

State Examination Commission – Physics Higher Level, 2008

Question 12c

In 1939 Lise Meitner discovered that the uranium isotope U-238 undergoes fission when struck by a slow neutron. Barium-139 and krypton-97 nuclei are emitted along with three neutrons.

Write a nuclear reaction to represent the reaction. (12)

In a nuclear fission reactor, neutrons are slowed down after being emitted.

Why are the neutrons slowed down?

How are they slowed down? (9)

Fission reactors are being suggested as a partial solution to Ireland's energy needs.

Give one positive and one negative environmental impact of fission reactors. (7)

Write a nuclear reaction to represent the reaction. (12)



In a nuclear fission reactor, neutrons are slowed down after being emitted.

Why are the neutrons slowed down?

To increase the chances of capture by U-235 nuclei and cause further fission thus sustaining the reaction

How are they slowed down? (9)

By colliding with a moderator such as graphite or heavy water.

Fission reactors are being suggested as a partial solution to Ireland's energy needs. Give one positive and one negative environmental impact of fission reactors. (7)

positive: Practically no greenhouse gas emission
negative: Radioactive by-products that require long term safe storage