
Diagnostic BioMEMS Final Assessment

Instructor Guide

Notes to Instructor

This Diagnostic BioMEMS Assessment is a final assessment on bioMEMS diagnostic devices. This assessment and its related primary knowledge and activity are part of the *Diagnostics BioMEMS Learning Module*.

The *Diagnostics BioMEMS Learning Module* consists of the following units:

- Diagnostics BioMEMS Overview Primary Knowledge (PK)
- Diagnostics BioMEMS Research Activity
- **Diagnostics BioMEMS Final Assessment**

Introduction

The purpose of this assessment is to determine your understanding of bioMEMS diagnostics applications and devices. This knowledge leads to an understanding of the importance of diagnostics in BioMEMS applications.

There are ten (10) assessment questions.

1. **What are two stumbling blocks for the development and use of diagnostic bioMEMS devices?**

Answer: It is a relatively newer technology, the physics of atoms dominate in the nano-scale (which can have different principles than in other scales), the diagnostic biomarker must be identifiable in a small sample size (micro to picoliter).

2. **What characteristics of bioMEMS make them advantageous for diagnostic testing?**

Answer: Miniaturization, the possibilities for point-of-care and in vitro/in vivo testing and monitoring, the ability to multiplex tests and samples, and the possibility for lower cost in health care.

3. Name at least three areas of diagnostic medicine that are being impacted by bioMEMS devices?

Answer: Clinical chemistry, therapeutics, molecular diagnostics, patient examination and monitoring, and medical imaging.

4. What is molecular diagnostics?

Answer: The use of genetic and molecular biology to diagnose genetic diseases and the presence of pathogenic organisms or viruses.

5. What do μ TAS and LOC stand for?

Answer: micro-total-analysis-system and lab-on-a-chip

6. What is the difference between a μ TAS and LOC?

Answer:

μ TAS performs a series of reactions and/or tests that result in a diagnostic answer. Whereas a LOC can be a subset of a μ TAS or not, but it performs only one test.

7. Define medical imaging.

Answer: Techniques and processes developed to produce medical images of the body for clinical purposes.

8. What is an example of medical imaging that can be improved by MEMS technology?

Answer: endoscopies and colonoscopies, seeing inside nasal cavities (other answers may be applicable)

9. **Based on the basic design of the artificial receptor LOC, how would you design a chip that would detect HIV?**

Answers will vary. Evaluate the answer based on the participant's understanding of bioMEMS diagnostic tools.

10. **Based on the advantages of diagnostic bioMEMS devices, pick one chronic condition that people may have (e.g. diabetes), and briefly explain how that condition could benefit from continuous monitoring of an implantable bioMEMS.**

Answers will vary. Evaluate the answer based on the participant's understanding of bioMEMS diagnostic tools.

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