Name: **Enrolment No:**	

UPES

End Semester Examination, May 2024

Course: Toxicology and Nanobiotechnology — **Semester: IV**

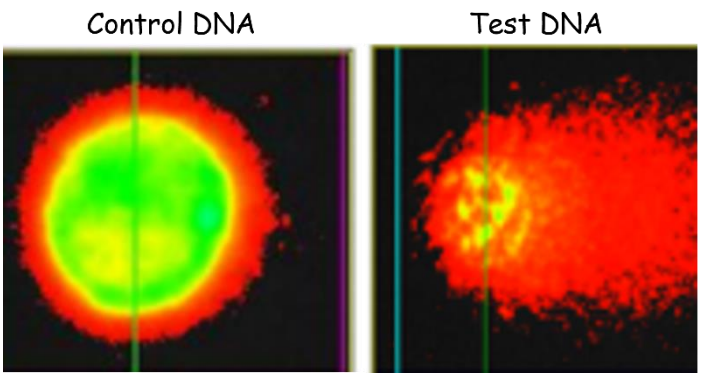
Program: B. Tech Biotechnology — **Duration: 3 Hours**

Course Code: HSTX 2001 — **Max. Marks: 100**

Instructions: Attempt all Questions

S. No.	Section A Short answer questions/ MCQ/T&F (20Qx1.5M= 30 Marks)	Marks	COs
Q 1	Recall the name of Noble prize winner who gave the concept of Nanotechnology.	**1.5**	**CO1**
Q 2	Define nanofibers.	**1.5**	**CO1**
Q 3	Recall the formula of Lambert-Beer law.	**1.5**	**CO1**
Q 4	Recall the different stages of sol-gel method.	**1.5**	**CO1**
Q 5	DLS is used to measure _____ and _____ of nanoparticles.	**1.5**	**CO1**
Q 6	Explain homogenous and heterogenous nucleation.	**1.5**	**CO1**
Q 7	Define polydispersity index (PDI).	**1.5**	**CO1**
Q 8	Enlist different applications of nanobiotechnology.	**1.5**	**CO1**
Q 9	Briefly explain the health and safety issues of nanoparticles	**1.5**	**CO1**
Q 10	Discuss the effect of the capping agent on the size of the nanoparticles.	**1.5**	**CO2**
Q 11	The process that results in the conversion of environmental contaminants into less toxic substances with the help of microbiological processes is called _____ a) Biofortification b) Bioremediation c) Bioleaching d) Microbiology	**1.5**	**CO1**
Q 12	Oil spills have been considered a major threat to the world environment, especially _____ a) Marine ecosystem b) Terrestrial ecosystem c) Land ecosystem d) Vertebrates	**1.5**	**CO4**
Q 13	…….. focuses on the impacts of chemical pollutants in the environment on biological organisms, specifically studying the impacts of chemicals on	**1.5**	**CO1**

	nonhuman organisms such as fish, birds, terrestrial animals, and plants.		
Q 14	Differentiate between "individual and quantal" dose-response.	**1.5**	**CO2**
Q 15	Compare "synergistic and antagonistic" effects.	**1.5**	**CO2**
Q 16	List three characteristics that determine the toxic response of a toxicant.	**1.5**	**CO2**
Q 17	Flavin-dependent monooxygenases (FMO) catalyze only oxygenation reactions. a) True b) False	**1.5**	**CO4**
Q 18	The LD50 is best described as which of the following: a) the dose at which 50 % of all test animals die b) the dose at which 50 % of the animals demonstrate a response to the chemical c) the dose at which all of the test animals die d) the dose at which at least one of the test animals dies	**1.5**	**CO3**
Q 19	Differentiate between risk assessment and risk management	**1.5**	**CO3**
Q 20	What is Biotransformation?	**1.5**	**CO1**
Section B (4Qx5M=20 Marks)			
Q		**5**	**CO**
Q1	Describe the applications of UV visible spectroscopy in the characterization of nanoparticles. Or Describe nucleation and growth theory with labeled diagram	**5**	**CO1**
Q2	Discuss chemical vapor deposition (CVD). Or Explain intelligent-pills.	**5**	**CO1**
Q3	Discuss the functions of following Phase II- xenobiotic metabolizing enzymes, with relevant examples for each: i) Glutathione transferases ii) Sulfotransferases	**5**	**CO3**
Q4	Briefly discuss the significance of intestinal gut flora in facilitating xenobiotic metabolism in humans.	**5**	**CO4**
Section C (2Qx15M=30 Marks)			

Q1	 The diagram depicts a sensitive technique for the detection of DNA damage at the level of the individual eukaryotic cell. Answer the following questions: a) What is the name of the assay? b) Briefly describe the principle of the assay. c) With the help of a well-labeled diagram, outline the steps involved in the assay. d) What is the Ames test used for? e) What are auxotrophic mutants? Explain with relevance to the Ames test. f) Discuss the advantage the Ames test has in the first-tier screening of mutagens when compared to *in-vivo* model systems.	**2+2+4+2+ 3+2**	**CO4**
Q2	a) Classify nanoparticles based on the method of synthesis. b) Differentiate among chemical, physical, and biological methods of synthesis of nanoparticles with suitable examples. c) Why scientists are always looking for new methods of synthesis of nanoparticles. Explain the synthesis of nanoparticles through Homogenous and Heterogenous nucleation	**4+7+4**	**CO1**
Section D (2Qx10M=20 Marks)			
Q			
Q1	a) Define nanostructures. b) Discuss various kinds of nanostructures (0D, 1D, 2D, and 3D) with a suitable example of each category.	**2+8**	**CO2**
Q2	a) Compare "Genotoxic and Nongenotoxic" carcinogens, with relevant examples for each. b) Discuss the stepwise mechanisms that lead to the manifestation of toxicity in an exposed organism. Support the discussion with relevant examples.	**4+6**	**CO4**