0611E1056

Candidate's Seat No : _____

B.Sc. Sem.-5 Examination

SE - 305

Physics (A) - Nano Sci.

Time : 2-30 Hours] November-2025 [Max. Marks : 70

Instructions: **1.** Attempt all Questions. **2.** Symbols have usual scientific meanings.

Q. 1 (a) What are excitons? Explain how the two different types of excitons can result in nano crystalline materials? (7)

OR

(a) Describe the effect of reducing the size from the bulk to nano dimensions on the electric properties of material. (7)

(b) Give the limitations of Mie theory of scattering. Explian the Drude model for free electron gas and discuss the phenomenon of surface plasmaon resonance (SPR). (7)

OR

(b) Describe the effect of reducing the size from bulk to nano with examples. (7)

Q. 2 (a) Describe method high energy ball milling method to synthesize of nano materials. (7)

OR

(a) Explain in detail about the structure of carbon nano tubes (CNT's). (7)

(b) Explain in detail: Chemical Vapour Deposition (CVD) Method. (7)

OR

(b) Explain in brief about electric arc deposition method. (7)

Q. 3 (a) Write the key difference between SEM and TEM? How do you characterize a material with SEM? (7)

OR

(a) Describe Transmission electron microscope (TEM). (7)

(b) Discuss Applications of nano technology in space and defense. (7)

OR

(b) Describe in detail about X-ray diffraction experiment. (7)

Q 4 (a) Write a note on ferromagnetic material. (7)

OR

(a) Write a short note on C_{60} fullerenes. (7)

(b) Write a detail note on photo luminescence. (7)

OR

(b) List the applications of nanotechnology in the field of electronics and medicines in detail. (7)

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Q 5 Answer in short (Any seven). Each carries two marks. (14)

(1) What do you mean by plastic deformation?
(2) What is the use of spin value?
(3) What is the usual dimensions of CdS nano particles?
(4) What do you mean by stearic repulsion in colloidal solution?
(5) Write one advantage of RF sputtering over DC sputtering.
(6) Define sputtering.
(7) Write full form of SAXS.
(8) Write Bragg's law for x-ray diffraction.
(9) What is magnetoelectronics?
(10) What is Coulomb blockade?
(11) What is the blue shift in nano materials?
(12) How will you determine the shape a synthesized nanoparticles?

0611E1056 -3 Candidate's Seat No : _____

B.Sc. Sem.-5 Examination

SE - 305

Physics (C) - OOCP

Time : 2-30 Hours] November-2025 [Max. Marks : 70

Instructions: (1) Figures to the right indicate marks of the questions.
(2) Symbols have their usual meanings.

Q1 (a)	Write the advantages of Object Oriented Programming C++.	(7)
	OR	
Q1 (a)	Write the basic concepts of Object Oriented Programming C++.	(7)
Q1 (b)	Write a program to convert and display temperature in Fahrenheit to Celsius.	(7)
	OR	
Q1 (b)	What is Object Oriented Programming? Write the applications of C++ in different areas.	(7)
Q2 (a)	Explain the Primitive Data types of C++.	(7)
	OR	
Q2 (a)	(a) Write a note on function overloading.	(7)
Q2 (b)	Write a C++ program to add amount data in rupees and paise format.	(7)
	OR	
Q2 (b)	Write a C++ program to calculate sum of first 25 natural numbers.	(7)
Q3 (a)	Explain Exception Handling with keywords 'throw', 'catch' and 'try'.	(7)
	OR	
Q3 (a)	Write a program to add distance data in meters and centimeters format.	(7)
Q3 (b)	Write a detailed note on Deconstructors.	(7)
	OR	
Q3 (b)	Write a note on Multiple Constructors in a Class.	(7)
Q4 (a)	Explain the private number function with suitable example.	(7)
	OR	
Q4 (a)	Explain the different operators in C++.	(7)
Q4 (b)	Explain the open() function with its different modes.	(7)
	OR	
Q4 (b)	Explain public member function with suitable example.	(7)
Q.5	Answer in short (Any Seven)	14

(i) Which data type is used for real value in C++?
(ii) What is the default extension of a C++ program?
(iii) How do you declare constants in C++?
(iv) Which function is a must in every C++ program?
(v) State the difference between Pre and Post Decrement.
(vi) Which operators are not overloaded?
(vii) What is the default constructor in C++?
(viii) What is a friend function in C++?
(ix) Which character is used for directivity?
(x) Which header file is used for standard input output?
(xi) Which identifier is used for character value?
(xii) What is an Inline function?

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