new and proper growth of foliage.
3. Encourages better fruiting
4. Maintains the shape of plant **(1 mark)**
- (d) (i) -Through washing the explant in bleaches/chlorox
-Sanitation and hygiene in a sealed laboratory **(½ mark)**
- (ii) media on which the explants grows and used as food for ex-plant, which contains nutrients, carbohydrates and hormones eg agar medium **(½ mark)**
- (e) 1. Avoid accidents
2. Saves time
3. Prevents wastage
4. Improves production **(½ mark)**
- (f) Scion refers to an unrooted part of a plant having one or more buds used for grafting or budding while rootstock refers to the root system upon which named varieties of plants (scions) are grafted. **(1 mark)**
- (g) Farm Planning is important because it helps outline details on how the farmer intends to use resources and undertake activities to achieve farming goals.
It helps the selection and development of the best alternatives to achieve the stated goals or objectives of a farm or enterprise. **(1 mark)**
- (h) (i) Pith – represents dead tissues
- gives strength and support to tree **(½ mark)**
- (ii) Sapwood – this is the newly formed wood
- minerals and water are conducted to the leaves. **(½ mark)**

18.

(i)

1. Profit from various enterprises:
–Farmers will only plant those commodities which he has the advantage in terms of profitability.
2. Change in value (prices) of products:
–A change in the price of various products may lead the farmers to shift from one type of farming to the other to increase their profit/hectare.
3. Availability of Capital
–Technology in modern times is hanging rapidly and for the adoption of this technology more and more capital is needed. Therefore, the availability of capital affects the selection of the enterprise and the type of farming.
4. Availability of Labour
–Some enterprises like sugar cane need more labour at harvesting than rice, which can be harvested using a combine harvester. So this enterprise can only be taken up if labour availability is scored.
5. Market Demand
–Farmers will only plant those commodities which has a high demand in market i.e. locally or overseas with high prices per unit.
6. Market Supply
–Farmers should be able to supply the produce all the year round in the market by growing off season crops to meet the demands of the consumers.
7. Synthetic Products
–Synthetic products are those which are made artificially. For example: cane sugar is a synthetic product of beet (white) sugar.
8. Substitute Products
–Farmers have a wide choice in the selection of resource combination giving a specific output.
–Substitute products or final products which are used by consumers such as cassava substituted for rice or potato or vice versa. But while selecting a suitable substitute product, the cost of the substitute should be taken into consideration.
9. Development of new uses for Existing Products (diversification):
➤ For example: yaqona can now be used for the manufacture of Pharmaceutical drugs instead of only drinking it during ceremonies. The by-product molasses can be converted into alcohol such as Rum, etc.

(1 mark)

- (j) (i) Splash Erosion – the spattering of small soil particles caused by the impact of raindrops on bare wet soils. **(½ mark)**
- (ii) 1. Cover cropping **(½ mark)**
2. Mulching **(½ mark)**

SECTION C**[20 marks]**

There are five essay questions in this section. Answer any two questions. Each question is worth 10 marks. Write an essay of approximately 200-250 words to answer each question. Write the question numbers of your choices in the boxes provided.

