



Agrotechnology Discipline
Khulna University, Khulna
4th Year Term-I, Examination 2026
0811 08 AT 4101: Plant Breeding
Full Marks: 60, Time: 3 hours, Credit: 03

- The FIGURES in the right margin indicate full marks. The questions are of equal value.
- Use separate sheets for each section.
- There are **FOUR** questions in each section, answer any **THREE** questions from each.

Section A

1. (a) 'Plant breeding is a strategic decision rather than a simple crossing.' Justify. [L5; CLO1] 2.0
(b) Explain how plant breeding contributes to biotic and abiotic stress resistance. [L3, CLO1] 3.0
(c) Describe the contribution of plant breeding in modern agriculture. [L2; CLO1] 3.0
(d) 'Plant breeding alone cannot solve all agricultural problems.' Analyze critically. [L4; CLO1] 2.0
2. (a) What is exploration in germplasm collection? [L1; CLO2] 1.0
(b) Define plant genetic resources. Discuss the importance, and utilization of germplasm in plant breeding. [L1, L2; CLO2] 1+2=3.0
(c) What is genetic erosion. Describe the causes of genetic erosion, its consequences, and preventive measures. [L1, L4; CLO2] 1+3=4.0
(d) Explain systematic evaluation of germplasm and its significance. [L5; CLO2] 2.0
3. (a) Define parthenogenesis? Differentiate between recurrent and non-recurrent apomixis. [L1, L4; CLO3] 1+2=3.0
(b) Discuss mechanisms promoting self-pollination and their genetic consequences. [L3; CLO3] 1+2=3.0
(c) 'Self-pollination ensures stability, while cross-pollination ensures variability.' Explain. [L5; CLO3] 2.0
(d) A plant species shows high seed set without fertilization. Identify the reproductive mechanism for this phenomenon and justify. [L6; CLO3] 2.0
4. (a) Germplasm introduced from another country carries a disease. Explain how this could have been prevented. [L3; CLO4] 3.0
(b) 'Selection is the backbone of plant breeding.' Justify with examples. [L5; CLO4] 3.0
(c) A breeder wants to transfer a disease resistance gene (dominant) into an elite variety without altering its genotype. Which method will you recommend? Explain the procedure. [L6; CLO4] 4.0

Section B

5. (a) Explain the causes of hybrid sterility in distant hybridization. [L2; CLO3] 3.0
(b) Justify the use of distant hybridization in modern plant breeding programs. [L5; CLO3] 4.0
(c) Illustrate how colchicine is used in restoring the fertility of interspecific hybrids. [L3; CLO3] 3.0
6. (a) Define homoeologous chromosomes. [L2; CLO3] 1.0
(b) Analyze how allopolyploidy leads to heterosis-like effects in crop plants. [L4; CLO3] 3.0
(c) A polyploid crop shows increased size but reduced yield—explain this observation in relation to the optimum ploidy level. [L4; CLO3] 3.0
(d) Give a short overview of different techniques used to manipulate ploidy levels. [L3; CLO3] 3.0
7. (a) Mutation breeding is said to complement conventional breeding rather than replace it. Justify this statement with examples. [L5; CLO4] 2.0
(b) How do spontaneous gene mutations happen? [L2; CLO4] 3.0
(c) Formulate a breeding program using EMS to enhance disease resistance in rice. [L6; CLO4] 5.0
8. (a) Differentiate between mutational and balanced true heterosis. [L2; CLO4] 2.0
(b) A hybrid rice shows 6.5 t/ha yield, while the check variety shows 5.0 t/ha. Calculate standard heterosis. [L5; CLO4] 2.0
(c) Why is standard heterosis more important for variety release? [L4; CLO3] 2.0
(d) Define the multiple factor hypothesis. [L1, L2; CLO4] 2.0
(e) Explain how kernel color in wheat supports multiple-factor inheritance. [L3; CLO4] 2.0

[L1-Remember, L2-Understand, L3-Apply, L4-Analyze, L5-Evaluate, L6-Create]



Agrotechnology Discipline
Khulna University, Khulna
4th Year Term-I, Examination 2026
0811 08 AT 4103: Pomology

Full Marks: 60, Time: 3 hours, Credit: 03

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- Use separate sheets for each section.
- There are **FOUR** questions in each section, answer any **THREE** questions from each.

