



FIJI NATIONAL UNIVERSITY
 COLLEGE OF AGRICULTURE, FISHERIES AND FORESTRY
 SCHOOL OF AGRICULTURAL SCIENCES
 DEPTT. OF SOIL SCIENCE & AGRIL. CHEMISTRY

FINAL EXAMINATION: 2016
B.Sc Agriculture 1st year: Trimester IIIrd

INTRODUCTION TO SOIL SCIENCE (SAC 503)

Time Allowed: 3.10 hours

Total Marks: 50

INSTRUCTIONS:

This paper consists of five (5) pages. Please check to see that your paper is complete.

Answer all questions in the answer booklet.

- Number your answers correctly in the provided answer booklet.
- Write your student ID number on all pages that you use including any additional sheet paper.
- Printed or written study materials are not allowed into the examination hall.
- Mark values appear at the end of each question or part thereof.
- Calculators are permitted.

“MOBILE PHONES ARE STRICTLY NOT ALLOWED”

SECTION NO.	TYPE	TOTAL MARKS
I	TRUE OR FALSE	$8 \times 0.75 = 6$
II	MULTIPLE CHOICE	$8 \times 0.75 = 6$
III	MATCHING	$8 \times 0.75 = 6$
IV	FILL IN BLANK	$8 \times 0.75 = 6$
V	DEFINITION	$6 \times 1.0 = 6$
IV	SHORT ANSWER	$5 \times 4.0 = 20$
TOTAL MARKS		50

PART I: STATE TRUE OR FALSE***8 x 0.75 = Total 6 marks***

1. Total pore space of sandy soils is higher as compared to clay soils.
2. The sand particles possess higher surface area as compared to clay particles.
3. The name of the deposited parent material is alluvial when it deposited by river.
4. The bulk density of soils is generally higher than particle density.
5. Soil structure refers to the relative proportion of particles of various sizes in a given soil.
6. Soil structure can be written in Type, Grade and Class sequence.
7. Size of clay particles is in between 0.020-0.200 mm as per International Society of Soil Science.
8. Metamorphic rocks are formed from the subsequent transformation of igneous rocks under the influence of heat and pressure.

PART II : WRITE THE LETTER OF YOUR CHOICE***8 x 0.75 = Total 6 marks***

1. What does the mean of soil for a pedologist?
 - a) A debris which covers the minerals
 - b) Soil is a natural body
 - c) Soil is a record of the past
 - d) None of the above
2. The soil colloids are important as they influence;
 - a) Ion exchange
 - b) Nutrient availability and fixation
 - c) Soil physical properties like structure, infiltration, conductivity
 - d) All of the above
3. Weight of a moist soil is 80g, after keeping it over night in oven at a temperature of 105°C , the weight of soil recorded 64g. Calculate the percent moisture of given soil.

a) 15 %	b) 25 %
c) 20 %	d) 30 %
4. The weight of a dry soil sample was recorded 120g, and volume of core sampler calculated 75 cc. What will be the bulk density ($\text{Mg} / \text{m}^{-3}$) of given soil sample?

a) 1.25	b) 1.45
c) 1.75	d) 1.65

5. Which of the following is an active factor of soil formation?
 - a) Organism
 - b) Parent material
 - c) Relief
 - d) None of the above

6. Which property out of given is not influenced by soil organic matter?
 - a) Soil temperature
 - b) Effect on soil color
 - c) Soil aeration
 - d) None of the above

7. Which one is not a chemical weathering process out of given?
 - a) Carbonation
 - b) Hydration
 - c) Oxidation
 - d) None of these

8. Which is the common example of 2:1 expanding type of clays mineral?
 - a) Montmorillonite
 - b) Illite
 - c) Kalolinte
 - d) None of these

PART III. MATCH THE FOLLOWING

8 x 0.75 = Total 6 marks

COLUMN "A"

COLUMN "B"

