

**University of Cambridge
Department of Veterinary Medicine**

Ionising Radiations (Radioactive Substances) Skill Questionnaire for New Workers

Note: this written questionnaire is part of the Departmental (Ionising Radiations) Induction Programme which as a new worker you are required to follow. You should also have attended the University's 'Core' training session for New Users of Ionising Radiations. Newly registered graduate students will also be expected to have attended the relevant session of the October Safety Course for new graduate students.

The aim of this short questionnaire is to ensure that you are aware of some of the most significant issues in respect of radiation protection, and that you are capable of performing some basic data calculations essential for the accurate and safe handling of radioactive substances.

You should complete the questions below and you may consult any reference material available to you (Departmental Local Rules, University Working Safely with Unsealed Radioactive Sources Booklet [HSD book 3 on Shared items/Departmental Safety/Ionising Radiation], the web eg http://www.knowledgedoor.com/1/Unit_Conversion/Power_Prefixes.htm). Correct answers to all questions are required if you wish to work/continue to work with radioactive substances.

1. Match the following ' $\frac{1}{2}$ lives' with the correct radionuclide:

87.4 days	^3H
60 days	^{14}C
5730 days	^{32}P
25.4 days	^{35}S
14.3 days	^{125}I
12.3 years	^{33}P

2. Name the SI unit of activity:

3. Name an SI unit of 'dose':

4. List four principle measures which can be used in order to reduce exposure to ionising radiations:

- a)
- b)
- c)
- d)

5. What type of particle forms beta radiation:

6. What is the best laboratory shielding material for modest activities of ^{32}P :

7. What is the preferred type of monitor for contamination monitoring of:

- ^{32}P
- ^{125}I
- ^3H

8. What type of 'radiation' is emitted from



9. Name four routes by which radioactive substances can enter the body

a)

b)

c)

d)

10. You have received a vial containing 37 MBq of ^{32}P -ATP. It has volume of 100 microlitres.

a) what is the activity in this delivery in millicuries

b) What is the concentration of radioactivity in MBq/microlitre

c) You want to use 100 microcuries in an experiment.

How much is this in MBq?

What volume do you need to remove?

How much radioactivity will be left in the vial?

What volume will be left in the vial?

d) If the specific activity is 200 TBq/mmol, how many micromoles will you have removed?

e) Would the above experiment need to be carried out within a specially designated area or could it be carried out in an undesignated area?

If yes which ... Supervised or controlled?

11. List three actions which should be taken following a significant spill of a radioactive substance:

a)

b)

c)

12. What must be recorded in writing when disposing of waste radioactive substances to drain or to the solid waste store?

13. What are the two main items of legislation which determine the arrangements by which radioactive substances are held or disposed by the University and name the outside agencies who monitor and enforce this legislation.

- a) Agency
- b) Agency

14. List four actions which are not permitted in a laboratory where radioactive substances are used or stored:

- a)
- b)
- c)
- d)

15. What are the annual 'whole body' and 'extremity' (effective) dose limits for a non-classified adult employee within the UK?

Whole body
Extremity

Is it acceptable within the University to allow people to receive that dose?

16. What does ALARP and BAT mean and how do these principles apply to question 15 above.