Sr. No. 009701

Dec 2023

B.Tech. (EIC) Re-appear, 7th Sem

Introduction to MEMS (EIEL-704)

Time: 3 Hours

Max. Marks:75

Instructions:

1. *It is compulsory to answer all the questions (1.5 marks each) of Part -A in short.*
2. *Answer any four questions from Part -B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*

PART –A

Q1 (a) What is a micro system? Give some examples. (1.5)

(b) Gauge Factor of a resistive sensor is dependent on which parameters. (1.5)

(c) Define Scaling. (1.5)

(d) Define Etching? (1.5)

(e) How piezoresistive sensors work? (1.5)

(f) Enlist any two commercial available MEMS products. (1.5)

(g) What are the common methods of IC and MEMS fabrication? (1.5)

(h) What is positive and negative photo resists and where they are used? (1.5)

(i) Differentiate between isotropic and anisotropic etching? (1.5)

(j) Differentiate between sensor and transducer. (1.5)

PART –B

Q2 (a) Explain the mechanism of stress and strain in strain gauge sensor and further draw the geometry of Strain gauge sensor and its characteristics? (7.5)

(b) Explain the working of SQUID magnetometers? (7.5)

Q3 (a) Differentiate between surface and bulk micromachining with suitable examples. (7.5)

(b) State various physical vapor deposition techniques. Explain in brief any one technique of PVD in MEMS fabrication. (7.5)

Q4 (a) Explain oxidation process in MEMS device fabrication? (7.5)

(b) Explain operating principle of pressure sensor. Describe the representation process flow for fabricating pressure sensor. (7.5)

Q5 (a) Discuss selection of material based on application and explain "silicon use as ideal substrate material in MEMS". (7.5)

(b) List types of lithography. Explain in detail X-ray lithography with its major features. (7.5)

Q6 (a) Discuss different wafer bonding techniques. (7.5)

(b) What are different types of energies for which sensors could be developed? List them along with examples of each type of energy. (7.5)

Q7 (a) (a)Distinguish between Wet and Dry etching process with suitable applications. (7.5)

(b) List the various light sources used in photo resists. (7.5)

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