- | | | |
|------------------------------------|-------|-------------------------------------|
| 1. Shape of kaolinite | ----- | A. Alluvium |
| 2. Secondary major nutrient | ----- | B. Eolian |
| 3. Wind deposited sand material | ----- | C. Hexagonal |
| 4. Quartz | ----- | D. Hydrometer method / Feel methods |
| 5. Particle size determination | ----- | E. Illite |
| 6. Micronutrient | | F. Kaolinite |
| 7. River deposited material | ----- | G. Magnesium |
| 8. 2:1 type non-expanding minerals | ----- | H. Montmorillonite |
| | ----- | I. Potassium |
| | ----- | J. SiO ₂ |

PART IV: FILL THE BLANK SPACE WITH PROPER WORD**8 × 0.75 = Total 6 marks**

1. In ----- substitution replacement of one atom by another of similar size but of lower valence takes place.
2. ----- is the process of removal of constituents from upper layers to lower layers. This layer is designated as the A-horizon.
3. The unit of measuring of bulk density or particle density is -----.
4. The alumino-silicate clay minerals are composed primarily of two basic structural units silica tetra hedron and -----.
5. Acid rocks contain -----% silica example granite, sandstone and gneiss.
6. Active factors of soil formation are ----- and Organism.
7. ----- can be defined as the smallest sampling unit that displays the full range of properties or characteristics of a particular soil.
8. If a colour notation is 7.5YR 5/6 in munsell's soil colour chart, here 5 represents ---
-----.

SECTION V: DEFINE THE FOLLOWING:**6 × 1.0 = Total 6 marks**

1. Cation exchange capacity
2. Primary minerals
3. Illuviation
4. Soil horizon
5. Particle density
6. Soil texture

PART VI: WRITE THE ANSWER FOR FOLLOWING QUESTIONS***5 x 4.0 = Total 20 marks***

Q 1:

- a) Write the definition of soil.
- b) What do you understand with concepts of soil to its users?
- c) What are the approaches to study of soils?

Q 2:

- a) What do you understand with soil forming rocks and minerals? Explain with appropriate examples.
- b) Give the list of physical weathering agents.
- c) Give the list of chemical weathering agents.

Q 3:

- a) List the name of important physical properties of soil
- b) Classification of particles size of International Society of Soil Science
- c) With appropriate diagram explain the prism type of soil structure.
- d) Name the factors responsible for reduction of soil temperature.

Q 4:

- a) Name the processes responsible for the transformation of primary minerals into silicate clays.
- b) What do you understand with silica tetrahedron?
- c) Draw the schematic diagram of 1:1 type of clay minerals
- d) List (only) the factors that affect cation exchange capacity.

Q 5:

A soil sample was collected to determine of bulk density, % pore space & moisture content. The measurements recorded were:

Height of cylinder	= 5 cm
Diameter of the core	= 4 cm
Moist weight of soil (without beaker)	= 125 gm
Dry weight of soil (without beaker)	= 100.5 gm
Standard particle density	= 2.65 g/cm ³

Calculate i) core volume ii) bulk density, iii) % pore space and iv) moisture %

END OF EXAMINATION PAPER

EQP RECEIPT CHECKLIST FORM

Particulars	Details/Comments (To be filled by Unit Lecturer)	Tick if present on EQP (To be filled by exams staff)
Cover Page		
Fiji National University with Logo	✓	
College	✓	
School	✓	
Program	✓	
Unit Code	✓	
Unit Name	✓	
Examination Period	✓	
Duration of Examination	✓	
Instructions	✓	
Total Number of Pages	✓	
Other Pages		
Footer	✓	
Page Number	✓	
Unit Code	✓	
Examination Period	✓	
Last Page		
The End	✓	
Overall		
Proper Print	✓	
Examination Requirements (FNU/E-1)	✓	
Moderator's Report (FNU/E-3)	✓	
ERRS (Class List)	✓	
Unit Coordinator/Principal Lecturer's Name	Dr Roshni R Singh	

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