



RV Educational Institutions<sup>®</sup>  
RV College of Engineering<sup>®</sup>

Autonomous  
Institution Affiliated  
to Visvesvaraya  
Technological  
University, Belagavi

Approved by AICTE,  
New Delhi

*Go, change the world*

Academic year 2023-2024 (Odd Sem)

**(OFFLINE CIE-I FOR I SEM PHYSICS CYCLE)**

### DEPARTMENT OF CHEMISTRY

Date	22 <sup>nd</sup> November 2023	Max. Marks	50
Course	<b>Fundamentals of Nanoscience and Technology</b>	Course Code	CHY114AT
Sem - I	CIE-I	Duration	90 Min
<b>EMERGING TECHNOLOGY</b>			

Instructions- Answer all FIVE questions

Test Questions		M	BTL	CO
1	Enumerate and provide concise explanations for the historical progression and advancements in the field of nanomaterials research.	10	1	1
2	How did ancient Indians employ nanoscale materials and processes in Ayurveda and metallurgy, showcasing their innovative methods within traditional practices? Give pertinent instances to illustrate their creative approach.	10	3	2
3	With neat schematic diagram, explain the essential components and working principle of molecular beam epitaxy (MBE). State the advantages and disadvantages of this process.	10	2	4
4	Sputtering is a versatile technique for nanomaterial fabrication. Discuss the DC sputtering process with schematic diagram. How it is employed in the top-down approach to create thin films and nanostructures. What are its applications?	10	2	3
5	Explain the principles and mechanisms of physical vapor deposition (PVD) as a top-down approach for nanomaterial synthesis. Discuss its advantages and limitations.	10	4	2

BT-Blooms Taxonomy, CO-Course Outcomes, M-Marks

Marks Distribution	Particulars	CO1	CO2	CO3	CO4	L1	L2	L3	L4	L5	L6
	Max Marks	10	20	10	10	7	29	7	0	7	
	Target	10	16	17	7						

\*\*\*\*\*



RV Educational Institutions \*  
RV College of Engineering \*

Autonomous  
Institution Affiliated  
to Visvesvaraya  
Technological  
University, Belagavi

Approved by AICTE,  
New Delhi

*Go, change the world*

Academic year 2023-2024 (Odd Sem)

**(OFFLINE CIE-II FOR I SEM PHYSICS CYCLE)**

### DEPARTMENT OF CHEMISTRY

Date	29 <sup>th</sup> December 2023	Max. Marks	50
Course	<b>Fundamentals of Nanoscience and Technology</b>	Course Code	CHY114AT
Sem - I	CIE-II	Duration	90 Min
<b>EMERGING TECHNOLOGY</b>			

Instructions- Answer all FIVE questions

Test Questions		M	BTL	CO
1	Outline the key steps involved in synthesizing nanoparticles using chemical vapor deposition (CVD). Illustrate the process with a neat schematic diagram and discuss the advantages and limitations of this method.	10	1	1
2	Briefly explain the principle and instrumentation behind UV-Vis absorption spectroscopy. Explain how UV-Vis spectra can be used to determine the size, shape, and composition of nanoparticles. Discuss the applications and limitations of UV-Vis absorption spectroscopy.	10	3	2
3	Describe the working principle of Scanning Electron Microscopy (SEM) and explain how it provides information about the surface morphology and elemental composition of nanomaterials. Draw a neat schematic diagram of SEM.	10	2	4
4	Explain the relationship between particle size and surface area in nanomaterials and discuss its influence on reactivity of nanomaterials compared to bulk materials. Discuss the relationship between surface plasmon resonance (SPR) and the size and shape of metallic nanoparticles with specific examples.	10	2	3
5	Briefly elaborate the potential applications of nano dimensional materials in agricultural industries and as micronutrients.	10	4	2

BT-Blooms Taxonomy, CO-Course Outcomes, M-Marks

Marks Distribution	Particulars	CO1	CO2	CO3	CO4	L1	L2	L3	L4	L5	L6
	Max Marks	10	20	10	10	7	29	7	0	7	
	Target	10	16	17	7						

\*\*\*\*\*





RV Educational Institutions \*  
RV College of Engineering \*

Autonomous  
Institution Affiliated  
to Vellore Institute  
of Technology  
University, Belagavi

Approved by AICTE,  
New Delhi

*Go, change the world*

Academic year 2023-2024 (Odd Sem)

(OFFLINE CIE-II FOR I SEM PHYSICS CYCLE)

### DEPARTMENT OF CHEMISTRY

Date	24 <sup>th</sup> January 2024	Max. Marks	50
Course	Fundamentals of Nanoscience and Technology	Course Code	CHY114AT
Sem - I	CIE-III	Duration	90 Min
EMERGING TECHNOLOGY			

Instructions- Answer all FIVE questions

Test Questions		M	BTL	CO
1	Elaborate on the principles and mechanisms involved in Chemical Vapor Deposition (CVD) for the synthesis of nanomaterials. How does it differ from the precipitation method and electrochemical method in terms of fabrication processes and applications? Illustrate the CVD process with a neat schematic diagram.	10	1	1
2	Explain the principles behind Physical Vapor Deposition (PVD) and Molecular Beam Epitaxy (MBE) techniques in the fabrication of nanomaterials. Compare and contrast these two methods, highlighting their applications in the field of nanotechnology.	10	3	2
3	Explain the mechanism of target material ejection in DC and RF sputtering with neat sketches.	10	2	4
4	Discuss the unique properties of nanomaterials that make them suitable for applications in display technology and light weighting components for automobiles. Provide examples and elaborate on the advantages they offer over conventional materials.	10	2	3
5	Explain the role of nanomaterials in energy production and storage. Discuss specific examples of nanomaterials used in batteries, solar cells, and other energy-related applications.	10	4	2

BT-Blooms Taxonomy, CO-Course Outcomes, M-Marks

Marks Distribution	Particulars	CO1	CO2	CO3	CO4	L1	L2	L3	L4	L5	L6
	Max Marks	10	20	10	10	7	29	7	0	7	
	Target	10	16	17	7						