Section A

1. (a) 'Fruit production is nutritionally and economically beneficial.' Justify. [L5; CLO1] 4.0
(b) 'There is enough scope for increasing fruit production in Bangladesh.' Explain. [L4, CLO1] 3.0
(c) What are the bases of fruit classification? Classify fleshy indehiscent fruits. [L2; CLO1] 3.0
2. (a) List the challenges of fruit production in Bangladesh. How to overcome them? [L4; CLO2] 3.0
(b) Which region of the world is important for fruit production? Write the characteristics, name 5 countries and 5 major fruits of this region. [L1; CLO2] 4.0
(c) Enlist the Ecological factors affecting fruit production. [L1; CLO2] 3.0
3. (a) Write the uses and medicinal value of different plant parts of mango. [L1; CLO3] 3.0
(b) Write the growth phases of mango. Which one of the growth phases is important for flowering? [L1; L4; CLO3] 4.0
(c) Explain the causes and remedies of alternate bearing of mango. [L1; CLO3] 3.0
4. (a) Analyze the factors those should consider in site selection and fertilizer management of fruit orchard. [L4; CLO5] 3.0
(b) Enlist the causes of unfruitfulness. Formulate solutions for unfruitfulness. [L2; CLO5] 4.0
(c) 'Growth regulators are important for propagation of fruit crops.' Justify. [L4; CLO5] 3.0

Section B

5. (a) How does boron (B) act within citrus plants? Discuss the B deficiency symptoms in citrus. [L2; CLO4] 4.0
(b) Illustrate the factors that affect nutrition requirement of fruit plants. [L1; CLO4] 3.0
(c) How do antagonistic and synergistic relations affect plant nutrient availability? Explain. [L4; CLO4] 3.0
6. (a) 'The day and night temperatures are crucial for strawberry production.' Justify. [L4; CLO2] 3.0
(b) List the major factors that affect fruit set. Explain two of them. [L2; CLO2] 3.0
(c) Illustrate the process of mango flower formation according to Lang. How does the CN ratio influence the flowering and fruiting of plants? [L1, L2; CLO3] 4.0
7. (a) Explain the sex expression phenomenon of avocado flowers. [L2; CLO 3] 2.0
(b) Describe the cultural management of bullock's heart and pomegranate. [L2; CLO 3] 2+2=4.0
(c) Assess the scope and challenges of introducing exotic fruit crops in Bangladesh. [L6; CLO3] 4.0
8. (a) Enlist the causes of postharvest fruit losses. Describe the effects of physiological changes and storage conditions on the postharvest fruit loss. [L2; CLO 3] 2+3=5.0
(b) 'Harvesting of mango and watermelon at their physiological maturity does not yield satisfactory fruit quality.' Justify. [L4; CLO3] 3.0
(c) List the objectives and principles of preparation of value-added products from fruits. [L2; CLO3] 2.0

[L1-Remember, L2-Understand, L3-Apply, L4-Analyze, L5-Evaluate, L6-Create]



Agrotechnology Discipline
Khulna University, Khulna
4th Year Term-I, Examination 2026

0811 08 AT 4105: Diseases of Horticultural Crops and Seed Pathology
Full Marks: 60, Time: 3 hours, Credit: 03

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- Use separate sheets for each section.
- There are **FOUR** questions in each section, answer any **THREE** questions from each.

Section A

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| 1. | (a) How can you recognize late blight disease in the field? What recommendations do you suggest for farmers to forecast this disease? [L3; CLO1] | 4.0 |
| | (b) Discuss the symptoms of late blight of potato with a labeled diagram. [L2; CLO1] | 3.0 |
| | (c) Enlist the control measures of late blight of potato. [L4; CLO4] | 3.0 |
| 2. | (a) How do you differentiate fungal wilt from bacterial wilt in the field? [L3; CLO1] | 3.0 |
| | (b) Illustrate the symptoms of yellow mosaic of lady's finger. Describe the ways of controlling the disease. [L4; CLO1, CLO2] | 3.0 |
| | (c) Describe the identifying symptoms of Alternaria leaf spot of cabbage. What are the ways for controlling favorable conditions for epidemic disease development of Alternaria leaf spot of cabbage? [L5; CLO4] | 4.0 |
| 3. | (a) What are the role of sanitation in managing mango and jackfruit diseases? [L2; CLO1] | 4.0 |
| | (b) A coconut garden is showing symptoms of leaf spot and decline yield. Suggest possible causes and solutions. [L3; CLO1] | 3.0 |
| | (c) Design an integrated disease management plan for a mixed orchard of mango and guava. [L3; CLO1] | 3.0 |
| 4. | (a) Define clean cultivation and why it is important for managing die back of fruit crops. [L2; CLO4] | 3.0 |
| | (b) Describe the symptoms and control measures of Panama- and Sigatoka diseases of banana. [L1; CLO1, CLO4] | 4.0 |
| | (c) Write about the epidemiological aspects of fruit crop diseases. [L3; CLO2] | 3.0 |

