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**GANDHI INSTITUTE OF ENGINEERING AND TECHNOLOGY UNIVERSITY, ODISHA, GUNUPUR
(GIET UNIVERSITY)**



Ph.D. (First Semester) Examinations, December – 2024
SPPEEEEC1011 – Nano Materials and Nano Technology
(ECE)

Time: 3 hrs

Maximum: 70 Marks

The figures in the right hand margin indicate marks.

Answer ANY FIVE Questions

(14 x 5 = 70 Marks)

	Marks
1. Explain the difference between bulk material and nanomaterials. Discuss the reason behind interesting properties.	6+8
2. Explain in detail any four material characterization techniques for nanomaterials.	14
3. Explain the method to synthesize gold nanoparticle. Discuss its size dependent properties from nanoscale to microscale.	6+8
4. Explain the lithography process in detail. Discuss different types of photoresist used for MEMS fabrication.	14
5. Explain the fabrication steps for development of n-MOS capacitor.	14
6. What is the process of synthesising carbon nanotube? Explain different types and properties of carbon nanotube.	14
7. Describe the role of nanoscale devices and quantum dots in the development of quantum computers and their potential impact on cryptography and computational science?	14
8.a. Explain the metal-semiconductor (p-type) junction band structure, with application of different (0V, +ve, -ve) voltage bias.	7
b. Explain the density functional theory modelling approach for two-dimensional system.	7

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