JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2025

PhD (PMS)

COURSE CODE (CREDITS): 24B1WPH131 (03) MAX. MARKS: 35

COURSE NAME: Nanotechnology in Agriculture

COURSE INSTRUCTORS: Ragini Raj Singh MAX. TIME: 2 Hours

Note: *(a) All questions are compulsory.*

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

Q.No	Question	Marks
Q1	**(a)** Describe the rationale behind using nanoemulsions for the delivery of Mancozeb and Eugenol. What advantages do nanoemulsions offer over conventional formulations in terms of stability, toxicity, and environmental safety?	3
	(b) Explain the significance of the following physicochemical parameters measured and discuss what their values indicate about the stability and suitability of the nanoemulsions for biological application: **(i)** Mean particle size **(ii)** Polydispersity index (PDI) **(iii)** Zeta potential **(iv)** pH	3
Q2	**(a)** Explain the rationale behind using amphiphilic polymers for developing mancozeb nanoformulations.	2
	(b) Describe the method used for encapsulating mancozeb in polymeric nanospheres.	2
	(c) Discuss the advantages of these nanoformulations over conventional mancozeb formulations from both environmental and agronomic perspectives.	3
Q3	**(a)** Describe the mode of action of mancozeb as a fungicide and discuss its environmental concerns.	2
	(b) From a sustainable agriculture perspective, justify the use of biopolymer-based nanoemulsions over conventional pesticide formulations. Include discussion on antifungal activity, plant growth, and environmental fate.	3

Q4	**(a)** Explain why a green chemistry approach is used for formulating nanoemulsions in agriculture.	2
	(b) Discuss the role of nanoemulsions in improving the antifungal efficacy and environmental safety of chemical fungicides, using mancozeb-loaded guar gum NEs as an example.	3
	(c) How can TiO2 nanoparticles be used to enhance the degradation of mancozeb in water? Discuss the mechanism involved.	3
Q5	**(a)** Discuss how overuse of fungicides can impact human health and the environment. Provide examples of acute and chronic effects.	2
	(b) Discuss the concept of precision agriculture in relation to fungicide application and environmental protection.	2
	(d) Evaluate the potential benefits and drawbacks of nanoformulations in fungicide delivery.	2
	(e) Given the increasing resistance of fungi to existing fungicides, propose strategies for developing sustainable fungicide formulations.	3