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**History of MEMS**

**Final Assessment**

**Participant Guide**

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|  | Introduction |
|  | The purpose of this final assessment is to test your knowledge of MEMS history after having completed the History of MEMS Learning Module.  This material involves the understanding of the major milestones that have occurred so far to create MEMS technology as we know it today. The assessment also tests your knowledge of major MEMS technologies.  There are fifteen (15) assessment questions. |

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|  | The following MEMS structure was manufactured using which process? |
|  | 1. Surface Micromachining 2. LIGA 3. Bulk Micromachining 4. SCREAM |

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|  | LIGA Gear |

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|  | Which of the following is NOT a micromachining method? |
|  | * 1. Bulk   2. Surface   3. MOEMS   4. LIGA |

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|  | The following MEMS device is built using which of the following processes? |
|  | 1. Bulk 2. SUMMiT IV 3. MOEMS 4. DRIE   SummitIV |

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|  | What type of bulk etch takes advantage of the crystallographic orientation properties of silicon?  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

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|  | The following is an example of what kind of pressure sensor?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

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|  | Which of the following is NOT a MEMS processing technique? |
|  | 1. Bulk Micromachining 2. Surface Micromachining 3. BioMEMS 4. LIGA |

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|  | HP micromachined the first \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in 1979, a device used in both commercial and personal products. |
|  | * 1. Resonant gate transistor   2. Ink-jet nozzle   3. Crash or inertial sensor   4. Electrostatic drive motors |

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|  | Who wrote the famous speech entitled "There's Plenty of Room at the Bottom"? |
|  | 1. Harvey Nathanson 2. Kurt Petersen 3. H. A. Waggener 4. Richard Feynman |

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|  | Which of the following was the first batch fabricated MEMS device? |
|  | 1. Inkjet nozzle 2. Resonant gate transistor 3. Optical switch 4. Integrated circuit |

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|  | Which of the following is NOT a bioMEMS application? |
|  | 1. Cell Culture 2. DNA Arrays 3. Drug Delivery 4. Accelerometer |

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|  | The attraction between molecules, atoms and surfaces is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. |
|  | 1. Van der Waals 2. Feynman 3. Coriolis 4. Atomic force |

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|  | Dr. Richard Feynman thought that physicists could advance biology research by doing what? |
|  | 1. Developing microsurgical devices 2. Making the electron microscope 100 times better 3. Overcoming Van der Waals forces 4. Creating biological computers |

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|  | At the end of his speech, how did Dr. Feynman encourage the exploration of "small" technology? |
|  | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

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|  | Dr. Feynman felt that lubrication would most likely NOT be an issue for components in the micro-scale due to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the micro-scale.  . |
|  | 1. Minimal force and rapid heat loss 2. The types of forces 3. The interactive forces 4. The lack of inertia and friction |

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|  | Which device did Dr. Feynman think could not be miniaturized? |
|  | 1. Electron microscope 2. Servo motor 3. Internal combustion engine 4. Pantograph |

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