QUESTION 1

<p>1. PAWPAW</p> <p>a. <u>Land Preparation:</u> The area should be: – Cleared and beg roots and stones removed. – Ploughed and left for at least two weeks for organic matter to decompose off well. – Harrowed and brought to a fine tilth. – Reploughed and harrowed and prepared into ridges 3m apart for pawpaw transplanting.</p> <p>b. <u>Recommended Varieties:</u> – Waimanalo – Sunrise solo – Hawaiian solo – Local solo</p> <p>c. <u>Planting and Spacing:</u> – Can be planted all year around. – Seedlings are transplanted directly on well prepared soil. – Spacing is 3m between rows and 2 – 3.5 m between plants.</p> <p>d. <u>Cultivation (care and maintenance):</u> – Keep the pawpaw plantation weed free and drained – Weed control can be achieved by using gramoxone at 90ml/14L – Apply NPK fertilizer (2:7:6) at the rate of 250kg/ha at planting time and 22g/plant at 3 – 6 months after planting.</p> <p>e. <u>Pest and Disease Control:</u> a) <u>Pests:</u> – There are no serious pests of Pawpaws found in Fiji.</p> <p>a) <u>Diseases:</u> – Fruit Rot – Root rot <u>Control:</u> – Dip mature fruits in hot water at 66°C for 20 minutes after harvesting – Use disease resistant varieties – Remove plants with early signs of any diseases.</p>	<p>2. COCONUT</p> <p>a. <u>Land Preparation:</u> – Clear the selected area to be used – Remove big stones and plant roots – Use the digging spade to prepare holes in a triangular or square pattern.</p> <p>b. <u>Recommended Varieties:</u> – Fiji Tall (20 – 30 m tall) – Malayan Dwarf – Dwarf Nana (8 – 12 m tall) – Rotuman Tall – Rotuman Dwarf</p> <p>c. <u>Planting and Spacing:</u> – Coconuts can be planted all the year around using either nuts or seedling. – Planting can be done in either triangular or square spacing sequence.</p> <p>d. <u>Cultivation (care and maintenance):</u> – Weed control is done manually using knife, weed 2m around the plants every 3 – 4 months. – Chemical weed control can also be done using parquet at the rate of 60 – 90 ml/14L of water. – Pick and burn all dry leaves.</p> <p>e. <u>Pest and Disease Control:</u> a) <u>Pests:</u> Rhinoceros Beetle – it eats young buds and leaves in a ‘v’ shape. <u>Control:</u> use baculovirus oryctes – a biological control.</p> <p>b) <u>Pests:</u> Stick Insect –sucks the sap or plant juice. <u>Control:</u> introduced wasp – a biological control.</p> <p>b) <u>Diseases:</u> grey leaf spot – a nutritional related disease <u>Control:</u> apply NPK fertilizer.</p> <p><u>Diseases:</u> stem bleeding – avoid cutting the stem to climb on. <u>Control:</u> avoid mechanical or physical damage to the stem.</p>	<p>3. COCOA</p> <p>a. <u>Land Preparation:</u> While clearing bush, leave some shade trees or clear the area by removing big roots and stones before planting the shade trees such as caliendra, gliricidiea or vaivai for shade or to improve the organic matter content of the soil.</p> <p>b. <u>Recommended Varieties:</u> – Amelanado – Trinitario – Waimendo</p> <p>c. <u>Planting and Spacing:</u> – Grows well in tropical areas with well distributed rainfall of 1000 – 2500mm/year. – It does not need a lot of sun shine and is not grown in dry zones. – Planting time for wet zones is between September to December. – Planting time for the Dry zones is between October and December. – Planting starts when 80% shade is achieved in the field. – 2-3 seeds are sown 2m X 3m in the field under the shades in prepared mounds</p> <p>d. <u>Cultivation (care and maintenance):</u> – Weed control can be done manually using knives or hoes. – Chemical weed control can be achieved using: gramoxone, glyphosate or Roundup. – Maintain shade up to 50% while cocoa is still growing. – Prune the trees to remove unnecessary branches and maintain shape of the trees for easy harvesting. – Apply the recommended doses of fertilizers as listed below</p>															
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>Urea /ha</th> <th>Super phosphate/ha</th> </tr> </thead> <tbody> <tr> <td>Year 1</td> <td>30 kg</td> <td>50 kg</td> </tr> <tr> <td>Year 2</td> <td>30 kg</td> <td>100 kg</td> </tr> <tr> <td>Year 3</td> <td>90 kg</td> <td>150 kg (2 applications)</td> </tr> <tr> <td>Year 4</td> <td>90 kg</td> <td>150 kg (2 applications)</td> </tr> </tbody> </table>				Urea /ha	Super phosphate/ha	Year 1	30 kg	50 kg	Year 2	30 kg	100 kg	Year 3	90 kg	150 kg (2 applications)	Year 4	90 kg	150 kg (2 applications)
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<p>e. <u>Harvesting and Marketing:</u> Pawpaws are ready for harvesting in about 9 months and can continue for another 3 years or more. Pick fruits when you see yellow stripes on fruits. Ripen them in a dry and well ventilated area.</p>	<p>f. <u>Harvesting and Marketing:</u> First fruits emerge after 4 years of planting and continue up to 30 to 40 years. Pick the nuts from the ground at intervals to suit the market demand. Store excess nuts in a dry place to avoid early sprouting.</p>	<p>e. <u>Pest and Disease Control:</u> a) <u>Pests:</u> - Stem borer, control using furodam (3 – 4 times a year) - Rose beetle, control using orthene or diazion - Termites, control by using diazion c) <u>Diseases:</u> - Black Pod <u>Control:</u> - Spray using perenox at 4g/litre of water every 2 weeks during wet periods. <u>Diseases:</u> - Canker <u>Control:</u> - Plant disease resistant varieties such as Amelanado. f. <u>Harvesting and Marketing:</u> - varieties like Amelanado starts bearing pods in 3 years time and can continue up to 30 years. - Yield is about 0.5 – 1 tone/ha of dried beans. - Harvesting is done in either march, April or November through to December</p>
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QUESTION 2

