

Question 1:

What does "multiplexing" mean with respect to point-of-care testing ?

- Simultaneous detection of multiple analytes from a single sample

Explanation:

In terms of point-of-care testing, "multiplexing" means the simultaneous quantification of different analytes from a single specimen.

- Consecutive detection of multiple analytes from a single sample
- A communication method, that combines multiple analog or digital signals into one signal to share it over a medium

Question 2:

Which signal detection techniques are most often used nowadays in xPOCT applications ?

- Optical and thermometric detection
- Optical and electrochemical detection

Explanation:

Due to their sensitivity, simplicity and adaptability to portable devices, optical and electrochemical detection techniques are mainly used recently in xPOCT applications.

- Electrochemical and microgravimetric detection
- Thermometric and microgravimetric detection

Question 3:

Which one is not one of the emerging xPOCT applications ?

- Personalized medicine
- Homecare monitoring
- Clinical xPOCT systems

Explanation:

For the clinical xPOCT applications, there already exist many different commercial devices for the simultaneous detection of clinical chemistry parameters, including blood gases, and electrolytes, or acute metabolites, or immunosassays.

- Wearables

Question 4:

To which category belongs lateral flow assays, for example at-home pregnancy tests ?

- Bead-based systems
- Array-based systems
- Microfluidic multiplexed systems
- Paper-based systems

Explanation:

Lateral flow assays belongs to paper-based systems and are by far the best-established commercial POCT products, since they are simple, fast and low-cost.

Question 5:

What is the main disadvantage of centrifugal microfluidic platforms with respect to XPOCT applications in resource-limited settings ?

- High sample consumption
- Limited flexibility in assay design
- System complexity and instrumentation

Explanation:

Lab-on-a-disc platforms prove many advantages, including (i) short turnaround times, (ii) low sample consumption, and (iii) high flexibility in assay design. However, they should be improved further for xPOCT applications, especially in resource-limited settings, in terms of their system complexity and instrumentation. For this reason, the current research trend in centrifugal microfluidic systems leads to electrochemical detection techniques.

- Long turnaround times
- Expensive test cartridges

Question 6:

How many valve channels are required for a microfluidic network with N channels, using microfluidic large-scale integration (mLSI) ?

- $2 \log_2 N$ valve channels

Explanation:

For the microfluidic large-scale integration, microfluidic multiplexors, combinatorial arrays of binary valves, are used in order to simplify the control of large-scale channel networks. With this approach, a microfluidic network with N channels, needs only $2 \log_2 N$ valve channels.

- N valve channels
- $N/2$ valve channels
- $2N$ valve channels

