



SLIATE

SRI LANKA INSTITUTE OF ADVANCED TECHNOLOGICAL EDUCATION

(Established in the Ministry of Higher Education, vide in Act No. 29 of 1995)

**Higher National Diploma in (Agriculture)
First Year, 1st Semester Examination – 2017
AG-1102-Principles of Soil Science and Soil Properties.**

Instructions for Candidates:

Answer part I and part II on this paper itself and will be collected after 01 hour.

Two hours for part III

No. of pages : 06

No. of questions :07

Time allowed : Three(03) hours.

Part-I

Question No.01

Circle the number of the correct answer on this paper itself.

- (i). Which of the following can be considered as a reason for Aluminum Toxicity in the agriculture land soils?
- a) Application of limestone.
 - b) Aluminum ions from the plant and animal waste materials.
 - c) Application of Aluminum fertilizers.
 - d) All the above are correct.
- (ii). Select the correct statement regarding soil air.
- a) Generally soil air has less CO₂ compared to atmospheric air.
 - b) Soil fertility has no relationship with soil air.
 - c) Soil microbes cannot utilize N₂ from soil air.
 - d) None of the above is correct.
- (iii). Select the correct statement from the following.
- a) Soil aeration is affected by soil structure.
 - b) Soil texture can be improved by ploughing the land.
 - c) Soil aeration is not affected by Soil texture.
 - d) Amount of soil air is not affected to the soil water.
- (iv). Which of the following is a true about soil acidity?
- a) Acidic soils have calcium (Ca) and Iron (Fe) deficiency problem.
 - b) Acidic soils have high Aluminum toxicity.
 - c) Microbial function are high in acidic soils.
 - d) Texture of the soil will be affected by acidity.

- (v). Select the correct statement regarding “Compost”.
- Compost is a one of the cheapest bio-fertilizer.
 - Compost contains higher amount of micro and macro nutrients compared to most of the in-organic chemical fertilizers.
 - Compost is a slow releasing fertilizer.
 - Compost is not suitable for plantation crops.
- (vi). Select the correct statement from the followings.
- Organic fertilizer application cannot be considered as a solution for poor drainage problem.
 - Organic matter decomposition rate is high in up country wet zone than dry zone of Sri Lanka.
 - Water weeds are not suitable for composting.
 - All the above are correct.
- (vii). Which of the following statements is true about Cation Exchange Capacity (CEC) of soil?
- Acidic soil has higher Cation Exchange Capacity.
 - Sandy soil has lower Cation Exchange Capacity compared to clay soil.
 - Cation Exchange Capacity of saline soil is generally high.
 - None of the above is correct.
- (viii). Select the correct statement from the followings.
- Natural soil contains equal amounts of organic and mineral matters by weight.
 - Volume of soil water and air is nearly 80% of the total soil weight.
 - Natural soil contains less than 10 % organic matter by weight.
 - None of the above is correct.
- (ix). Which of the following statements is true about the soil in the coastal area of Sri Lanka?
- This soil is generally highly fertile soils.
 - This soil is more suitable for paddy cultivation
 - Acidity development is very common in coastal area soil due to high sodium content.
 - This soil is mostly affected by soil salinity problem.
- (x). Select the correct statement regarding gypsum?
- It has no specific properties.
 - The chemical composition of gypsum is variable from place to place.
 - It is a secondary type of mineral.
 - None of the above is correct.

- (xi). Select the correct statement regarding soil density.
- Generally bulk density of soil is less than its particle density.
 - Bulk density may be affected by soil compaction.
 - Bulk density of organic soil is less than of mineral soils.
 - All the above are correct.
- (xii). Select the correct statement regarding soil texture.
- Generally soil texture is affected by land preparation and ploughing activities.
 - Soil texture does not depend on the particle size of soil.
 - Soil texture can be changed by application of organic matter.
 - Soil texture influences the root growth water movement in soil.
- (xiii). Which of the followings can be used to minimize soil acidity?
- Application of organic fertilizers.
 - Irrigation with more water.
 - Stop cultivation practices in such lands for long term.
 - All the above are correct.
- (xiv). Select the correct sequence (order) of the soil separate sizes from the following.
- Gravel > Sand > Fine sand .> Clay > Silt
 - Coarse sand > Sand > Gravel > Clay > Silt
 - Gravel > Sand > Fine sand >Silt >Clay.
 - Coarse Sand > Gravel > Fine sand > Clay.> Silt
- (xv). Select the correct statement regarding “BDH indicator method used for soil pH evaluation” from the following.
- It is an accurate method.
 - It can be practiced in the field.
 - It is not suitable for clay soils.
 - All the above are correct.
- (xvi). Select the correct statement from the followings.
- Rocks are made out of single minerals only.
 - Primary minerals are formed from secondary minerals.
 - Properties of a rock depend on the mineral available in the rock.
 - All the above are correct.

(Total 16 marks)

Part-II

Question No.02

- (i). Name two (02) chemical properties of soil. (02 marks)

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- (ii) Name two (02) methods used to evaluate soil texture & give one advantage of each method. (04 marks)

Method

Advantage

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- (iii) Name three (03) commonly used liming materials in agriculture. (03 marks)

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- (iv) Name three (03) types of water available in soil. (03 marks)

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Question No. 03

- (i) Name four (04) factors that affect soil formation. (02 marks)

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(ii) Name two (02) methods used to evaluate soil fertility & give one advantage of each method. (04 marks)

Method

Advantage

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(iii) Define the term soil “amendments” (03 marks)

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(iv) Name three (03) in-organic chemical fertilizers commonly used in agriculture and give the nutrient/elements supplied by each fertilizer. (03 marks)

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Part-III.

Question No.04

- (i) Define the term “soil profile” (03 marks)
- (ii) What are the uses of soil profile study? (04 marks)
- (iii) Draw a diagram to show the “horizons” of an undisturbed forest soil and write one character of each horizon. (08 marks)

Question No.05

- (i) Define the term “bio-fertilizer”. (03 marks)
- (ii) What are the benefits of bio-fertilizer compared to chemical fertilizer? (04 marks)
- (iii) Name four (04) organic materials used as fertilizer in agriculture and give special benefits of each material. (08 marks)

Question No.06

- (i) What are the uses of soil moisture for agriculture? (03 marks)
- (ii) Name three (03) methods used to estimate soil moisture content and give one advantage of each method. (06 marks)
- (iii) Briefly explain the problems associated with poor drainage condition in agriculture soil. (06 marks)

Question No.07

- (i) Briefly explain the fertility characters of rice soil. (05 marks)
- (ii) Write short notes on the followings.
 - a. Reddish Brown Earth (RBE) Soil. (05 marks)
 - b. Management of salt affected (saline) soils. (05 marks)