## Q1.(2019)

Why is alpha radiation dangerous inside the human body?

**[1 mark]**

Tick (✓) **one** box.

Alpha radiation is electromagnetic radiation. ☐

Alpha radiation is highly ionising. ☐

Alpha radiation is very penetrating. ☐

## Q2.(2020)

Radioactive waste from nuclear power stations is a man-made source of background radiation.

Which of the following is also a man-made source of background radiation?

**[1 mark]**

Tick (✓) **one** box.

cosmic rays ☐

radiotherapy ☐

rocks ☐

stars ☐

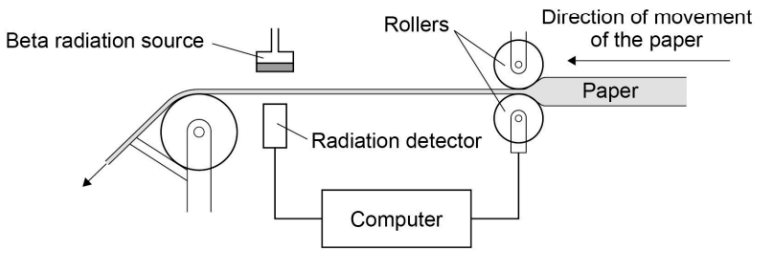
## Q3.(2021)

a)

Beta radiation can be used to monitor the thickness of paper during production.

**Figure 9** shows how the radiation is used.

**Figure 9**




The computer uses information from the radiation detector to change the size of the gap between the rollers.

Complete the sentences.

Choose answers from the box.

Each answer can be used once, more than once or not at all.

| decrease | stay the same | increase |
|---|---|---|

The thickness of the paper between the beta source and the detector increases.

**[2 marks]**

The reading on the detector will _____.

This is because the amount of radiation absorbed by the paper

will _____.

b)

Why should the radiation source used in **Figure 9** have a long half-life?

**[1 mark]**

Tick (✓) **one** box.

So the activity of the source is approximately constant. ☐

So the amount of radiation decreases quickly. ☐

So the radiation has a long range in air. ☐

Q4.(2022)

The average background radiation dose per year in the UK is 2.0 millisieverts.

A dental X-ray gives a patient a radiation dose of 0.005 millisieverts.

Calculate how many dental X-rays would be the same as the average background radiation dose per year.

**[2 marks]**

_____

_____

_____

Number of dental X-rays = _____

Q5.(2023)

a)

Workers in nuclear power stations must be aware of nuclear irradiation and radioactive contamination.

Draw **one** line from each term to an example of the term.

**[2 marks]**

| **Term** | **Example** |
|---|---|
| | Exposure to a beam of gamma rays |
| Radioactive contamination | Exposure to ultraviolet radiation from the Sun |
| Nuclear irradiation | Accidental transfer of plutonium onto a human body |
| | Using a mobile phone |

b)

Why are workers required to walk across a sticky floor before leaving the nuclear power station?

**[1 mark]**

Tick (✓) **one** box.

- To remove alpha particles from their shoes. ☐
- To remove gamma radiation from their shoes. ☐
- To remove radioactive dust from their shoes. ☐

c)

The places where people work and live contribute to the nuclear radiation they are exposed to.

**Table 3** shows the mean daily dose of radiation caused by two different jobs.

**Table 3**

| Job | Mean daily dose in mSv |
|---|---|
| Aeroplane pilot | 0.072 |
| Nuclear power station worker | 0.00050 |

Calculate the number of days a nuclear power station worker must work before receiving the same dose that an aeroplane pilot receives in one day.

**[2 marks]**

Number of days = _____

Q6.(2024)

A teacher measured the background radiation in a laboratory.

Which sources of background radiation are natural and which are man-made?

**[2 marks]**

Tick (✓) **one** box in **each** row.

| Source of background radiation | Natural | Man-made |
|---|---|---|
| Cosmic rays | | |
| Medical X-rays | | |
| Nuclear accidents | | |
| Radon gas | | |