Q. P. Code: 25577

03 Hrs **[Total Marks 80]**

N.B.:
(1) **Question No.1 is compulsory**
(2) Attempt any **three** questions out of remaining **five** questions
(3) Figures to right indicate full marks
(4) Assume suitable data if **necessary**.
(5) Notations carry usual meaning.

Q.1 (A)	Explain potential use of Carbon Nano Tubes	05
(B)	Differentiate negative and positive photoresist from sacrificial layer point of view. Name few photoresist of both the class.	05
(C)	Write short note on Electronic Speckle Pattern Interferometry	05
(D)	Discuss the domestic and industrial application of Nanotechnology	05
Q. 2(A)	Comment on scanning type two photon microstereolithography and dynamic mask stereo lithography system under following consideration i) Speed of fabrication ii) Fabrication of overhanging structure iii) Significance of resin properties such as viscosity and surface tension iv) Limit on spatial dimensions of component v) Diffraction of light.	10
(B)	Explain potential use of silicon dioxide in MEMS	05
(C)	Write Short note on Comb drive	05
Q.3 (A)	Write short note on Scaling laws in modeling of MEMS	08
(B)	Write short note on (i) Biosensors (ii) Air bag sensor	12
Q. 4(A)	Explain (i) Chemical Vapour Deposition technique (ii) Ion beam Lithography	10

(B)	What are the most commonly used vibration and geometrical characterization techniques in MEMS. Explain with neat sketch any one of the vibration and surface characterization technique.	10
Q.5(A)	Write short note on lumped parameter modeling and distributed parameter modeling methods	10
(B)	Explain isotropic etching with neat sketch	05
(C)	Enumerate the advantages and disadvantages of scanning type of microstereolithography system	05
Q.6	Write short note on	20

(i) Shape Memory Alloy

(ii) Bulk-Micromachining

(iii) Nano-Electro-Mechanical Systems (NEMS)

(iv) High aspect ratio 3D processes.

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