AUTOMATION IN THE CLINICAL LABORATORY

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KEY WORDS AND DEFINITIONS

- **Aliquot**: A portion of a total amount of specimen

- **Analyzer Configuration**: The format in which analytical instrument are configured; available in both open and closed system

- **Automation**: The process whereby an analytical instrument perform many tests with only minimal involvement of an analyst; also defined as the controlled operation of an apparatus, process, or system by mechanical or electronic devices without human intervention.

- **Batch Analysis**: A type of analysis in which many specimens are processed in the same analytical session, or "run".

- **Centralized Testing**: A mode of testing in which specimens are transported to central, or "core" facility for analysis

- **Core Laboratory**: A type of centralized laboratory to which sample are transported for analysis.

- **Multiple-Channel Analysis**: A type of analysis in which each specimen is subjected to multiple analytical processes so that a set of test results is obtained on a single specimens; also known as multi test analysis.

- **Point-of-Care Testing (POCT)**: A mode of testing in which the analysis is performed at the site where healthcare is provided; also known as bedside, near-patient, decentralized and off-site testing
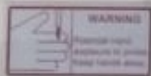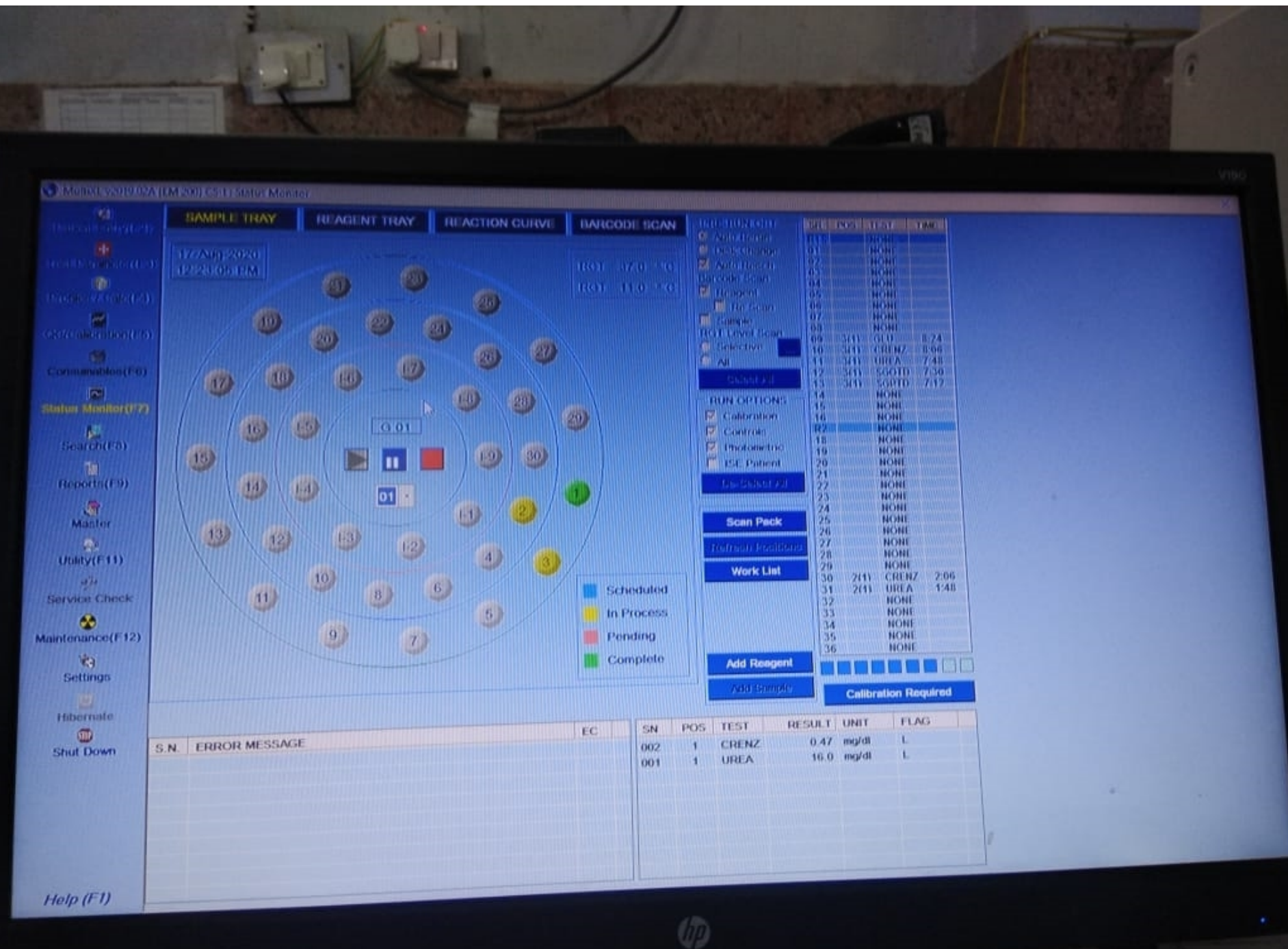
Table 10.3 Examples of analytical techniques used to quantify analytes by auto-analysers

Analytical technique	Examples of analytes
Ion-selective electrodes	K^+, Na^+, Li^+, Cl^-
Visible and UV spectrophotometry	Urea, creatinine, calcium, urate
Turbidimetry	IgG, IgA, IgM
Reaction rate	Enzymes – aspartate transaminase, alanine transaminase, γ-glutamyl transferase, alkaline phosphatase, creatine kinase, lactate dehydrogenase
Kinetic interaction of microparticles in solution (KIMS)	Therapeutic drug monitoring – phenytoin, carbamazepine
Immunoassay	Cortisol, luteinising hormone, thyroid-stimulating hormone

BENEFITS OF ANALYZERS

- With automation, chances of manual errors have been reduced due to automatic setting of different parameters. Results thus obtained are accurate and reliable.

- The analyzers are computer based so they have self monitoring features. They monitor the progress of chemical reaction and indicate any abnormality.

- Analyzers are easy to operate as most of the steps are automatic

- Work load in laboratory is finished in short duration.

- Analyzers have digital display and give print out of results. Manual calculations are thus eliminated.

- Entire range of tests like cardiac, hepatic and renal function can be performed by analyzers.

- With an automatic analyzer, physician and patients develop a great amount of confidence in the results.