

Code: 20ME6601

III B.Tech - II Semester – Regular Examinations - APRIL 2024

**MICRO AND NANO MANUFACTURING
(HONORS in MECHANICAL ENGINEERING)**

Duration: 3 hours

Max. Marks: 70

Note: 1. This paper contains questions from 5 units of Syllabus. Each unit carries 14 marks and have an internal choice of Questions.
2. All parts of Question must be answered in one place.

BL – Blooms Level

CO – Course Outcome

			BL	CO	Max. Marks
UNIT-I					
1	a)	Discuss the methods of creating nano structures.	L2	CO1	7 M
	b)	Nanotechnology has been incorporated widely in medicinal field. Elaborate on the challenges faced in the field.	L2	CO1	7 M
OR					
2	a)	Describe the following: (i) Gas Condensation Processing (ii) Chemical Vapor Condensation	L2	CO1	14 M
UNIT-II					
3	a)	Compare and contrast SEM and TEM.	L4	CO1 CO2	9 M
	b)	Explain the fundamental principle of operation of an optical microscope.	L2	CO1 CO2	5 M

OR					
4	a)	Explain the process of scattering of X-rays from various sources.	L2	CO1 CO2	7 M
	b)	Discuss the magnitude of size scale, their structure and method of observation.	L2	CO1 CO2	7 M
UNIT-III					
5	a)	Illustrate Lithography process with the help of a neat sketch.	L3	CO1 CO3	7 M
	b)	What is nano finishing? Explain its significance and describe any one nano finishing technique.	L2	CO1 CO3	7 M
OR					
6		Explain in details the steps involved in MEMS fabrication using Bulk Micromachining with the help of neat sketches.	L2	CO1 CO3	14 M
UNIT-IV					
7	a)	What is Nanoimprint lithography? Explain its implementation with reference to electronic and optical nanodevice fabrication.	L2	CO1 CO3	9 M
	b)	What are inertial sensors? List its types and applications.	L2	CO1 CO3	5 M
OR					
8	a)	Compare and contrast Optical MEMS and RF MEMS.	L4	CO1 CO3	14 M

UNIT-V

9	a)	Describe the mechanism of material removal in Micro-drilling process.	L2	CO1 CO4	7 M
	b)	Explain the piezoelectric nano grinding process.	L2	CO1 CO4	7 M
OR					
10	a)	Elaborate the factors responsible for surface finish in micro-milling process.	L2	CO1 CO4	7 M
	b)	Provide some insights on the applications of ultra-precision process in semi-conductor and electronics field.	L3	CO1 CO4	7 M