CAMBRIDGE
OCR

Wednesday 14 January 2026 – Afternoon

Level 3 Cambridge Technical in Applied Science

05874 Unit 22: Global scientific information

PRE-RELEASE

INSTRUCTIONS

- Do **not** take your copy of the pre-release into the exam.
- Do **not** take any notes into the exam.

INFORMATION

- A clean copy of this pre-release will be given to you with the question paper.
- This document has **4** pages.

Pre-release research brief

You should carry out your own research on the themes given in this research brief. Your research will help you to prepare for your examination.

Your research is only for your own use. You must not bring your notes into the examination.
A clean copy of this research brief will be provided in the examination.

In your research you should consider the following themes.

- Categories of information holder **(organisations accredited to ISO / IEC 17025)**
- Impacts of knowledge, products and processes
- Reasons for transmission of scientific information
- Rural locations of scientific information

The questions in **Section A** of the examination will require you to draw on the knowledge and understanding which you have gained while researching these themes.

Instructions:

Read the following two pages of information.

Carry out your own research on the themes given above.

Source A 'Food Forensics' – a food testing laboratory

Adapted from: Food Forensics Achieves UKAS Accreditation [1]

Food Forensics [2] is addressing the global problem of food fraud by the application of science to determine the authenticity and integrity of food content. UKAS (the UK Accreditation Service) has given Food Forensics accreditation to ISO / IEC 17025 [3], [4], for the measurement and interpretation of stable isotope compositions in food, beverages and feedstuffs [5]. Stable isotope ratio analysis (also known as SIRA or isotope testing) is a method that has been used extensively in police forensics and archaeology to determine where something has come from. Different environments in different parts of the world have known ratios of heavy and light isotopes.

ISO / IEC provides an accreditation for laboratories carrying out food testing services. The services can focus on the chemical composition of food, such as stable isotope compositions, and/or the presence of microbes (such as bacteria and fungi). This accreditation recognises that the laboratory can produce precise, accurate tests and data. Not only do the test methods have to be appropriate and the equipment checked and maintained on a regular basis, the test data must also be of a high quality and the staff undertaking the testing should be technically competent.

Food Forensics Managing Director Alison Johnson said: "Achieving our UKAS accreditation is the result of a great deal of hard work and commitment from the Food Forensics team and provides our customers, who are facing increasing risks of food fraud, accredited testing solutions."

Food Forensics analyses the stable isotopic compositions of individual foods or beverages and compares these to its authentic reference datasets to establish the validity of claims on the label.

It is essential that the reference samples are authentic. For example, samples of beef, pork, chicken etc., are taken directly from the slaughter line where they can be linked with paper traceability information. Each animal species must have its own database and these are updated regularly. Isotope testing is not a proof of origin test, it is a test for consistency with samples of known origin.

The company has developed a wide portfolio of solutions covering:

- country of origin claims (country or region) and
- verification of production system (organic, free range etc.)

The company's customers include primary producers and processors through to blue chip retailers who insist on optimum due-diligence and risk profiling to help protect their product integrity.

Food Forensics works with its customers to establish robust Food Fraud Risk Management systems and test modelling to mitigate and monitor risk.

Food Forensics has a strategic partnership with Centre Testing International (CTI) [6], one of the largest testing companies in China. Food Forensics is CTI's partner in establishing a stable isotope testing laboratory in Shanghai to provide reference datasets of authentic Chinese export products. There are many other laboratories around the world that also offer stable isotope testing and all manage their own local databases.

[1] https://www.technologynetworks.com/tn/news/food-forensics-achieves-ukas-accreditation-194818

[2] https://www.foodforensics.co.uk/

[3] https://www.ukas.com/resources/resources/soas-17025/

[4] https://www.ukas.com/accreditation/standards/laboratory-accreditation/food/

[5] https://assets.thermofisher.com/TFS-Assets/CMD/brochures/sn-30410-irms-stable-isotopes-food-beverage-sn30410-en.pdf Thermo Fisher Scientific: SmartNotes – How Can Stable Isotope be Used to Determine Origin and Authenticity of Food and Beverage products?

[6] https://www.cti-cert.com/en/about and https://www.cti-cert.com/en/services/Food

Source B 'IsoBank' – storing stable isotope data

Adapted from: About IsoBank [7]

IsoBank is a multi-organisation effort to build a common repository for stable isotope data originating from any context, and to support easy location and access to this data by the research community. It will be an online, openly accessible database, with isotope measurements indexed via discipline-specific metadata.

We are currently accepting deposits of open data sets documenting stable isotope measurements across all disciplines. We encourage potential depositors to explore the extensive metadata model, and compare it to their current data structures, before beginning the ingest* process. IsoBank is in an early access phase, and actively solicits contributions and feedback from the community.

Stable isotopes are used across a diversity of scientific fields, from ecology and physiology to medicine and archaeology, and at local and global scales.

As the analysis of stable isotopes grows, the amount of data has accumulated. We estimate that >1 million samples are run each year among 12 major laboratories in the United States alone.

More investigators are independently generating their own stable isotope datasets. Yet much of this data exists in unpublished formats and may never be used. At the same time, there is a growing need for data accessibility, transparency and reproducibility.

IsoBank will function as a universal resource, and allow scientists to verify, replicate, compare, extend, and integrate data across studies. IsoBank will be networked internationally with isotope analysis laboratories, government-funded science agencies, and peer-reviewed journals to foster collaborations and ensure sustainability.

IsoBank is a collaborative project of the Texas Advanced Computing Center at The University of Texas at Austin, the University of Wisconsin at Madison, the University of New Mexico, and the University of Utah, and is funded by the National Science Foundation.

* Data ingestion is the process of importing large, assorted data files from multiple sources into a single, cloud-based storage medium – a data warehouse, data mart or database where it can be accessed and analysed.

[7] https://isobank.tacc.utexas.edu/