Register No.: …… Name: ……..

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

SECOND SEMESTER M.TECH DEGREE EXAMINATION (Regular), JULY 2022

(2021 Scheme)

Course Code: **21MD204-E**

Course Name: **Experimental and Characterization Techniques for Nanotechnology**

Max. Marks: **60** **Duration: 3 Hours**

PART A

(Answer all questions. Each question carries 3 marks)

1. With neat sketches, classify nanostructures based on dimensionality.
2. Explain error analysis.
3. List out the various applications of nanofluids.
4. Explain the working principle of XPS.
5. Compare STM and SPM.
6. Write down Scherrer's equation for particle size determination.
7. Explain the role of neutron scattering in experimental nanoscience.
8. Discuss the term Photoluminescence.

PART B

(Answer one full question from each module, each question carries 6 marks)

MODULE I

9. Discuss the energy related application areas of nanotechnology. (6)

OR

10. Enumerate the applications of linear model analysis in nanotechnology. (6)

MODULE II

11. Explain the concept of Design of Experiments. Differentiate between full and partial factorial designs. (6)

OR

12. Explain the different techniques employed for the measurement of temperature? (6)

MODULE III

13. Explain any two methods for synthesis of nanofluids. (6)

OR

14. Describe how thermal conductivity of nanofluids are measured. (6)

MODULE IV

15. Explain the working principle of Raman spectroscopy. (6)

OR

16. Explain the principle of Dynamic light scattering. Explain how this technique is employed to determine the sizes of particles. (6)

MODULE V

17. With neatly labelled diagram, explain the working of Scanning Electron Microscope. (6)

OR

18. With neatly labelled diagram, explain the working of Atomic Force Microscope. (6)

MODULE VI

19. Compare XAFS and EXAFS. (6)

OR

20. With the help of necessary diagram, explain the working of an ESCA instrument. (6)

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