Khulna University

School: Life Science **Discpline:** Agrotechnology **Program:** MS in Entomology
Year: 1st **Term:** 2nd **Examination Year:** 2025 **Session:** 2024-2025
081108 ENT 5201: Hostplant Resistance to Insects and Pathogens
Full Marks: 60 **Time:** 03 Hours **Credit:** 03

- Full marks for each question are indicated in the right margin and all questions carry equal weight.
- Use separate sheet for each section.
- There are four questions in each section, answer any three from each.

Section A

1a. How do you differentiate three main mechanisms of host plant resistance? [L4; CLO1] 2

b. Evaluate the extent to which the specific technological component of Bt Brinjal has directly translated into socio-economic and environmental benefits for the farmers? [L5; CLO1] 3

c. How does compensatory growth in soybeans allow them to maintain yield despite leaf loss? [L2; CLO1] 3

d. 'Active stomatal closure helps a plant defend against bacterial blight" – judge. [L5; CLO1] 2

2a. Why are oats resistant to the take-all fungus when wheat is susceptible? [L2; CLO1] 2

b. Besides reducing chemical use, what is one major environmental benefit of HPR? [L2; CLO1] 3

c. Evaluate the environmental and economic significance of adopting host plant resistance as a long-term pest control strategy in developing countries like Bangladesh. [L5; CLO2] 3

d. Why does Ecological Resistance typically break down faster than Genetic Resistance when pathogen pressure or environmental conditions change? [L2; CLO2] 2

3a. Compare pattern-triggered immunity (PTI) and effector-triggered immunity (ETI) as plant defense cascade against insect herbivory. [L5; CLO2] 5

b. Evaluate the role of secondary metabolites as both defense molecules and communication signals in plant insect interaction. [L5; CLO2] 5

4a. What visual cue helps insects search nectar in flowers, often only visible under UV light? [L1; CLO2] 2

b. Critically analyze the genetic, ecological and environmental factors that influences the durability of plant resistance to insect pests. [L4; CLO2] 2

c. Discuss the concept of a 'refuge' in pest management using the example of the codling moth's cryptic behavior. [L5; CLO2] 3

d. Why does applying a pesticide late in the pest's life cycle speed up resistance development? [L2; CLO2] 3

Section B

5a. Analyze why HPR is considered compatible with IPM. [L4; CLO2] 3

b. How does low host specificity contribute to the resilience of polyphagous insects? [L2; CLO2] 3

c. Evaluate how low trophic plasticity affects the success of monophagous insects. [L5; CLO2] 2

d. What is the primary reason a female polyphagous insect might choose one host plant over another? [L2; CLO2] 2

6a. How does a higher nitrogen content in a plant generally affect a polyphagous insect's fitness? [L2; CLO2] 2

b. How can plant stress (like drought) potentially make a plant more suitable for phloem feeders like aphids? [L2; CLO2] 2

c. What is the primary function of an antifeedant chemical against pests? Give one example of a terpenoid mentioned, and state its general effect on insects. [L1; CLO2] 3

d. What is the main difference between a repellent and a toxin in how they affect pests? [L4; CLO2] 3

7a. Why does the selection of offspring need to be repeated over several generations in conventional breeding? [L4; CLO3] 3

b. Approximately how long can it take to develop a new crop variety using conventional breeding and why? [L2; CLO3] 3

c. Why was Genetic Engineering necessary to create Golden Rice, as opposed to using conventional breeding methods? [L2; CLO3] 2

d. How does using MAS save breeders several years compared to conventional selection methods? [L2; CLO3] 2

8a. Evaluate the future prospects and challenges of transgenic crops in global insect pests management program. [L5; CLO3] 4

b. Explain the factors determing durability of plant resistance against pests and pathogens. [L2; CLO3] 3

c. Differentiate between protease and alpha amylase inhibitors. [L4; CLO3] 3