



FIJI NATIONAL UNIVERSITY

COLLEGE OF AGRICULTURE, FISHERIES AND FORESTRY
SCHOOL OF AGRICULTURE
DEPARTMENT OF SOIL SCIENCE & AGRI CHEMISTRY

FINAL EXAMINATION: 2016

Trade Diploma in Agriculture, year 1: Trimester-3

FUNDAMENTALS OF SOIL SCIENCE (SAC 402)

TOTAL MARKS: 100

TIME ALLOWED: 3:10 HOURS

Instructions

Answer all questions in the answer booklet

- This paper consists of six (6) pages. Please check to see that your paper is complete
- Number your answers correctly in the provided answer booklet.
- Write your student ID number on all pages including additional sheets.
- Write your student ID number on question paper.
- Don't write answers on question paper; write answers only in answer booklet.

“MOBILE PHONES ARE STRICTLY PROHIBITED IN THE EXAMINATION HALL”

PART	TYPE		TOTAL MARKS
I	MULTIPLE CHOICE ANSWERS	10 x 1	10
II	TRUE OR FALSE	11 x 1	11
III	FILL IN THE BLANKS	11 x 1	11
IV	DEFINITIONS/SHORT ANSWERS	6 x 3	18
V	DESCRIPTIVE QUESTIONS	5 x 7	35
VI	ESSAY QUESTION	1 x 15	15
TOTAL MARKS			100

PART I: MULTIPLE CHOICE ANSWER

10 x 1 = 10 marks

1. One of the dominant processes in soil genesis is:
 - a) mineral weathering,
 - b) humification of organic matter
 - c) leaching and removal of soluble materials
 - d) All of the above
2. One of the physical classifications of water is:
 - a) structure
 - b) Capillary water
 - c) Texture
 - d) Bulk density
3. One of the factors affecting capillary water is:
 - a) Surface tension
 - b) Soil texture
 - c) Soil structure
 - d) All of the above
4. One of the three (3) classes of water is:
 - a) Hygroscopic
 - b) Gravitational
 - c) Capillary
5. One of the nutrient elements obtained from atmosphere through photosynthesis is:
 - a) Hydrogen
 - b) Carbon
 - c) Oxygen
 - d) All of the above
6. One of the nutrient elements obtained from the soil is:
 - a) Nitrogen
 - b) Phosphorus
 - c) Potassium
 - d) All of the above

7. One type of soil erosion is:
- a) Sheet erosion
 - b) Rill erosion
 - c) Gully erosion
 - d) All of the above
8. One method of controlling soil erosion is:
- a) Avoid overgrazing
 - b) Planting of wind break
 - c) Minimum or no tillage
 - d) All of the above
9. One of the nutrient elements obtained from atmosphere through photosynthesis is:
- a) Nitrogen
 - b) Phosphorus
 - c) Potassium
 - d) None of the above
10. One of the reason for soil erosion is:
- a) Overgrazing
 - b) Over irrigation
 - c) Running water
 - d) All of the above

PART II: TRUE OR FALSE

11 x 1 = 11 marks

1. A soil profile is usually studied to a depth of 3 to 5 feet.
2. Soils change over time in response to their environment.
3. The environment is influenced by the soil-forming factors.
4. Soils are products of evolution, and soil properties are a function of time or soil age.
5. The age of a soil is expressed by its degree of development and not the absolute number of years.
6. Water contained in soil is called soil moisture.
7. The water is held within the soil pores.
8. If the moisture content of a soil is optimum for plant growth, plant can readily absorb the soil water.
9. Not all the water, soils can hold is available to plants.
10. Soil water dissolves salts and makes up the soil solution, which is important as medium for supplying nutrients to growing plants.
11. Gravitational water is of no use to plants because it occupies the larger pores, it reduces aeration in the soil.

PART III: FILL IN THE BLANKS

11 x 1 = 11 marks

1. _____ is removed from the atmosphere by plants and used to make all the organic molecules necessary for life.
2. The largest amount of carbon present on the land is not in the living plants, but in soil _____
3. As soil organic matter is depleted, it becomes a source of carbon dioxide for the _____
4. _____ is also released to the atmosphere when fuels, such as gas, oil, and wood, are burned.
5. The _____ cycle is also referred to as the *hydrologic* cycle.

6. _____ water is unavailable for the use of plants.
7. _____ is the proportion of the weight of a soil relative to its volume
8. _____ refers to the volume of soil voids that can be filled by water and or air.
9. _____ as the relative proportion of sand, silt and clay.
10. _____ is the arrangement of soil separates into units called soil aggregates.
11. _____ is the ability of a soil to retain water for use by plants.

PART IV: ANSWER 6 FROM THE FOLLOWING **6x3 = 18 marks**

1. In the soil profile, define what is Additions?
2. In the soil profile, define what is eluviation?
3. Define what is Illuviation?
4. Define what is a Soil genesis?
5. Define what is Parent material?
6. Define what is Topography?

PART V: ANSWER ANY 5 FROM THE FOLLOWING **5 x 7 = 35**

1. Briefly discuss what field saturation is.
2. Briefly explain why organic matter is very important to the soil.
3. Briefly discuss what organic matter is.
4. Briefly explain two causes of soil erosion
5. Briefly discuss two importance of soil profile
6. Briefly discuss only two function of soil in the ecosystem

PART VI: ANSWER ANY / FROM THE FOLLOWING

1x15 = 15 marks

1. Briefly discuss the following factors affecting soil water availability:

- a) Soil structure
- b) Soil texture
- c) Organic matter
- d) Soil compaction

OR

2. Briefly discuss the following sources of organic matter:

- a) Crop residue
- b) Green manure.
- c) Livestock manure
- d) Sewage sludge
- e) Processing wastes

THE END