Q. Code: 795438

Reg. No. | | | | | | | | | | | | | |

B.E./ B. TECH.DEGREE EXAMINATIONS, MAY 2024

Sixth Semester

OE18612 – NANOTECHNOLOGY AND PROTOTYPING LABORATORY

(Common to all branches except EEE)

(Regulation 2018 /2018A)

TIME:3 HOURS **MAX. MARKS: 100**

COURSE OUTCOMES	STATEMENT	RBT LEVEL
CO 1	Understand various semiconductor process technology and microfabrication methods	**3**
CO 2	Synthesis nanostructures using variety of semiconductor technology for a given application.	**4**
CO 3	Characterize any specific nanostructure structurally, electrically and by imaging.	**3**
CO 4	Trained in cleanroom protocol, utilize vacuum and physical deposition technology.	**4**
CO 5	Design and prototype any Nano device.	**4**

PART- A(10x2=20Marks)

(Answer all Questions)

		CO	RBT LEVEL
1.	How can contamination from people be reduced?	**1**	**2**
2.	List the different types of etching in semiconductor fabrication.	**1**	**2**
3.	Give examples for the different Dimensional nano structures.	**2**	**3**
4.	Define sol-gel process.	**2**	**3**
5.	Assess the merits of X-Ray diffraction technique over other structural characterizations.	**3**	**2**
6.	Differentiate primary, secondary, back scattered electrons measured in SEM.	**3**	**3**
7.	What is the need for MSDS in a process industry?	**4**	**2**
8.	Why is vacuum critical in nanomaterial synthesis?	**4**	**3**
9.	What are the fabrication tools used for metal deposition?	**5**	**2**
10.	Write a short note on bottom up approach.	**5**	**2**

PART- B (5x 14=70Marks)

		Marks	CO	RBT LEVEL
11. (a)	Define cleanroom protocol. What are the ISO standards that deals with size and numbers of particles in cleanrooms?	**(14)**	**1**	**3**
	(OR)			
(b)	What are the different etching techniques? Explain in detail the process involved in etching.	**(14)**	**1**	**3**

12. (a)	Explain in detail the High Energy Ball Milling process with a neat sketch.	**(14)**	**2**	**3**
	(OR)			
(b)	Explain pulsed laser deposition with its schematic layout. List its advantages.	**(14)**	**2**	**3**
13. (a)	Explain the working of Scanning Tunneling Microscopy (STM) with a neat sketch.	**(14)**	**3**	**3**
	(OR)			
(b)	Write a short note on AFM and explain its modes of working with a neat sketch.	**(14)**	**3**	**3**
14. (a)	Discuss in detail any one method of metal deposition technique with neat schematic.	**(14)**	**4**	**3**
	(OR)			
(b)	Discuss in detail the method of Spin coating technique with neat diagrams.	**(14)**	**4**	**3**
15. (a)	Define photolithography. What are the steps involved in the fabrication of an IC?	**(14)**	**5**	**4**
	(OR)			
(b)	Explain bottom-up and top down approaches for fabricating of nanostructures with examples. What are the advantages and disadvantages of both methods?	**(14)**	**5**	**4**

PART- C (1x 10=10Marks)

(Q.No.16 is compulsory)

		Marks	CO	RBT LEVEL
16.	Discuss in detail the fabrication of a thin film solar cell.	**(10)**	**5**	**4**

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