



VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN  
[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]  
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

**Question Paper Code: 3002**

**B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – March/ April 2023**

First Semester

Biotechnology

**U19PH102 – PHYSICS FOR BIOTECHNOLOGY**

(Regulation 2019)

Time : Three Hours

Maximum : 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

**PART – A**

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	What are the conditions for interference?	2	K2	CO1
2.	Distinguish between single mode fiber and multimode fiber.	2	K1	CO1
3.	How electromagnetic wave will propagate in a medium?	2	K1	CO2
4.	Differentiate between polarised light and unpolarised light.	2	K2	CO2
5.	Draw (111) plane for a cubic lattice.	2	K6	CO3
6.	Find out atomic radius for BCC cell if the lattice constant is 'a'.	2	K5	CO3
7.	What are properties of nanomaterials?	2	K1	CO4
8.	Mention some applications of nanomaterials.	2	K1	CO4
9.	What information are obtained from Raman Spectroscopy?	2	K2	CO5
10.	What is the principle of thermo gravimetric analysis?	2	K1	CO5

**PART – B**

(5 x 16 = 80 Marks)

Q.No.	Questions	Marks	KL	CO
11. a)	i. Describe the design and working principles of Michelson Interferometer	12	K2	CO1
	ii. A light source of wavelength of 589 nm is used in a Michelson Interferometer. If the movable mirror is moved through 0.0589 mm, find out the number fringes cross the field of view.	4	K3	CO1

		(OR)			
	b)	i. Describe the design and working principles of Displacement and temperature fiber optic sensors.	12	K6	CO1
		ii. A light propagates through an optical fiber having core and cladding refractive indices of 1.563 and 1.498, respectively. Find out the numerical aperture, critical angle and acceptance angle of the fiber.	4	K3	CO1
12.	a)	i. Draw a Fraunhofer diffraction pattern due to single slit and obtain relations for maxima and minima intensities.	10	K4	CO2
		ii. A monochromatic light of wavelength 690 nm is incident on a grating having a slit width of 0.022 mm. Find out the angle at which the first diffraction minimum would be observed.	6	K3	CO2
		(OR)			
	b)	i. How do you produce and analyze plane, circularly and elliptically polarized lights experimentally? Explain with diagram.	12	K4	CO2
		ii. Un polarized light makes oblique incident on the surface of the water (refractive index 1.3) and undergoes polarization. Find out the angle between the surface of water and incident light.	4	K5	CO2
13.	a)	i. What are Bravais space lattice? Explain with diagram.	10	K1	CO3
		ii. Copper has a FCC structure and the atomic radius of 0.1278 nm. Calculate the inter-planar spacing for (111) planes.	6	K2	CO3
		(OR)			
	b)	i. What is crystal defect? Explain point defect and line defect with neat diagram.	10	K2	CO3
		ii. Draw burger Vector.	6	K2	CO3
14.	a)	i. What is nanomaterial?	2	K2	CO4
		ii. Explain any two methods for preparation of nanomaterials in detail.	14	K1	CO4
		(OR)			
	b)	i. What is carbon nanotube? Draw different structures & mention its properties.	8	K2	CO4
		ii. Explain the synthesis of carbon nanotube by laser ablation method.	8	K2	CO4
15.	a)	i. What is x- ray diffraction and its principles?	6	K2	CO5
		ii. How do you analyze elements present in the sample using X-ray diffraction?	10	K4	CO5
		(OR)			
	b)	i. Explain the principle, construction and working of Scanning Electron Microscopy (SEM)	10	K2	CO5
		ii. Differentiate between Scanning Electron Microscope (SEM) & Transmission Electron Microscope (TEM).	6	K3	CO5