LOYOLA COLLEGE (AUTONOMOUS) CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **PLANT BIOLOGY AND PLANT BIOTECHNOLOGY**

FIFTH SEMESTER – **NOVEMBER 2024**

UPB 5602 – NANOTECHNOLOGY

Date: 21-11-2024 Dept. No. Max. : 100 Marks

Time: 09:00 am-12:00 pm

	SECTION A - K1 (CO1)
	Answer ALL the Questions **(10 x 1 = 10)**
1.	**Fill in the blanks**
a)	Nanomaterials are the materials with at least one dimension measuring less than _____.
b)	AFM stands for _____ .
c)	The size of quantum dots is between _____.
d)	_____ are used in nanomedicine to remove plaque from the walls of arteries.
e)	The short DNA strands used in DNA origami to hold large DNA structure in place is called _____.
2.	**State whether the following statements are TRUE or FALSE**
a)	Nanoparticles are one dimensional nanomaterials.
b)	The monochromator in spectrophotometer is used to obtain a parallel beam of light.
c)	Nanoclusters are monodispersed particles that are less than 10 nm in diameter.
d)	Nanorods are used in cancer therapy.
e)	Nanosilica coated high oxygen barrier films are used as nanocoatings.
	SECTION A - K2 (CO1)
	Answer ALL the Questions **(10 x 1 = 10)**
3.	**Choose the correct answer**
a)	Which of the following is NOT a characteristic of nanomaterials? i) High surface area to volume ratio ii) Reduced reactivity due to larger particle size iii) Increased strength and hardness compared to bulk materials iv) Unique optical, electrical, and magnetic properties
b)	Find out a method used for characterizing the size, shape and concentration of nanoparticles. i) Spectroscopy ii) Neutron scattering iii) Scanning probe microscopy iv) X-ray diffraction
c)	What is the full form of HiPCO method used for CNT production? i) High – Potential Carbon Nanotube ii) High – Pressure Carbon Monoxide iii) High – Potential Carbon Monoxide iv) High – Pressure Carbon Nanotube
d)	Nanomaterials can confer cytotoxicity by:

	i) Generating free radicals ii) Disrupting membrane potential iii) Promoting apoptosis iv) all of the above
e)	Which of the following is a potential environmental application of nanotechnology? i) Carbon emissions ii) Oil spill clean-up iii) Deforestation iv) Plastic production
4.	**Answer the following, each in about 50 words**
a)	Define the top down approach in nanoparticle synthesis.
b)	State the Beer – Lambert's law.
c)	Outline the nature of Quantum dots.
d)	Define nanomedicine.
e)	Comment on biotemplates.
	SECTION B - K3 (CO2)
	Answer any TWO of the following in 500 words **(2 x 10 = 20)** **Draw diagrams / flowcharts wherever necessary**
5.	Construct the important milestones in the history of nanotechnology.
6.	Identify the characteristics and applications of nanoclusters.
7.	Inspect the role of nanotechnology in wound healing.
8.	Organize the role and the applications of nanoparticles in paint industry.
	SECTION C – K4 (CO3)
	Answer any TWO of the following in 500 words **(2 x 10 = 20)** **Draw diagrams / flowcharts wherever necessary**
9.	Explain the principle of surface plasmon resonance on the behaviour of nanoparticles.
10.	Examine at length the property of photoluminescence.
11.	Analyze the history, structure, properties and applications of graphene.
12.	Highlight the use of nanoparticles in antimicrobial activity and its different modes of action.
	SECTION D – K5 (CO4)
	Answer any ONE of the following in 1000 words **(1 x 20 = 20)** **Draw diagrams / flowcharts wherever necessary**
13.	.Explain the working principle of UV- Visible spectroscopy with a note on PMT.
14.	Evaluate in detail on the nano carriers in drug delivery.
	SECTION E – K6 (CO5)
	Answer any ONE of the following in 1000 words **(1 x 20 = 20)** **Draw diagrams / flowcharts wherever necessary**
15.	Discuss the salient features and applications of Scanning Electron Microscope and Transmission Electron Microscope.
16.	Elaborate on the applications of nanotechnology in the food industry, using suitable examples.

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