JHARKHAND Rai University
RANCHI

PRACTICE SET
End Semester (1st Sem.) Examination, Dec, 2025

Program: B. Sc. (Hons.) Agriculture
Semester: I
Course: Fundamentals of Soil Science
Course Code: SS-101

Course Outcomes:
At the end of the Course, the Student will be able to-

CO1 Explain the origin, development, and classification of soils.
CO2 Analyze soil properties relevant to plant growth and agricultural productivity.
CO3 Identify essential nutrients and understand their behavior in soils.
CO4 Recommend basic soil management and conservation techniques for sustainable agriculture

Section: I (5 Marks questions, only Lower Order Thinking -LOT)
UNIT-I

Sl. No.	Model Questions	Blooms Taxonomy	CO
1.	Define pedology and edaphology and differentiate between them.	Remember	CO1
2.	List the major types of rocks and minerals important in soil formation.	Remember	CO1
3.	Describe weathering, and how does it contribute to soil formation?	Understand	CO1
4.	Define cation exchange capacity (CEC) and base saturation in soils.	Remember	CO1
5.	Explain the chemical weathering process.	Understand	CO1

Section: II (10 Marks questions, only Higher Order Thinking - HOT)

Sl. No.	Model Questions	Blooms Taxonomy	CO
6	Breakdown the constitution and properties of silicate clays and explain their significance in soil fertility.	Analyze	CO1
7	Outline the types and processes of weathering and analyze the Rock	Analyze	CO1

	cycle.		
8	Evaluate cation and anion exchange in soils, appraise their role in nutrient availability.	Evaluate	CO1
9	Critique base saturation and buffering capacity of soils and their importance in soil management.	Evaluate	CO1
10	Design a soil fertility improvement plan for a given clayey soil, integrating knowledge of clay properties, ion exchange capacity, and base saturation to optimize crop productivity.	Create	CO1

Section: I (5 Marks questions, only Lower Order Thinking -LOT)

UNIT-II

Sl. No.	Model Questions	Blooms Taxonomy	CO
11	Define soil formation and restate the main factors influencing it.	Understand	CO2
12	Summerize soil organic matter and its importance for soil fertility?	Understand	CO2
13	List the major pedogenic processes involved in soil development.	Remember	CO2
14	Compare between inorganic and organic soil colloids.	Understand	CO2
15	Explain the role of soil colloids in ion exchange processes.	Understand	CO2

Section: II (10 Marks questions, only Higher Order Thinking -HOT)

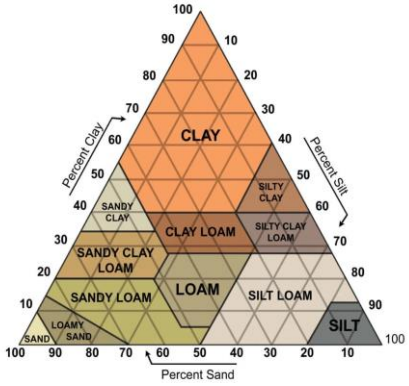
Sl. No.	Model Questions	Blooms Taxonomy	CO
16	Breakdown the process of soil formation and analyse how climate, parent material, and topography influence soil properties.	Analyze	CO2
17	Analyze the composition and fractionation of soil organic matter examining its role in nutrient cycling and soil structure.	Analyze	CO2
18	Assess major pedogenic processes and their effect on soil horizons and fertility.	Evaluate	CO2
19	Evaluate the properties of soil colloids and their impact on soil physical and chemical behavior.	Evaluate	CO2
20	Design an experimental model to study cation and anion exchange in soils, incorporating both inorganic and organic colloids, and explain how it can be used to assess nutrient availability and soil fertility.	Create	CO2

UNIT-III

Section: I (5 Marks questions, only Lower Order Thinking -LOT)