1. Physical Weathering Processes.

In the day time where it is too hot the rocks expand and in the night, it cools and contracts again. This repeated expansion and contractions makes the rocks weak forming cracks which breaks down forming soil due to high and low temperatures.

In the rivers and creeks, stones rub onto each other, wearing each other out by abrasion as they are carried down stream. Sediments and soil from these rocks are usually deposited on the banks of the rivers.

2. Chemical Weathering Processes.

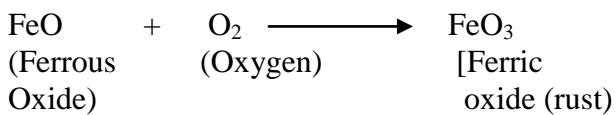
- a) carbon dioxide
 - b) oxygen
 - c) water
 - d) solutions

Carbon dioxide:

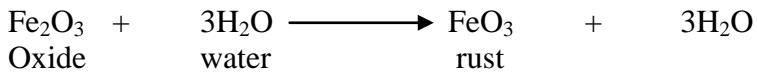
When it rains, the water combines with carbon dioxide in the atmosphere to form a weak **carbonic acid** which dissolves lime rocks away.

Oxygen:

This involves the conversion of complex minerals to simple forms by oxygen. The process is important in the breaking down of volcanic rocks.

Water:

Hydration occurs when the combination of water with rock minerals weakens rock structure, as minerals are dissolved or expand.

Mineral solution

Minerals and gases when dissolved in water can either be acidic or basic in composition. These solutions can attack rock minerals and destroy rock structure over a period of time to form soil. Rapid chemical processes in ideal position results in the developments of deep soils.

3. Biological Weathering Processes

It is due to the action of living things in the soil which hold in the breaking down or weathering of rocks to smaller pieces by the following agents:

- i) Plant roots – roots of plants grow into cracks in rocks and secrete substances which help dissolve rock minerals. As roots thicken, they exert force which push the rock apart.
- ii) Animals – soil organisms such as earthworms burrow into the soil and expose the rocks to other weathering agents.
- iii) Micro-organisms – bacteria and fungi decay organic matter with the formation of organic acids have the potential to dissolve rock minerals to form soil.

- iv) Lichens – these are the first plants to grow on any rocks. The primitive roots of the lichen enter fissures or crack in the rocks and produce acids that dissolve any lime materials causing the rock to crumble and break easily. After the death of the lichens, its remains on the rocks trap other minerals which become the starting materials for other plants to grow on.

