

## Qualification Framework written examination

### Unit 4: Weights and Measures

May 2024

### 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

There are two sections to the examination paper:

**Section A** Consists of six questions.  
Candidates should attempt to answer three questions.  
Total allocation of marks is 30 marks.  
Suggested time allocation is 30 minutes.

**Section B** Consists of four questions.  
Candidates should attempt to answer two questions.  
Total allocation of marks is 70 marks.  
Suggested time allocation is 90 minutes.

Total time allowed – two hours (plus ten minutes' reading time).

### Note:

The Weights and Measures written exam paper is a **closed book**; no materials are permitted to be taken into the examination room.

*The examination paper has 5 pages, including this front sheet.*

Section A

Candidates should attempt to answer three questions.

Each question carries ten marks.

Total: 30 marks.

1. What is a non-weighing instrument? (10 marks)
  
2. With reference to relevant guidance notes and legislation, explain what a desiccating product is.  
Why is it important with regard to Packaged Goods Regulations 2006? (10 marks)
  
3. With reference to the Weights and Measures Act 1985, outline the obligations that relate to public weighbridges. (10 marks)
  
4. Using the example of a 50t weighbridge with 20kg divisions, explain what an extended displaying device is and when you use it. (10 marks)
  
5. With respect to weights and measures legislation, outline the requirements that would apply to a bunch of bananas and a bunch of carrots. Both have a band around them to ensure the bunch stays together. (10 marks)
  
6. (a) What is standard temperature accounting? Explain what guidance is available on this matter. (5 marks)  
  
(b) Outline briefly how you would inspect a liquid fuel measuring instrument that utilises standard temperature accounting. (5 marks)

**Section A total of 30 marks.**

**End of Section A.**

## Section B

Candidates should attempt to answer two questions.

Each question carries 35 marks.

Total: 70 marks.

7. You are inspecting a local supermarket and decide to weigh some of the packaged products on the shelf. You decide to weigh all the tins of "Sweetcorn in Water". They are marked "Net drained weight 160g and 195g e" You check the batch number and the best before date of all the tins and they are the same. The name and address marked on the package is the head office of the supermarket, which is also in your authority.

(a) With reference to legislation, discuss why the tin is marked "Net drained weight 160g and 195g e" and what problems this may cause. (5 marks)

(b) What is the significance of the e mark? (5 marks)

(c) What are the requirements regarding the equipment that you would use to weigh the tins? (5 marks)

You decide to weigh the tins gross, and the weights range from 167g to 120g.

(d) What offences may have taken place at the supermarket? (5 marks)

(e) You speak to the manager of the supermarket and discover that they do not themselves import but purchase the sweetcorn from a food importer that is also in your area. You decide to visit the business and discover that they have imported the product from Italy. You discover that they have no records, and they ask your advice on what they should do to meet their obligations. Outline in detail the advice that you give, with reference to the regulations and the procedures for carrying out any physical checks on the product.

(15marks)

(35 marks)

**SECTION B CONTINUES OVER THE PAGE.**

8. At a marina in your authority is a business that restores vintage motor launches. It also maintains launches for private individuals whose boats are moored there. A refuelling point at the marina is used to fuel their own boats they have restored, those they are maintaining for others and for any boats transiting thorough the marina. The marina can take boats that are suitable for travelling to continental Europe and have fuel tanks of a capacity up to 500 litres.

According to your database, the marina is low risk and, because of staff cuts, it has not been visited for five years. You decide to visit and notice that the liquid fuel-measuring instrument at the refuelling point has been renewed with a brand-new pump. You notice the pump has markings that show it has been verified in accordance with the Measuring Instrument Regulations 2016. It bears a CE mark and a notified body number.

You enquire as to how long they have had the pump, and you are told it was put in as a new instrument in January 2021 by Marina Services Ltd, a local business that you know has an approval under section 11A of the Weights and Measures Act as a manufacturer, installer or repairer of liquid fuel measuring instruments. You had no record of the liquid-fuel measuring instrument being installed.

(a) Explain with reference to legislation whether you would advise that it is necessary to have the liquid fuel measuring instrument conformity assessed. (6 marks)

(b) You decide to undertake a metrological test on the liquid fuel measuring instrument. With reference to the relevant regulations, explain how you would do this and the errors you would apply. (10 marks)

(c) They ask you if the instrument can be converted to indicate in gallons as well as litres, as many of the vintage launches have fuel gauges marked in gallons. What advice would you give? Explain your answer. (7 marks)

(d) You take a 20-litre measure and note that the delivered quantity is 300ml less than indicated. What actions could you take? (5 marks)

(35 marks)

**SECTION B CONTINUES OVER THE PAGE.**

9. You are working as an inspector of weights and measures. Whilst out on inspection you notice a weighbridge that has been there for ten years being worked on at the entrance to a local port and which is used to weigh lorries going to the Continent.

Five days later you receive a notification that a local weighbridge manufacturer, James, and Daughters, has initially conformity assessed the weighbridge.

You decide to visit the site to carry out an inspection. Due to budget cuts, you do not have a weighbridge test unit. You ask to see the paperwork that the engineer has left behind. You ascertain that the weighbridge was initially conformity assessed by James and Daughters on 23rd August 2023, and note that there are no trade transactions completed using the weighbridge.

The recent work was a replacement indicator and is a different brand to the one that was used when the instrument was first placed on the market. The instrument is marked with a CE mark, an M23 and the identification of a European notified body. There is a declaration of conformity with a date of 23rd August 2023

- a) With detailed reference to the regulations, explain why the weighbridge may have been initially conformity assessed ten years ago. (7 marks)
- b) With reference to the regulations, explain why the instrument has been initially conformity assessed recently? (6 marks)
- c) Upon further investigation, you decide to interrogate the checksum of the instrument and note that it is different to the one indicated in the type-examination certificate.

Contrast a version number with a checksum and, with reference to the WELMEC Guide 7.2, explain why this is important. (7 marks)

- d) You decide to go back with a weighbridge unit and decide to undertake a full inspection. You have a trainee with you and will check the instrument following the procedures outlined in EN45501. Outline in detail that procedure and the errors that could be applied. (15 marks)

(35 marks)

**SECTION B CONTINUES OVER THE PAGE.**

10. The local authority for which you work wants to attach a weighing instrument to the rear of a bin lorry with the intention of charging local businesses for the waste that it collects. The process must be fully automatic with the weight data being sent to the council office via a 5G connection from the lorry. At the council office, the invoice will be calculated, and the completed invoice e-mailed to the customer immediately.

They have contacted your department for advice on the legal requirements of the instrument they are intending to purchase.

- a) With reference to the Measuring Instruments Regulations 2016 (as amended), what type and class of weighing instrument should they purchase? (5 marks)
  - b) With reference to the relevant normative document, comment on the test loads you would use and how you would determine their accuracy if you were asked to initially conformity assess this instrument. (5 marks)
  - c) Explain, with reference to regulations, whether this instrument could be used to charge for domestic waste at a later date. (5 marks)
  - d) Explain the different conformity assessment procedures that must be used to enable the Council to place the instruments on the market. (5 marks)
  - e) Briefly outline the process you would undertake if you were asked to initially conformity assess this instrument. (8 marks)
  - f) Outline, with reference to the essential requirements of the Measuring Instruments Regulations 2016 and the WELMEC Guide 7.2, the legal metrology requirements that would apply to the transfer of weight data from the weighing instruments to the Council computer systems where the invoicing would be completed. (7 marks)
- (35 marks)

**Section B total of 70 marks.**

**END OF EXAMINATION PAPER.**