

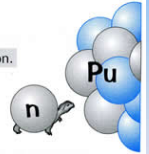


Fission and Fusion

Workbook page 100

Q1 Match up each key word or phrase with its meaning.

Keyword	Meaning
Fission	A process which changes atomic nuclei.
Nuclear reaction	Joining together.
Fusion	A device using an uncontrolled nuclear reaction.
Atomic bomb	Splitting apart.
Nuclear reactor	A device using nuclear fusion.
Hydrogen bomb	A device using a controlled nuclear reaction.



Q2 Explain how a nuclear fission chain reaction occurs, starting with a single plutonium nucleus absorbing a slow-moving neutron.

A plutonium nucleus absorbs a slow moving (thermal) neutron. This results in a very unstable nucleus that undergoes fission. That means it splits into two smaller nuclei or fission fragments. Two or three neutrons are also released when the fission occurs. These can then go on to be absorbed by other plutonium nuclei so the whole process continues in this way. The reaction itself produces what is needed to instigate the next stage of the reaction.

Q3 List four differences between nuclear fission and nuclear fusion.

- In fission a heavy nucleus splits in two - in fusion two lighter nuclei join.
- Fission reactors use plutonium or uranium as fuel - fusion reactors use hydrogen.
- Fission produces a lot of radioactive waste compared to fusion.
- Fusion requires very high temperatures - fission does not.

Also: Fusion reactors are only in the experimental stage whereas fission reactors have been around since the 1950s.

Q4 Give two good points and two bad points about fusion reactors.



Good points Fuel is cheap and plentiful and they produce very little radioactive waste.

Bad points No materials can withstand the high temperatures required in the reaction vessel. It requires a lot of energy to achieve such high temperatures at the moment it is not cost effective.