QUESTION 3

- a. Causes (mode of infection)

- * Bacteria species such as:
- Streptococcus agalactia
- Streptococcus cooreus
- E. coli
- Pseudomonous spp.

- * Mechanical Causes:

- Poor fitting or crack teat cups of the milking machine.
- Vacuum problems of milking machine.

- * Poor Sanitation and Management Procedures:

- Drinking poor dirty or contaminated water.
- Feeding on contaminated concentrates or pasture.
- Teat injury or teat sours not treated.
- Dirty milking equipment or dirty hands.
- Non-disinfected equipment and teat dips.

- b. Signs and Symptoms:

- * One or more swollen, red, hard or painful udder.
- * Reduced milk production.
- * Changes in appearance and composition of milk.

For example:

1. Slightly watery with a few flakes.
2. Watery with large watery clots.
3. Watery, brown or bloody with a few flakes.
4. Watery with white strings.

- c. Prevention:

- * Practice proper sanitation methods like:
 1. sanitizing equipment before and after milking
 2. wash and dry udder before milking
 3. dip teats in a sanitized solution after removing the milking unit

- * Milking Units:

1. check vacuum pressure and lines
2. clean and replace rubber inflations and other wearable parts needed

- * Prevent teat or udder wounds:

1. check paddocks and remove harmful objects
2. trim hoofs and dehorn as needed
3. cull cows with pendulous udders
4. cull cows with recurring mastitis

- d. Economic Importance:
 - 1. Increase cost of production
 - 2. Decrease in production
 - 3. Herd replacement is expensive
 - 4. Delay in maturity of young calves

QUESTION 4

Resources of a Farm Business.

- Land
- Labour
- Capital
- Management
- Technology

Description and Importance of each Resource in Agricultural Production

1. Land
 - a. Is a primary agricultural resource which differ in fertility and topography
 - b. These differences have a major influence on the type of farming enterprise that is to be practiced.
 - c. The area of land suitable for farming and that which is not suitable for further development must be considered.
2. Labour
 - a. This includes the people who live and work on the farm
 - b. Laborers could either be skilled, unskilled, casual or permanent labourers.
 - c. It is important that the manager knows the attitude, background and capability of labourers in achieving the objectives and goals by the using them. This can also be influenced by how well other resources like land, capital, technology and management is utilized.
3. Capital
 - a. This is a man-made factor of production such as physical (farm tools, machinery and buildings) or Financial (money, credit or loans)
 - b. This factor is often considered to be the most limiting resource in agriculture production.
 - c. It is very important to understand the time involved in any investment. For example: borrowing or loan and planting crops so that the first repayment of loan can be met.
 - d. Capital has 2 dimensions: quantity and time.
4. Management
 - a. This is one's ability to organize and control resources to achieve the set objectives.
 - b. For information or sound decision or judgment to be made wisely, it will depend largely to the personal experience of the manager.
 - c. The manager should also be able to have skills which utilizes a wide range of abilities and awareness of human factors and its importance in the running of an enterprise. Therefore, the long term success or failure of the business depends on the managers effort and abilities.

5. Technology

This refers to new ideas or innovations which are practiced to increase agricultural production. It includes;

- i. The use of machines in land preparation, planting and harvesting.
- ii. Use of fertilizers in land preparation, planting and harvesting.
- iii. Use of fertilizers to improve soil fertility.
- iv. Inter-cropping
- v. Inter-row cultivation
- vi. Hydroponics

The significant development in agricultural technology during the last 30 to 40 years have brought about a change have brought about a large increase on farm output however farmers must still examples new method in relation to their own business and see if they can be profitably applied.

QUESTION 5

Criteria for selecting a Greenhouse

When selecting a site for the construction of a greenhouse, points to bare in mind are:

- 1. Open area with free flowing air.
- 2. Must be near a reliable source of water.
- 3. Minimum shade provided.
- 4. Flat land, well drained.
- 5. Reasonable amount of sunlight