

Course Code(Credits): 18B1WBT633 (3)

Max. Marks: 35

Course Name: Nano-Biotechnology

Course Instructors:Dr. Abhishek

Max. Time:2:0 Hour

*Note: All questions are compulsory. Marks are indicated against each question in square brackets.*

Q.No	Question	CO	Marks
Q1	Drug delivery involves the administration of a pharmaceutical agent to achieve a desired therapeutic effect whereas nano drug delivery, a specialized area of drug delivery, utilizes nanoparticles to enhance the efficacy, safety, and targeting of drugs.	CO-4	3+2 +2+2
	a. Give a strategies to deliver a hydrophobic drug to target site using nano-carrier b. What are the advantages of using nano-drug delivery system over conventional drug delivery system c. Elaborate the ideal characteristic of nano drug delivery system d. What do you understand by active targeting of drug delivery system and how active targeting differs from passive targeting?		
Q2	Nanoparticles are playing an increasingly important role in diagnostics and detection of environmental pollution, offering improved sensitivity, specificity, and early detection capabilities for various diseases and pollutant.	CO-4 CO-5	4+4+2
	a. Give a strategic plan for the detection of glucose in human urine using nanoparticles b. Nanoparticles are one of the most important candidates to utilize for environmental pollution detection and remediation due to their unique properties. Explain with suitable example c. What do you understand by theranostic nanoparticles, list-out the advantage of theranostic nanoparticles in medical biotechnology		
Q3	Electron microscopes are used for a wide range of applications, primarily to observe the ultra-structure of materials, both biological and non-biological, at very high resolution. They are used in research, industry, and forensic science, providing detailed images of specimens that are beyond the capabilities of optical microscopes.	CO-3	4+1
	a. Illustrate the working principle of Transmission electron microscope with neat and clean diagram b. Also explain the importance of goniometer in TEM microscopy		
Q4	List the four unique properties of nano-materials that make them useful in a variety of industries. Also write down the historical applications of nano-materials.	CO-1	2



Q5	Nanoparticle synthesis is the process of creating materials with dimensions ranging from 1 to 100 nanometers. These materials can be produced using various methods, including chemical, physical, and biological approaches. Which methods you will select for the synthesis of colloidal gold nanoparticles and why? Give a detailed explanation.	CO-2	3
Q6	<p>Fluorescence quenching is the process that inhibits the radiative emission of photons during singlet-singlet electron transitions within a fluorophore.</p> <ol style="list-style-type: none"> <li>How do you differentiate between static and dynamic quenching, Also write down the equation for static and dynamic quenching</li> <li>The intensity of fluorescence is directly proportional to the concentration of the fluorophores in a reasonable concentration range however at high concentration or the fluorophore the proportionality is no more satisfied, Explain Why?</li> <li>Write down the relationship between radiative decay constant, non radiative decay constant and quantum yield.</li> </ol>	CO-3	3+2+1