Total No. of Questions : 12]

SEAT No. :

P1126

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[4659]-350

B.E. (Instrumentation & Engineering)

b - MICRO - ELECTRO MECHANICAL SYSTEMS

(2008 Course) (Elective - IV) (Semester - II) (406270)

Time : 3Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate books.***
2) ***Neat diagrams must be drawn wherever necessary***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data, if necessary.***

SECTION-I

Q1) a) Explain advantages of miniaturization with suitable examples. **[8]**

b) Explain with neat diagram Integrated radio frequency transceivers. **[8]**

OR

Q2) a) Explain working of ADXL 50 accelerometer with neat sketch. **[8]**

b) What are the advantages of MEMS sensors over the conventional sensors? **[8]**

Q3) a) Explain Piezoresistive sensor with neat diagram. Give their applications and materials used to form these devices. **[8]**

b) Explain the role of Micro actuator in MEMS field. **[8]**

OR

Q4) a) Explain working of Electrostatic Comb drive & list materials used for making the same. **[8]**

b) Explain working principle of portable blood analyzer with neat diagram. **[8]**

Q5) a) What is lithography? What are different steps involved in it. **[9]**

b) What are the process-steps used in the fabrication of micro system? **[9]**

OR

Q6) Explain following micromachining Technique with neat diagram. **[18]**

a) Chemical vapor deposition

b) Sputtering

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SECTION-II

Q7) a) Explain with neat sketch Transversaly Deformable Beam. **[8]**

b) i) Define Hook's Law **[8]**

ii) Young's modulus of elasticity

OR

Q8) a) Define stress & strain. What is the relation between stress and strain. **[8]**

b) What is difference between Straight Beam in pure bending & initially Curved Beam in pure bending? **[8]**

Q9) a) Compare Finite Difference Method and Finite Element Method. **[8]**

b) How the Finite element method used in MEMS field. **[8]**

OR

Q10) a) Compare Finite element Method over analytical method. **[8]**

b) Describe in detail the steps involved in solving structural problem using Finite Element method. **[8]**

Q11) a) Explain working of PNP transistor with neat diagram. **[9]**

b) Draw and Explain Wheatstone Bridge for measurement of Change in Resistance. What is bridge balance condition. **[9]**

OR

Q12) a) Draw and Explain working of Instrumentation amplifier. **[9]**

b) What is difference between half wave and full wave rectifier in MEMS. **[9]**

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