Section B

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| 5. | (a) A diseased betel vine leaf is supplied to you. How will you confirm whether the disease is leaf rot but not anthracnose? Prescribe the control measures of this disease. [L3; CLO3] | 4.0 |
| | (b) Is it possible to locally transmit the seed-borne pathogen from seed to plant and again to seed? If yes, discuss with an example. [L3; CLO3] | 3.0 |
| | (c) Write down the importance of seed-borne disease in relation to the damage that occurs during storage. [L2; CLO3] | 3.0 |
| 6. | (a) A diseased tobacco leaf is supplied to you. How will you confirm whether the disease is frog eye leaf spot or Cercospora leaf spot? Prescribe the control measures for the disease. [L4; CLO3] | 4.0 |
| | (b) Discuss the process of seed to plant and again to seed transmission of <i>Xanthomonas</i> sp. and <i>Pseudomonas</i> sp. [L3; CLO3] | 3.0 |
| | (c) What is the importance of seed health testing in relation to crop production? [L4; CLO3] | 3.0 |
| 7. | (a) What is seed treatment and why is it important? [L1; CLO2] | 2.0 |
| | (b) Give a detail explanation of biological control methods used against seed-borne pathogens. [L3; CLO2] | 4.0 |
| | (c) Explain, with a specific example, how the relationship between disease severity and crop loss is characterized. [L3; CLO4] | 4.0 |
| 8. | (a) What do you know about plant quarantine? How does plant quarantine play an important role in controlling seed-borne diseases? [L3; CLO4] | 3.0 |
| | (b) Discuss disease forecasting and crop loss assessment? 'Epidemiological knowledge is necessary for developing plant disease forecasting systems.' Justify. [L5; CLO2] | 4.0 |
| | (c) Compare and contrast the symptoms of <i>Taphrina</i> leaf spot and anthracnose of turmeric with the labeled diagram. [L4; CLO1] | 3.0 |

[L1-Remember, L2-Understand, L3-Apply, L4-Analyze, L5-Evaluate, L6-Create]



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0811 08 AT 4107: Stresses in Agriculture and Disaster Management

Full Marks: 60, Time: 3 hours, Credit: 03

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Section A

1. (a) What are stress and strain? Differentiate between stress tolerance and stress avoidance. [L2, L3; CLO1, CLO2] 4.0
(b) 'Enzymes extracted from salt-tolerant species are just as sensitive to the presence of NaCl as enzymes from salt-sensitive glycophytes are.' Elaborate. [L4; CLO1, CLO2] 3.0
(c) Write the effects of oxidative stress on plant under salinity. [L2; CLO1, CLO2] 3.0
2. (a) Convert EC 15 dS m⁻¹ into mM and per cent salinity. [L5; CLO1, CLO2] 3.0
(b) What are compatible solutes under salinity? 'Compatible solutes help plant to survive under salinity but it results growth and yield reduction'. Do you agree with the statement? Support our answer. [L1, L4; CLO1, CLO2] 4.0
(c) Draw a graph showing that different plant species differ greatly under the same level of salinity. [L3; CLO1, CLO2] 3.0
3. (a) Illustrate and describe the ABA-mediated stomatal closure under drought. [L3; CLO1, CLO2] 4.0
(b) Compare and contrast waterlogging and inundation. Why does metal toxicity increase under waterlogging? [L3; CLO1, CLO2] 2.0
(c) How do plants change their respiration during the episodes of anoxia? Is this survival permanent or temporary? How? [L2, L4; CLO1, CLO2] 4.0
4. (a) At high temperature, how are photosynthesis and respiration affected. [L2; CLO1, CLO2] 3.0
(b) 'Negative effects on cellular membranes are common under both high- and low-temperature stress conditions.' Explore. [L4; CLO1, CLO2] 3.0
(c) Show that the GABA mediates cytosolic pH during high heat stress. [L4; CLO1, CLO2] 4.0

Section B

5. (a) Schematically elucidate the concept of disaster. [L2; CLO2] 3.0
(b) 'Successive and recurrent disasters increased the climatic refugees in Bangladesh.' Analyze. [L4; CLO2] 4.0
(c) Assess the impact of global warming on disaster. [L5; CLO2] 3.0
6. (a) Differentiate hazard from disaster. [L2; CLO3] 3.0
(b) Classify hazard on the basis of their speed of onset with two examples in each case. [L2; CLO3] 3.0
(c) Identify the causes of flood in Bangladesh with proper diagram. [L3; CLO3] 4.0
7. (a) Explain vulnerability. [L2; CLO3] 2.0
(b) Characterize tangible and intangible vulnerability. [L2; CLO3] 2.5
(c) Vulnerability assessments fulfill diverse purposes-assess. [L5; CLO3] 2.5
(d) Suggest the guidelines for implementing disaster risk reduction. [L3; CLO3] 3.0
8. (a) Show the possible elements of risk in tabular form. [L2; CLO4] 3.0
(b) Identify the aspects of disaster management proposed by the International Federation of Red Cross & Red Crescent Societies with neat labeled diagram. [L3; CLO4] 4.0
(c) Assess the Hyogo Framework for Action (HFA) in disaster risk management. [L5; CLO4] 3.0

[L1-Remember, L2-Understand, L3-Apply, L4-Analyze, L5-Evaluate, L6-Create]