


Name:			
Enrolment No:			
UPES End Semester Examination, December 2023			
Course: Nanomaterials Processing Program: BTech AMNT Course Code: MEMA 3006		Semester: V Time : 03 hrs. Max. Marks: 100	
Instructions:			
i) Write your enrolment number on the top left of the question paper. ii) Do not write anything else on the question paper except your enrolment number. iii) Attempt all part of a question at one place only. iv) Internal choice is given for question number 6 of Section B and question number 11 of Section C.			
SECTION A (5Qx4M=20Marks)			
S. No.		Marks	CO
Q 1	Mention any four examples of anisotropic nanomaterials. Defend your examples.	4	CO3
Q 2	Fill in the blank and defend your answer: “The λ_{max} of Au nanoparticle observes _____ shift when the particle size decreases.”	4	CO2
Q 3	Describe Electrodeposition technique for nanoparticle synthesis, and mention the important parameters involved.	4	CO2
Q 4	How will you categorize nanoparticles based on their state?	4	CO1
Q 5	What are the steps involved in hydrothermal method for nanoparticle synthesis?	4	CO2
SECTION B (4Qx10M= 40 Marks)			
Q 6	Explain the different chemical methods for synthesis of nanoparticles. For any one type, include a chemical reaction. <p style="text-align: center;">Or</p> How can you use biological methods for nanoparticle synthesis? Use an appropriate example to defend your answer.	10	CO2

Q7	Define the following (include examples): i) Nanocomposites ii) Core-shell nanomaterials iii) Ceramic nanomaterials iv) Organic nanomaterials	4 × 2.5	CO1
Q 8	Differentiate between graphene, reduced-graphene oxide, and graphene oxide.	10	CO1
Q 9	How will you ensure growth of nanowire and not nanosphere in case of Au nanoparticles?	10	CO3
SECTION-C (2Qx20M=40 Marks)			
Q 10	What are hybrid nanostructures, and give examples of the following hybrid nanostructures and include a suitable schematic representing them: i) 0D in 1D ii) 0D on 1D iii) 1D on 1D (radial) iv) 1D on 1D (axial) v) 1D on 1D (branched) vi) 0D on 2D vii) 1D on 2D viii) 2D on 2D	20	CO3
Q 11	i) Differentiate between contact, proximate, and projection printing. ii) Recall the steps involved in fabricating a MOSFET. Or i) Explain the phenomenon observed in a Jablonski diagram. ii) How do light emission properties of a metal differ from a semiconductor?	10 + 10	CO2