

MODEL QUESTION PAPER
SEVENTH SEMESTER B.TECH DEGREE EXAMINATION
Elective IV

08.736 MEMS (TA)

Time 3 hours

Max. Marks 100

PART A

(Answer *All* questions)

(10 x 4 = 40marks)

1. List a few applications of Microsystems in the automotive industry.
2. Explain the working principle of chemical micro-sensors.
3. With neat sketches, explain micro grippers.
4. Explain Tripper Force Scaling Vector.
5. What is ion implantation?
6. What is the working principle of the chemical vapour deposition?
7. What are the major advantages of surface micro matching?
8. Why silicon is widely used as the substrate material for MEMS and Microsystems?
9. What are the principle requirements that should be considered on the detailed design analysis?
10. Mention a few optical MEMS components.

PART B

(Answer any two questions from each module)

MODULE I

(10x3=30 marks)

11. Explain micro pressure sensors.
12. Briefly explain micro accelerometers.
13. Write notes on scaling in heat transfer.

MODULE II

(10x3=30marks)

14. With neat sketches explain the steps involved in photolithography
15. Explain the fabrication steps in the LIGA process.
16. Explain bulk micro manufacturing.

MODULE III

(10x3=30 marks)

17. Explain the three levels of micro system packaging.
18. Explain the various interfaces in micro system packaging.
19. Explain the selection of signal transduction in micro system.

Mems Question Papers

**Henry Helvajian, Siegfried W.
Janson, Franz Lärmer, Society of Photo-
optical Instrumentation Engineers**

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Manufacturing Systems and Industry Application Yan Wen Wu, 2011-06-30 Selected peer reviewed papers of the 2011 International Conference on Materials Engineering for Advanced Technologies ICMEAT 2011 May 5 6 2011 Singapore Singapore *The Europa Year-book* Michael S. Farbman, Ramsay Muir, Hugh F. Spender, 1926 **Micromachined Circuits and Devices** Shibani Kishen Koul, Sukomal Dey, 2022-02-07 This book presents the design of different switching and resonant devices using the present state of the art radio frequency RF micromachining MEMS technology Different topologies of MEMS switches have been discussed considering optimum performances over microwave to millimeter wave frequency range Wide varieties of micromachined switching networks starting from single pole double throw SPDT to single pole fourteen throw SP14T are discussed utilizing vertical and lateral actuation movements of the switch Different transduction mechanisms of micromachined resonators are highlighted that includes capacitive piezoelectric and piezoresistive types The book provides major design guidelines for the development of MEMS based digital phase shifters

tunable filters and antennas with extensive measurement data Apart from the radio frequency RF requirements an extensive guideline is given for the improvement of the reliability of micromachined switches and digital phase shifters where multiple switches are operating simultaneously It takes multiple iterations and extensive characterizations to conclude with a reliable MEMS digital phase shifter and these aspects are given one of the prime attentions in this book Detailed performance analysis of metamaterial inspired MEMS switches is then discussed for application in millimeter wave frequency bands up to about 170 GHz The book concludes with future research activities of RF MEMS technology and its potential in space defense sensors and biomedical applications

The Electrical Engineering Handbook Wai Kai Chen, 2004-11-16 The Electrical Engineer's Handbook is an invaluable reference source for all practicing electrical engineers and students Encompassing 79 chapters this book is intended to enlighten and refresh knowledge of the practicing engineer or to help educate engineering students This text will most likely be the engineer's first choice in looking for a solution extensive complete references to other sources are provided throughout No other book has the breadth and depth of coverage available here This is a must have for all practitioners and students The Electrical Engineer's Handbook provides the most up to date information in Circuits and Networks Electric Power Systems Electronics Computer Aided Design and Optimization VLSI Systems Signal Processing Digital Systems and Computer Engineering Digital Communication and Communication Networks Electromagnetics and Control and Systems About the Editor in Chief Wai Kai Chen is Professor and Head Emeritus of the Department of Electrical Engineering and Computer Science at the University of Illinois at Chicago He has extensive experience in education and industry and is very active professionally in the fields of circuits and systems He was Editor in Chief of the IEEE Transactions on Circuits and Systems Series I and II President of the IEEE Circuits and Systems Society and is the Founding Editor and Editor in Chief of the Journal of Circuits Systems and Computers He is the recipient of the Golden Jubilee Medal the Education Award and the Meritorious Service Award from the IEEE Circuits and Systems Society and the Third Millennium Medal from the IEEE Professor Chen is a fellow of the IEEE and the American Association for the Advancement of Science 77 chapters encompass the entire field of electrical engineering THOUSANDS of valuable figures tables formulas and definitions Extensive bibliographic references

