

B.Sc. Sem.-5 Examination**SE-305(A)****Physics****Time : 2-30 Hours]****April-2025****[Max. Marks : 70****Q: 1**

(a). Describe the effect of reducing the size from bulk to nano with examples. (07)

OR

(a). Discuss in brief about Excitons. (07)

(07)

(b). What are nano materials? Give the classification of nano materials and describe how the quantum confinement results a blue shift on band gap in nano materials. (07)

OR

(b). Write a note on Ferromagnetic materials.

(07)**Q: 2**

(a). Write a note on the synthesis of nano particles by Physical Vapour Deposition method.

(07)**OR**

(a). Describe High Energy Ball Milling method to synthesis nano materials.

(07)

(b). Discuss Colloids and Colloids in solutions. Also discuss synthesis of Colloids. (07)

OR

(b). What are Sol and Gels? Describe Sol-gel method for the synthesis of nano materials.

(07)**Q: 3**

(a). Describe the construction and working of Scanning Electron Microscope (SEM). (07)

OR

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

(07)

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(b). Discuss the applications of nanotechnology in space and defense. (07)

OR

(b). Discuss the applications of nanotechnology in domestic appliances. (07)

Q: 4

(a). Write a note on Photoluminescence. (07)

OR

(a). Write a note on the synthesis of nano particles by Chemical Vapour Deposition (CVD). (07)

(b). Describe about the structure of Carbon Nano tubes. (07)

OR

(b). Discuss the applications of nanotechnology in cosmetics. (07)

Q: 5 Attempt any seven (7) from the following(each question carry 2 marks): (14)

1. What do you mean by plastic deformation?
2. Define Cathode Luminescence.
3. What do you mean by a technique called EDAX?
4. What are diamagnetic materials?
5. Full form of MOCVD is
- (A) Mineral Chemical Vapor Deposition (B) Metallo Organic Chemical Vapor Deposition
- (C) Melted Chemical Vapor Deposition (D) Mineral Organic Chemical Vapor Deposition
6. Fullerenes with atom molecule is the most stable.
- (A) 60 (B) 70 (C) 78 (D) 55
7. State types of mills used in High energy ball milling method.
8. Define Colloids.
9. State types of electron microscope.
10. Define field emission.
11. Give one disadvantage of SEM.
12. What is the advantage of using electron in microscopy?

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Candidate's Seat No : _____

B.Sc. Sem.-5 Examination

SE-305(B)

Physics

April-2025

Time : 2-30 Hours]

[Max. Marks : 70

Instructions: (1) Figures to the right indicate marks of the questions.

(2) Symbols have their usual meanings.

Q.1 (a) What is Object Oriented Programming? Write the applications of C++ in different areas. (7)

OR

(a) Write the basic concepts of Object Oriented Programming C++. (7)

(b) Explain the Primitive Data types of C++. (7)

OR

(b) Write a program to evaluate the following series (7)

$$\cos(x) = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!} + \dots$$

Q.2 (a) Write a note on function overloading. (7)

OR

(a) Write a note on Multiple Constructors in a Class (7)

(b) Write a C++ program to add amount data in feet and inch format. (7)

OR

(b) Write a C++ program to calculate sum of first 25 natural numbers. (7)

Q.3 (a) Explain Exception Handling with keywords 'throw', 'catch' and 'try'. (7)

OR

- (a) Write a note on importance of Deconstructors. (7)
 (b) Explain public member function with suitable example. (7)

OR

- (b) Write a program for function overloading for function volume() of cube and cylinder. (7)

Q.4 (a) Explain the open() function with its different modes. (7)

OR

- (a) Write a program for arithmetic operator (+) overloading to add time in Hours and Minutes. (7)

- (b) Write a C++ program to display string in triangle 'PROGRAM'. (7)

OR

- (b) Explain the different operators in C++. (7)

Q.5 Answer in short (Any Seven) (14)

- (i) What is the default extension of a C++ program?
- (ii) Which identifier is used for character value in C++?
- (iii) Which character is used to represent single line remark statement in C++?
- (iv) Which function is a must in every C++ program?
- (v) Which operator is called scope resolution operator?
- (vi) Which data type is used for real value in C++?
- (vii) What is the default destructor 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 function is used to repeat a process in C++?
- (xii) Which operators are not overloaded?