LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.Sc. DEGREE EXAMINATION – **BIOTECHNOLOGY**

THIRD SEMESTER – **NOVEMBER 2022**

PBT 3601 – NANOTECHNOLOGY

Date: 02-12-2022 Dept. No. Max. : 100 Marks

Time: 09:00 AM - 12:00 NOON

	PART A	
	Answer ALL the questions	
I	**Choose the correct answer**	**(5 x 1 = 5)**
	Electronegativity is defined as the power of an atom in a molecule to _____ a) Repel electrons towards itself b) Attract electrons towards itself c) Expand itself d) All of the mentioned	
2	The following technology is used in making memory chips a) Nano design b) Nanofabrication C) Micro array d) Tissue engineering	
3	The X-ray diffraction is based upon a) Illkovic equation b) Bragg's equation c) Boltzmann equation d) Van deemter equation	
4	During Differential thermal analysis what kind of reference material is used? a) Chemically active b) Physically active c) Inert d) Having catalytic property	
5	The transduction methods used in biochips are _____. a) surface plasmon resonance b) cheminluminescence c) fluorescence d) all the above	
II	**State whether the following are true or false.**	**(5 x 1 = 5)**
6	The nucleus will be integral spin when protons or neutrons are even.	
7	Compounds that lower the surface tension of a liquid are called as wetting agent.	
8	Sample recovery is possible after spectroscopic analysis because the sample is not chemically affected.	
9	The elastic scattering of photons is called as atmospheric scattering	
10	DNA chip technology is used to produce biochips	
III	**Complete the following**	**(5 x 1 = 5)**
11	A semiconductor whose excitons are confined in all three spatial dimensions is called as _____	
12	Nucleic acid ligands that bind with high affinity to their target molecules and used in the detection of protein analytes are called as _____	
13	Raman effect is scattering of _____	
14	The cathode of electron microscopy consist of _____	
15	The term _____ network was traditionally used to refer to a network or circuit of biological neurons.	

IV	**Answer the following within 50 words**	**(5 x 1 = 5)**
16	Indicate 0D,1D,2D and 3D nanomaterials.	
17	Briefly explain what is Sol-Gel method.	
18	Write short note on magnetic hard devices	
19	Define green packaging	
20	Describe the advantages of nano sensing.	

PART B

Answer the following each within 500 words. (5 x 8 = 40 Marks)
Draw diagrams wherever necessary

21	a) Write down the optical properties on metal and nonmetals with an example OR b) Write a note on the applications of Ag and Au nanoparticles.
22	a) Write a detailed note on theragnostics and its application OR b) What are biosensors, describe its types?
23	a) Explain Scherrer powder method in nanoparticle size analysis with a suitable XRD diagram OR b) Explain how differential scanning calorimetry is used to determine thermal decomposition of polymer
24	a) Explain the principle and working of UV-VIS double beam spectrophotometer with a neat optical layout OR b) Differentiate between scanning probe microscopy and scanning tunnelling electron microscopy.
25	a) Write the applications of nanomaterials as antimicrobial coatings OR b) Discuss the manufacture of polycrystalline and nano crystalline silicon solar cells.

PART C

Answer any TWO of the following, each within 1500 words. (2 x 20 = 40 Marks)
Draw diagrams wherever necessary.

26	Discuss the effect of temperature on conductivity of semiconductor and explain various methods to determine the electrical conductivity
27	a) Toxicity and environmental risks of Nanomaterials justify. b) Describe nanotechnology application in food science.
28	How do you study the Raman effects? Give the experimental techniques and CARS application
29	What is TEM? How do you characterize the material with TEM

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