

Khulna University

School: Life Science **Discipline:** Agrotechnology **Program:** Master of Science in Agronomy

Year: MS First **Term:** Second **Examination Year:** 2025 **Session:** 2024-25

Course Code: 0811 08 AGR 5201 **Course Title:** Crop Nutrition

Total Marks: 60 **Time:** 3 hours **Credit:** 3.0



- The **figures** in the right margin indicate full marks. The questions are of equal value.
- Use separate sheet for each section.
- Draw and label where necessary
- There are **four** questions in each section, answer any **three** from each.

Section-A

Ques. No.	Question Description [CLO and Level]	Marks
1.	a) When can a soil be considered fertile? Discuss. [L2; CLO1]	1.5
	b) 'Fertile soil sometimes is unproductive' - analyze the statement with possible reasons. [L5; CLO1]	2.0
	c) 'Although chemical fertilizer application has been increasing day by day in Bangladesh soil but the soil health is decreasing'. Justify the statement. [L2; CLO2]	4.0
	d) How can nutrients be lost from the soil? Clarify. [L4; CLO1]	2.5
2.	a) Graphically explain Mitcherlich's growth law with an equation. [L2; CLO1]	3.0
	b) Estimate the proportional yield with an increment of growth factors $x=2$. [L3; CLO1]	2.0
	c) Mention the process of P-retention in soil. Do you think that P-retention is positive for soil and plant? Support your answer. [L1,5; CLO2]	5.0
3.	a) Mention the methods of soil fertility evaluation. Which methods of soil fertility evaluation are more effective and why? [L2&5; CLO2]	3.0
	b) Suppose the seed yield of sunflower at the control treatment (no N added) was 0.87 t ha^{-1} , and the yields at 40, 60, 80, 100, 120 and 140 kg N ha^{-1} are 1.79, 2.68, 3.12, 3.31, 3.19 and 3.03 t ha^{-1} , respectively. Also, the total N uptake at control, 40, 60, 80, 100, 120 and 140 kg N ha^{-1} are 23.54, 58.75, 83.17, 97.34, 113.87, 120.22 and $117.45 \text{ kg ha}^{-1}$, respectively. Calculate the agronomic N efficiency, physiological N efficiency and apparent N recovery efficiency. [L3; CLO2]	5.0
	c) State the bases of fertilizer recommendation in Bangladesh. [L4; CLO2]	2.0
4.	a) 'The 4R nutrient stewardship concept may improve the crop productivity and nutrient use efficiency'- analyze. [L4; CLO2]	3.5
	b) In a soil test, if you find that K level is far more than the critical level, will you suggest to stop applying K to that soil? Support your answer. [L5; CLO2]	3.0
	c) What is nitrate depression? Discuss the role of the C:N ratio in nitrate depression and humus formation. [L2&5; CLO3]	3.5

Section-B

5.	a) Name the immobile elements in plant. Differentiate the deficiency symptoms of S and N in plant. [L2; CLO4]	4.0
	b) 'Soil pH and interaction of ions may affect mineral nutrient absorption by plants'- justify. [L4&5; CLO4]	3.0
	c) Report the process of loss of NH_4^+ and NO_3^- from soil. 'Immobilization of N is not a permanent loss'. Argue. [L1,4; CLO1]	3.0
6.	a) What is nutrient use efficiency? How can nutrient use efficiency of crops be improved? [L2&4; CLO1]	4.0
	b) What is ammonia volatilization? 'There are some factors enhance the ammonia volatilization' Elaborate. [L2,4; CLO1]	3.0
	c) Mention the efficient application methods of urea. Why are they efficient? [L2; CLO1]	3.0
7.	a) 'Plants' movement and stomal regulation are affected by K'. explain with examples. [L5; CLO5]	4.0
	b) Discuss the key pathways of nutrient losses from the soil. [L5; CLO4]	3.0
	c) 'High Mg concentration in plant increase the RuBP carboxylase functions'. Explain. [L5; CLO1]	3.0
8.	a) Illustrate and describe the infection process by <i>Rhizobia</i> during nodule organogenesis. [L2; CLO4]	4.0
	b) Describe the mechanism of BNF by <i>Rhizobium</i> in a root nodule with illustration. [L5; CLO4]	6.0

*Levels of Bloom's cognitive domain:

[L1=Remember; L2=Understand; L3=Apply; L4=Analyze; L5=Evaluate; L6=Create]