Sl. No.	Model Questions	Blooms Taxonomy	CO
21	Define soil pH and compare between soil acidity and alkalinity.	Remember	CO3
22	What is Oxygen Diffusion Rate (ODR) in soils? Explain its significance in assessing soil aeration.	Understand	CO3
23	Enlist the type of Soil structure.	Remember	CO3
24	Mention the main fractions of soil organic matter and their general properties.	Understand	CO3
25	Define cation exchange capacity (CEC) and base saturation.	Remember	CO3

Section: II (10 Marks questions, only Lower Order Thinking -LOT)

Sl. No.	Model Questions	Blooms Taxonomy	CO
26	Categorize the different types of soil-water based on their availability to plants. Explain the principle and working of a tensiometer used for measuring soil water tension.	Analyze	CO3
27	Evaluate the constitution & properties of silicate clays and as their influence on soil chemical behaviour.	Analyze	CO3
28	Deduce the derivation of Stokes' Law for Particle settling velocity in a fluid. Derive the equation, evaluate its underlying assumptions, and justify its applications in soil science.	Anslyze	CO3
29	Evaluate soil bulk density and particle density using its definition, explain their importance, and describe their determination methods. A soil sample (132 g, 100 cm^3 core) displaced 3.70 cm^3 of liquid when 10 g was used for particle density. Calculate the bulk density, particle density, and porosity (%), and interpret the results.	Evaluate	CO3
30	Explain soil texture and soil structure. Describe the procedure for determining soil textural class of following A soil sample was analyzed in the laboratory and found to contain the following proportions of soil separates Sand = 25%,Silt = 55%,Clay = 20% Using the USDA Soil Textural Triangle, determine the textural class of this soil 	Create	CO3

	and explain your steps.		

UNIT IV

Section: I (5 Marks questions, only Lower Order Thinking -LOT)

Sl. No.	Model Questions	Blooms Taxonomy	CO
31	Comapre between macro- and micro-organisms in soil with examples.	Understand	CO4
32	Outline two beneficial and two harmful effects of soil organisms on crop growth.	Rememebr	CO4
33	Define soil pollution and list its main sources.	Rememebr	CO4
34	Interpret the behavior of pesticides in soils.	Understand	CO4
35	Summarize two methods to prevent or mitigate soil pollution.	Understand	CO4

Section: II (10 Marks questions, only Lower Order Thinking -LOT)

Sl. No.	Model Questions	Blooms Taxonomy	CO
36	Assess the role of soil macro- and micro-organisms in nutrient cycling and soil fertility.	Evaluate	CO4
37	Analyse the harmful effects of certain soil organisms on crops and suggest management strategies.	Analyse	CO4
38	Review Biological Nitrogen Fixation (BNF), its mechanism, types, and significance in agriculture	Evaluate	CO4
39	Evaluate the strategies for prevention and mitigation of soil pollution from both pesticides and inorganic contaminants.	Evaluate	CO4
40	Design an integrated soil management plan for a farm, considering the role of soil organisms, minimising pesticide and inorganic contamination, and ensuring sustainable soil health and productivity.	Create	CO4

Summary Sheet:

CO Wise

CO	Q. No	Marks
CO1	1-10	75
CO2	11-20	75
CO3	21-30	75
CO4	31-40	75
Total		**300**

Unit Wise

Unit	Q. No	Marks
Unit-1	1-10	**75**
Unit-2	11-20	**75**
Unit-3	21-30	**75**
Unit-4	31-40	**75**
Total		**300**

Blooms Taxonomy Level (BTL) Wise

BTL	Q. No	Marks
LOT	1-5,11-15,21-25,31-35	**100**
HOT	6-10,16-20.26-30.36-40	**200**
Total		**300**

Submitted By: Ms. Rojalin Hota **Reviewed By: Dr. Neha G. A. Kisku**

Disclaimer: - This is a practice set. The Question in End semester examination will differ from the practice set. This practice set is meant for practice only.