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Code No. : 17543 S (A) N

**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD**

Accredited by NAAC with A++ Grade

**B.E. (Mech. Engg.) VII-Semester Supplementary Examinations, May/June-2023**

**Nano Technology (PE-III)**

Time: 3 hours

Max. Marks: 60

Note: Answer all questions from Part-A and any FIVE from Part-B

Part-A (10 × 2 = 20 Marks)

Q. No.	Stem of the question	M	L	CO	PO
1.	How does nanosize influence the electron band gap?	2	1	1	1
2.	Define kinetic stability?	2	1	1	1
3.	Classify Nanomaterials.	2	2	2	1
4.	List out the applications of nanotribology in modern industry?	2	1	2	1
5.	What are zero, one and two dimensional nano structures?	2	1	3	1
6.	Explain about nanowires?	2	2	3	1
7.	What is nanomanipulation?	2	1	4	1
8.	Describe MEMS fabrication?	2	2	4	1
9.	Explain basic biological concepts and principles for the development of nanoengineering Systems.	2	2	5	7
10.	What is biocompatibility and why is it important?	2	1	5	7
<b>Part-B (5 × 8 = 40 Marks)</b>					
11. a)	Explain the importance of size and shape dependence of material properties at the nanoscale.	4	2	1	3
b)	What is Nano technology? Enumerate the challenges of Nano technology.	4	2	1	1
12. a)	Describe the property of Ferro electricity with neat graph and give examples	4	2	2	1
b)	How porous silicon will be prepared and how it is useful in electronics?	4	3	2	6
13. a)	List out characterization techniques and explain any two of them.	4	3	3	1
b)	What is the significance of top down and bottom up approaches? Give examples for each process.	4	3	3	2

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14. a)	Explain Electron beam lithography with a neat sketch.	4	4	4	5
b)	Write about strain engineering in epitaxial thin films.	4	4	4	1
15. a)	Describe the primary requirement for characterising a nanomaterial by electrochemistry?	4	1	5	1
b)	Explain how the thermal properties of nano materials can be evaluated using a suitable characterization process.	4	2	5	5
16. a)	Describe the effect of nanoscale dimensions on their properties	4	2	1	4
b)	Compare the Si-based and Ge-based nanomaterials.	4	3	2	2
17.	Answer any <i>two</i> of the following:				
a)	Explain how to characterize a material with scanning electron microscope (SEM) with neat sketch.	4	4	3	5
b)	What are different tools and techniques used in nanofabrication? Explain any one technique used in nanofabrication.	4	2	4	5
c)	Explain in detail the synthesis procedure of carbon nano tubes.	4	3	5	12

M : Marks; L: Bloom's Taxonomy Level; CO; Course Outcome; PO: Programme Outcome

i)	Blooms Taxonomy Level - 1	25%
ii)	Blooms Taxonomy Level - 2	40%
iii)	Blooms Taxonomy Level - 3 & 4	35%

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