

CTSI Professional Competency Framework (CPCF) written examination

Unit 4: Laboratory Equipment - Metrology

May 2022

Guidance for this examination

Please ensure that you indicate clearly at the top of the answer booklet, the law viewpoint from which you will be answering: English, Scottish or Welsh.

The examiners may expect candidates to show knowledge of legislation which is in place but not in force (i.e., has been enacted) and regulations which have been made but are not yet in force, if they are directly relevant to the subject-matter of the examination.

Examination structure

This examination paper is 1-hour 30mins (plus ten minutes reading time)

Total of 5 questions.

Candidates should attempt **all** questions.

Please be aware that each question has been given a mixture of marks available (identifiable against each question).

Note:

The Laboratory Equipment – Metrology paper is a **closed book**; no materials are permitted to be taken into the examination room.

The examination paper has 2 pages, including this front sheet.

Candidates should attempt to answer all questions

1. Define the statements below and state when it is applicable, with examples.
 - Parallax error
 - Adhesion and cohesion of a liquid
 - Repeatability and reproducibility
 - Euramet cg18
 - Proficiency testing

(20 marks)

2. An auditor queries a stated value for a mass on one of your issued calibration certificates and asks for clarification on the validity of the result. Describe the processes you would follow to determine whether the auditor has a valid comment, and what internal quality control checks you could instigate to prove your stated value.

(30 marks)

3. A client would like to have non-standard metallic disks calibrated to F1 level. Your quality manual does not have a validated procedure for determining the density of metals for mass calibrations. Explain the procedure for conducting such a calibration and how you would ensure the validity of your method, paying particular regard to air density and any air buoyancy corrections.

(20 marks)

4. Replicate testing is a necessary quality requirement with accredited organisations. Outline the procedure when conducting a replicate testing for a range of E2 masses, especially in the procedures, comparing the results, and the preparation of the associated uncertainty budgets.

(20 marks)

5. Accurately reporting the result in micrometer determinations is crucial to the stated result. Outline the procedure to be followed to allow this and explain how this is allowed for when preparing an uncertainty budget for dimensional calibrations.

(10 marks)

(total of 100 marks)

End of exam paper.