Maintenance, Safety, Risk, Management and Life-Cycle Performance of Bridges Nigel Powers, Dan Frangopol, Riadh Al-Mahaidi, Colin Caprani, 2018-07-04 Maintenance Safety Risk Management and Life Cycle Performance of Bridges contains lectures and papers presented at the Ninth International Conference on Bridge Maintenance Safety and Management IABMAS 2018 held in Melbourne Australia 9-13 July 2018 This volume consists of a book of extended abstracts and a USB card containing the full papers of 393 contributions presented at IABMAS 2018 including the T Y Lin Lecture 10 Keynote Lectures and 382 technical papers from 40 countries The contributions presented at IABMAS 2018 deal with the state of the art as well as emerging concepts and innovative applications related to the main aspects of bridge maintenance safety risk management and life cycle performance

Major topics include new design methods bridge codes heavy vehicle and load models bridge management systems prediction of future traffic models service life prediction residual service life sustainability and life cycle assessments maintenance strategies bridge diagnostics health monitoring non destructive testing field testing safety and serviceability assessment and evaluation damage identification deterioration modelling repair and retrofitting strategies bridge reliability fatigue and corrosion extreme loads advanced experimental simulations and advanced computer simulations among others This volume provides both an up to date overview of the field of bridge engineering and significant contributions to the process of more rational decision making on bridge maintenance safety risk management and life cycle performance of bridges for the purpose of enhancing the welfare of society The Editors hope that these Proceedings will serve as a valuable reference to all concerned with bridge structure and infrastructure systems including students researchers and engineers from all areas of bridge engineering The Europa Year-book Michael Farbman,Ramsay Muir,Hugh F. Spender,1927 Vols for 1926 27 include section A European bibliography **Micromachining and Microfabrication Process Technology** ,1999 *17th IEEE International Conference on Micro Electro Mechanical Systems* ,2004 *Law Notes* Albert Gibson,Robert McLean,1886 **Reliability, Testing, and Characterization of MEMS/MOEMS.** ,2001 **The World of Learning 1978-79** ,1978 The Educational year book. [5 issues]. ,1880 **MEMS Components and Applications for Industry, Automobiles, Aerospace, and Communication** Henry Helvajian,Siegfried W. Janson,Franz Lärmer,Society of Photo-optical Instrumentation Engineers,2001 Big data analytics for smart healthcare applications Celestine Iwendi, Thippa Reddy Gadekallu,Ali Kashif Bashir,2023-04-17 *ASME Technical Papers* ,1999

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Table of Contents Mems Question Papers

1. Understanding the eBook Mems Question Papers
 - The Rise of Digital Reading Mems Question Papers
 - Advantages of eBooks Over Traditional Books
2. Identifying Mems Question Papers
 - Exploring Different Genres
 - Considering Fiction vs. Non-Fiction
 - Determining Your Reading Goals
3. Choosing the Right eBook Platform
 - Popular eBook Platforms
 - Features to Look for in an Mems Question Papers
 - User-Friendly Interface
4. Exploring eBook Recommendations from Mems Question Papers
 - Personalized Recommendations

- Mems Question Papers User Reviews and Ratings
- Mems Question Papers and Bestseller Lists
- 5. Accessing Mems Question Papers Free and Paid eBooks
 - Mems Question Papers Public Domain eBooks
 - Mems Question Papers eBook Subscription Services
 - Mems Question Papers Budget-Friendly Options
- 6. Navigating Mems Question Papers eBook Formats
 - ePub, PDF, MOBI, and More
 - Mems Question Papers Compatibility with Devices
 - Mems Question Papers Enhanced eBook Features
- 7. Enhancing Your Reading Experience
 - Adjustable Fonts and Text Sizes of Mems Question Papers
 - Highlighting and Note-Taking Mems Question Papers
 - Interactive Elements Mems Question Papers
- 8. Staying Engaged with Mems Question Papers
 - Joining Online Reading Communities
 - Participating in Virtual Book Clubs
 - Following Authors and Publishers Mems Question Papers
- 9. Balancing eBooks and Physical Books Mems Question Papers
 - Benefits of a Digital Library
 - Creating a Diverse Reading Collection Mems Question Papers
- 10. Overcoming Reading Challenges
 - Dealing with Digital Eye Strain
 - Minimizing Distractions
 - Managing Screen Time
- 11. Cultivating a Reading Routine Mems Question Papers
 - Setting Reading Goals Mems Question Papers
 - Carving Out Dedicated Reading Time
- 12. Sourcing Reliable Information of Mems Question Papers
 - Fact-Checking eBook Content of Mems Question Papers

- Distinguishing Credible Sources
- 13. Promoting Lifelong Learning
 - Utilizing eBooks for Skill Development
 - Exploring Educational eBooks
- 14. Embracing eBook Trends
 - Integration of Multimedia Elements
 - Interactive and Gamified eBooks

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