# History of MEMS
## Final Assessment
## Participant Guide

**Introduction**

The purpose of this final assessment is to test your knowledge of MEMS history after having completed the History of MEMS Learning Module.

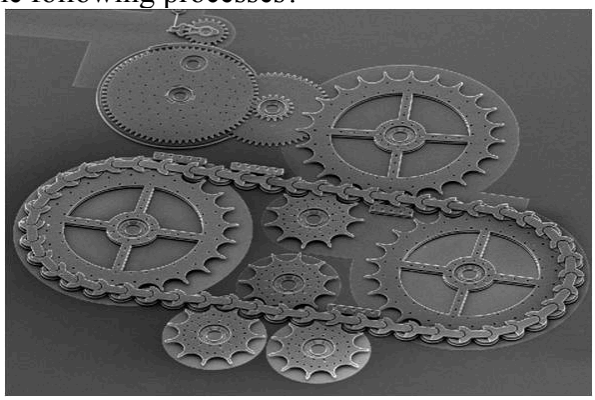
This material involves the understanding of the major milestones that have occurred so far to create MEMS technology as we know it today. The assessment also tests your knowledge of major MEMS technologies.

There are fifteen (15) assessment questions.

1. The following MEMS structure was manufactured using which process?
   a. Surface Micromachining
   b. LIGA
   c. Bulk Micromachining
   d. SCREAM


2. Which of the following is NOT a micromachining method?
   a. Bulk
   b. Surface
   c. MOEMS
   d. LIGA

3. The following MEMS device is built using which of the following processes?
   a. Bulk
   b. SUMMiT IV
   c. MOEMS
   d. DRIE



4. What type of bulk etch takes advantage of the crystallographic orientation properties of silicon?

_____

5. The following is an example of what kind of pressure sensor?_____

6. Which of the following is NOT a MEMS processing technique?
   a. Bulk Micromachining
   b. Surface Micromachining
   c. BioMEMS
   d. LIGA

7. HP micromachined the first _____ in 1979, a device used in both commercial and personal products.
   a. Resonant gate transistor
   b. Ink-jet nozzle
   c. Crash or inertial sensor
   d. Electrostatic drive motors

8. Who wrote the famous speech entitled "There's Plenty of Room at the Bottom"?
   a. Harvey Nathanson
   b. Kurt Petersen
   c. H. A. Waggener
   d. Richard Feynman

9. Which of the following was the first batch fabricated MEMS device?
   a. Inkjet nozzle
   b. Resonant gate transistor
   c. Optical switch
   d. Integrated circuit

10. Which of the following is NOT a bioMEMS application?
    a. Cell Culture
    b. DNA Arrays
    c. Drug Delivery
    d. Accelerometer

11. The attraction between molecules, atoms and surfaces is called _____.
    a. Van der Waals
    b. Feynman
    c. Coriolis
    d. Atomic force

12. Dr. Richard Feynman thought that physicists could advance biology research by doing what?
    a. Developing microsurgical devices
    b. Making the electron microscope 100 times better
    c. Overcoming Van der Waals forces
    d. Creating biological computers

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

    _____

    _____

14. Dr. Feynman felt that lubrication would most likely NOT be an issue for components in the micro-scale due to _____ in the micro-scale.
    .
    a. Minimal force and rapid heat loss
    b. The types of forces
    c. The interactive forces
    d. The lack of inertia and friction

15. Which device did Dr. Feynman think could not be miniaturized?
    a. Electron microscope
    b. Servo motor
    c. Internal combustion engine
    d. Pantograph

*Support for this work was provided by the National Science Foundation's Advanced Technological Education (ATE) Program through Grants. For more learning modules related to microtechnology, visit the SCME website (http://scme-nm.org).*