KEY

Fusion

Name - _____

1.) Write a definition of nuclear fusion in your own words.

Nuclear fusion is the joining of two atoms to form a single larger atom. This only occurs at extremely high temperatures (millions of degrees).

2.) Why must two nuclei be moving at high speeds for nuclear fusion to occur?

Nuclei must be moving at high speeds to collide and create a fusion reaction as these speeds allow the nuclei to overcome the repulsive forces that exist between like charged particles.

3.) Complete the following nuclear fusion reactions:

a.) ${}_1^2H + {}_1^2H \rightarrow {}_2^3He + {}_0^1n$

b.) ${}_2^3H + {}_2^3H \rightarrow {}_2^4He + 2\,{}_1^1H$

c.) ${}_2^3H + {}_2^3H \rightarrow {}_2^4He + {}_1^1H + {}_1^1H$

d.) ${}_1^2H + {}_1^2H \rightarrow {}_1^3H + {}_1^1H$

4.) What are the major obstacles facing the development of a commercially successful nuclear fusion power plant?

The problems to overcome to make a fusion plant is the difficulties of a vessel that can withstand the heat of the reaction without melting and being able to create the conditions of extreme heat and pressure needed to start the reaction in a controlled environment.

5.) Why does a hydrogen bomb require a nuclear fission bomb?

A hydrogen bomb requires extreme temperatures to cause the fusion reaction to proceed and a fission reaction is the only way we know of today to cause the extreme temperatures needed to cause a fusion reaction to occur here on earth.