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Reg. No. : .....

Name : .....

Ph.D. ENTRANCE EXAMINATION 2023

FACULTY OF APPLIED SCIENCES AND TECHNOLOGY

NANO SCIENCE AND NANO TECHNOLOGY

Time : 3 Hours Max. Marks : 100

Instructions **:**

1) *Answer **any ten** questions each from* Section ***A*** *and* ***B.***
2) *Each question carries **5** marks.*
3) *No additional Answer sheets will be provided.*
4) *Candidates should clearly indicate the section, Question number in the answer booklet.*

Section – A

Research Methodology

Answer any **ten** questions. Each question carries **5** marks.

1. How to formulate the objectives for a particular area of research?

2. What is the difference between conceptual and empirical research?

3. What are the methods to select a particular problem for research?

4. Narrate the importance of review of literature in defining a problem.

5. Give the importance of digital media for identifying a problem for research.

6. How do you formulate a good design for research?

7. Write a note on the importance of models for research.

8. What are the important sampling methods?

9. Give the data processing and analysis strategies citing one example.

10. Write a note on hypothesis and its testing methods.

11. Give a note on plagiarism. What are the methods to get rid off plagiarism?

12. Write a note on intellectual property rights.

13. What are the important facts to be noted when citing a reference in the thesis?

14. Explain different types of errors that can happen while completing an experiment.

15. Discuss the importance of software packages for curve fitting.

($10 \times 5 = 50$ Marks)

Section – B

Nano Science and Nano Technology

Answer any **ten** questions. Each question carries **5** marks.

1. What is the physical significance of wave function?

2. Differentiate group velocity and phase velocity.

3. Obtain the solution of schrodinger equation for a free particle in one dimension.

4. Write a note on different types of operators.

5. State uncertainly principle setting two examples.

6. Write a note on linear harmonic oscillator.

7. Enumerate applications of superconductors.

8. State and prove Bloch theorem.

9. Write a note on any two characterization techniques in the field of nano science.

10. What is the importance of nano biology research in the field of medical science?

11. What are photonic crystals?

12. Differentiate quantum dots and quantum wires.

13. Briefly explain nanolithography.

14. Briefly explain any one synthesis method of carbon nano tubes.

15. What are the applications of nano composites in the field of optoelectronics?

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(10 × 5 = 50 Marks)