

[This question paper contains 2 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 7908

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Unique Paper Code : 2163010020

Name of the Paper : Immunological Concepts and Applications in Plant Science

Name of the Course : Botany

Semester : VIII

Duration : 2 Hours

Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No- on the top immediately on receipt of this question paper.
2. Each question carries 15 marks, so attempt FOUR questions in all.
3. Question No. 1 is compulsory.

1. (A) Define any five of the following terms:

(5 x 1 = 5)

- i. Hapten
- ii. R gene
- iii. Immunoglobulin
- iv. Epitope
- v. Valence
- vi. Necrotroph

(B) Fill in the blanks any five of the following:

(5 x 1 = 5)

- i. In the plant immune system, the first layer of induced immunity triggered by recognition of PAMPs is called _____
- ii. According to Flor's model, for each resistance gene in the host, there is a corresponding _____ gene in the pathogen.
- iii. _____ are small nucleic acid molecules that play a key role in developing antiviral resistance in plants.
- iv. _____ are PRRs that detect flagellin in bacteria and trigger PTI in plants.
- v. The _____ are proteins that bind to specific DNA sequences to activate or repress defence genes.
- vi. _____ is a whole plant immunity that develops after a localised infection.

P.T.O.

(C) Expand any five of the following:

(5 x 1 = 5)

- i. CaM
- ii. CBL
- iii. HR
- iv. NLRs
- v. AREB
- vi. Avr

2. Write Short Notes on any three of the following:

(3 x 5 = 15)

- i. Management of plant pathogens in agriculture.
- ii. Flor's model of plant pathogen interaction.
- iii. Biochemical defenses in plants
- iv. SiRNA and disease resistance in plants
- v. Differentiate between PTI and ETI

3. Draw well labelled diagrams representing any three of the following:

(3 x 5 = 15)

- i. Flagellin-induced resistance as a model system of PTI
- ii. Structure of Antibody
- iii. Different signaling routes for ROS burst including activity of the NADPH oxidase.
- iv. MAPK cascade in plant defense
- v. Zig-zag model

4. A. Discuss the different pre-existing mechanical defense mechanisms present in plants.

B. Describe the defense response elicited upon Calcium spiking in plant cells. (7.5 + 7.5)

5. A. Elaborate the Salicylic acid, Jasmonic acid, and Ethylene mediated signaling cascades in response to pathogen attack in plants. (10)

B. Discuss the application of CRISPR Cas technology for crop improvement. (5)

6. A. Describe the role of any two transcription factor families in mediating plant defense response. (10)

B. ISR is considered a valuable tool for sustainable agriculture. Justify this statement by providing suitable reasons.

OR

Describe the mechanism of SAR with reference to the key molecules involved in the process. (5)