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90919



909190



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SUPERVISOR'S USE ONLY

Level 1 Agricultural and Horticultural Science, 2018

90919 Demonstrate knowledge of soil management practices

9.30 a.m. Thursday 22 November 2018
Credits: Four

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate knowledge of soil management practices.	Demonstrate in-depth knowledge of soil management practices.	Demonstrate comprehensive knowledge of soil management practices.

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

You should attempt ALL the questions in this booklet.

If you need more room for any answer, use the extra space provided at the back of this booklet.

Check that this booklet has pages 2–11 in the correct order and that none of these pages is blank.

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

Achievement

TOTAL

12

ASSESSOR'S USE ONLY

QUESTION ONE: SILT SOILS

ASSESSOR'S
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Soil texture refers to the size of the particles that the soil is made up of.

- (a) Describe the particle and pore size of a silt loam soil, and explain how these influence the physical properties of that soil.

medium sized pore space. Ideal soil allows just enough air and water into the soil. Earth worms like this soil as particles aren't too big or small. Better production from earthworms. Because there is enough air and water. As well as nutrients //

- (b) Constant or continuous cropping in the same soil can lead to over-cultivation. Describe what happens to soil structure when it is over-cultivated, and explain how this affects soil properties and plant growth.

Over-cultivating the soil. you are disturbing the soil structure. you will lose nutrients. And ~~disturb~~ micro-organisms (earthworms). Also over-cultivating makes soil lose this can lead to erosion. Over-cultivating affects plant growth because ~~the~~ you have disrupted your soil structure you have turn nutrients over.

Plants need nutrients to grow. eg. NPKS.

Nitrogen, phosphorus, potassium and sulphur.

Earthworms help unlock these nutrients. But

over-cultivating means going to lose micro-organisms (earthworms) -//

When a grower needs to irrigate their paddocks, they can use either a centre pivot irrigator or a gun irrigator.

Centre pivot irrigator



Source: www.southernwatercompany.com/products-services/irrigators-pivots.

Gun irrigator



Source: <http://www.rainer.co.nz/assets/Uploads/SAM4.jpg>.

- (c) Select either a centre pivot irrigator or a gun irrigator as the most suitable method of irrigating.

Justify your selection by comparing and contrasting it with the other method.

Selected method: *centre pivot*.

In your answer, consider:

- the efficiency of application
- the effect each one has on the physical, chemical, and biological properties of soil
- the effect on plant growth.

Advantages of centre pivot irrigator - It is very efficient applies water to ^{crop} plants, ~~it~~ it covers alot of distance means whole crop will be irrigated. can select how much water you want to apply. It is good for micro-organisms. good for when soil is dry eg. summer when there is less rain. plants need water to ~~survive~~ live.

Disadvantages - cost alot of money to install and run. Can damage some of your crop. because of continuous going over same track can

More space for this answer is available on the next page.

create pugging -

Advantages of gun irrigator - Apply water to crop. Plants need water to grow. Can select where you want to put gun irrigator. can irrigate more than one paddock.

disadvantages - cost alot to run, motor, power, water. Needs alot labour. constantly moving it. covers small areas.

//

I would select centre pivot irrigation it is efficient. covers alot of crop with water. can ~~set~~ select how much water you want to apply to crop. Ideal in summer when there is not much rain and soil is very dry. Compared to gun irrigator it cover small areas with water. involves alot of maintenance if motor breaks or to fuel it up. And labour constantly moving it.

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2

A4

QUESTION TWO: SOIL TESTING

A soil drop test is when a spadeful of soil is dug up and then dropped onto the ground. The soil then breaks into peds, which are clumps of soil.

Soil drop test



- (a) Explain how the size and shape of the soil peds show what the drainage and aeration of that soil will be like.

It shows has good drainage and aeration because it is not crumbling the soil. The humus is holding soil together.

After completing a soil drop test, a grower noticed that the soil had very little organic matter.

- (b) Describe a management practice that could be carried out on soil to improve its organic content, and explain how adding organic matter will affect soil properties.

organic matter give plants nutrients I would add lime to encourage earthworms to create more organic matter.

After a laboratory had carried out a soil test on samples taken from a farm, it was recommended that lime be applied to the paddocks.

(c) Justify why a grower would apply lime to the paddocks.

In your answer, consider:

- how lime can be applied to soil
- how lime affects the physical, chemical, and biological properties of soil
- the effects on plant growth.

Applying lime to soil it makes soil less acidic. helps balance out PH. ideal PH scale is 5.9-6.8. Methods of applying lime are using a bike or tractor using a spinner. or can be sprayed using a ~~spray~~ tractor in a liquid form. Can also use an aeroplane. Lime helps flocculate particles together this is good for plant growth because it is retaining air and water. These are vital for plant growth. Also encourages earthworms to top of the soil. Earthworms break down ~~soil pecks~~ ^{organic matter} and release nutrients into the soil.

QUESTION THREE: SOIL NUTRIENTS

ASSESSOR'S
USE ONLY

The nutrient status of soil is very important. Nutrients in the form of fertilisers need to be applied to the soil in specific ratios.

- (a) Explain the effects that applying excess (too much) nutrients can have on soil properties and plant growth.

Applying too much nutrients make soil very unbalanced. make it too acidic. plants will not grow and possible die.

In order to improve plant growth on a dairy property, a farmer can apply either dairy shed effluent or fertiliser.

- (b) Select the better method, and justify your selection by comparing and contrasting it with the other management practice.

Selected management practice: Fertiliser.

In your answer, consider:

- how each method is carried out
- the effect on the physical, chemical, and biological properties of soil
- how application rates can be managed.

Advantages of effluent - Applies nutrients, and water. Can be applied through irrigation. Cheap to run. encourages earthworms.

Disadvantages of effluent - Don't know how much nutrients are in the substance. bad smell. can make soil too acidic and kill crop. can leach and ~~part of the~~ pollute waterways.

Advantages of fertiliser - Applies nutrients, know how much nutrients are being applied. helps plant growth.

Disadvantage of fertiliser - costly, involve alot of labour to apply.

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I would select fertiliser because you know how much nutrients are being added to soil. These nutrient will encourage earthworms. And make plant growth better. Will be costly to buy and apply fertiliser. Involve alot of labour. But compared to Effluent you know how much nutrients are being added. Not destroying environment. Effluent can leach and go into waterways. Effluent is cheap and easy to apply but not ^{as} reliable. As fertiliser //

Achievement Exemplar 2018

Subject	Level 1 Agricultural and Horticultural Science	Standard	90919	Total score	12
Q	Grade score	Annotation			
1	A4	In question 1 the candidate has only made a basic comparison between the two irrigation systems and not linked it to the effects on the properties of the soils.			
2	A4	In question 2 there is a misunderstanding of soil peds, and although the candidate has some understanding of application of lime this is not fully explained to meet Merit criteria.			
3	A4	Although the Candidate has shown some differences between fertilizer and effluent, they have not made good connections to soil properties or shown how application rates can be controlled.			