Reg. No.											

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

SEVENTH SEMESTER BTECH. (E & C) DEGREE END SEMESTER EXAMINATION
DECEMBER 2021-JANUARY 2022
SUBJECT: Nanotechnology (ECE - 4079)

TIME: 75 minutes **MAX. MARKS: 20**

Instructions to candidates

- Answer **ALL** questions.
- Missing data may be suitably assumed.

Q. No.	Questions	M*
1A.	Calculate total energy, binding energy of exciton in the first orbital, placed in GaAs and CdSe matrix separately. Given that, Rydberg's constant is 13.6 eV, effective mass of the exciton is 0.058 m_o and ε = 12.4 in GaAs and 0.1 m_o and ε = 9.4 in CdSe matrix. Comment on the result.	5
1B.	Describe a methodology to form periodic nanostructures on a given substrate and characterisation of the same.	3
1C.	Differentiate, through band diagram, single layer and double layer graphene.	2
2A.	Distinguish between the principles of SEM and TEM. What are applications of these techniques?	3
2B.	Describe different scanning probe techniques to characterise the nanostructures surfaces for their electronic and morphological properties. How they differ in their principles.	3
2C.	Describe,with the aid of band diagrams, how the density of states can be estimated for a given nanostructure? Indicate the experimental technique that can used for the purpose.	4