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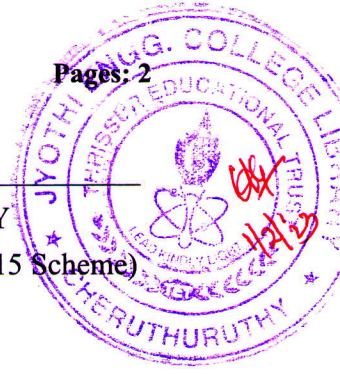
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Reg No.: \_\_\_\_\_

Name: \_\_\_\_\_

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**  
Seventh Semester B.Tech Degree (S, FE) Examination January 2023 (2015 Scheme)



**Course Code: MR403**

**Course Name: Nanotechnology**

Max. Marks: 100

Duration: 3 Hours

**PART A**

*Answer all questions, each carries 5 marks.*

Marks

- 1 Illustrate the concept of top down approach in nanotechnology with an example? (5)
- 2 Discuss how Gold nanoparticles are synthesized by colloidal method. What are their properties? (5)
- 3 "Transmission Beam Microscopy permits smooth penetration of electron beam through the specimen". Validate the given statement with various steps involved in specimen preparation of TEM. (5)
- 4 Discuss the need for self assembly process in nano fabrication. Explain how layer by layer assembly is carried out? (5)
- 5 What are various risk factors to be considered while handling nanomaterial? (5)
- 6 With necessary figure explain the impact of photoresists when they are coated on the surface of the substrate. (5)
- 7 Write short note on MEMS? (5)
- 8 How are Nano sensors made? Explain types of Nano sensors. (5)

**PART B**

*Answer any three full questions, each carries 10 marks.*

- 9 a) Explain various properties that differ when a material is reduced from bulk to Nano scale. (7)  
b) Why does this property variation occur? (3)
- 10 With neat sketch explain Sol-Gel Process in detail. (10)
- 11 a) Discuss about several methods that are being used for fabrication of Carbon Nano Tube (CNT). How CNTs are classified? (10)

- 12 a) "Thermal conductivity of Nano fluids increases when Nano sized solids are dispersed in it". Justify the statement. (5)
- b) How two step preparation method of Nano fluids differ from that of single step method? (5)
- 13 a) Explain 0D, 1D, 2D, 3D nanomaterial with examples. Plot the variation density graph for each structure. (5)
- b) Explain biological synthesis of nanoparticles. (5)

**PART C**

*Answer any two full questions, each carries 15 marks.*

- 14 a) What are various potential human hazards that can be caused due to exposure to nanoparticles? How can we prevent such hazards? (15)
- 15 a) Explain about micro and Nano fabrication techniques. (15)
- 16 a) What are Dendrimers? Explain with suitable classifications. Write some of its applications. (15)
- 17 a) Discuss in detail about any three areas where Nanotechnology found its application. (15)

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