

Hall Ticket Number:

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Code No. : 17554 (A) N/O

**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD***Accredited by NAAC with A++ Grade***B.E. (Mech. Engg.) VII-Semester Main & Backlog Examinations, Dec.-23/Jan.-24****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 the nanoscale catalysts can increase the rate, selectivity and efficiency of various chemical reactions.	2	1	1	1
2.	List the two reasons for instability of the nano particles.	2	1	1	1
3.	Describe the term nanofiber?	2	1	2	1
4.	Define two-dimensional nanomaterial.	2	2	2	1
5.	Describe the synthesis procedure for one-dimensional nanostructures, specifically nanowires.	2	1	3	1
6.	Classify nanostructures based on growth media.	2	1	3	1
7.	Which type of Thermodynamic process is the diffusion technique of doping?	2	1	4	1
8.	Illustrate poor versus good step coverage and conformal versus non-conformal layer with neat sketches	2	3	4	2
9.	Differentiate between the organic and inorganic biomaterial?	2	3	5	1
10.	What is nano carrier?	2	2	5	1
<b>Part-B (5 × 8 = 40 Marks)</b>					
11. a)	Describe how the chemical, thermal and electronic properties are altered due to size reduction in Nano Technology.	4	3	1	1
b)	State and explain the five challenges of nanomaterials.	4	1	1	12
12. a)	What are piezoelectric, pyroelectric and ferroelectric materials? Explain the concept of polarization with corresponding graphs.	4	2	2	2
b)	Explain the challenges of Silicon nanoparticles and the need of Germanium based nanoparticles.	4	4	2	2
13. a)	Classify and explain the nanostructured materials based on dimensions.	4	4	3	1
b)	Illustrate and explain the SEM characterization technique with the help of neat diagram.	4	2	3	5

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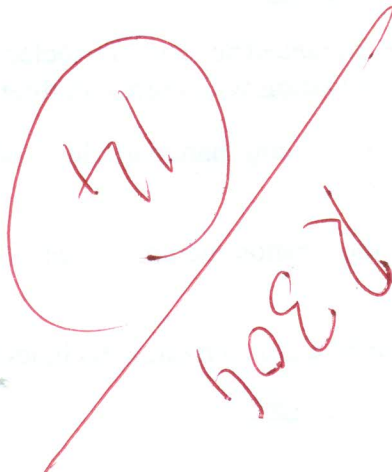
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14. a)	Describe the principle and steps of photolithography in detail with the help of a neat diagram	4	2	4	2
b)	Illustrate the e-beam nano fabrication technique with the help of neat diagrams	4	3	4	2
15. a)	Classify all the types and sub types of nano pharmaceuticals. List the advantages of nano engineered drugs.	4	3	5	6
b)	Define "Antibacterial activity" of nano biomaterials. Explain with reference to materials with examples.	4	2	5	6
16. a)	Explain the advantages of nano technology in detail.	4	2	1	12
b)	Explain the different types of Silicon Nanoparticles	4	3	2	2
17.	Answer any <i>two</i> of the following:				
a)	Discuss the synthesis procedure of nanoparticles by heterogeneous method.	4	2	3	5
b)	Describe the principle and the methodology of thin film deposition and doping in detail with the help of a neat diagrams	4	2	4	3
c)	What are carbon nano tubes? Write a short notes on applications of carbon nano tubes.	4	3	5	3

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

i)	Blooms Taxonomy Level – 1	20%
ii)	Blooms Taxonomy Level – 2	40%
iii)	Blooms Taxonomy Level – 3 & 4	40%

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