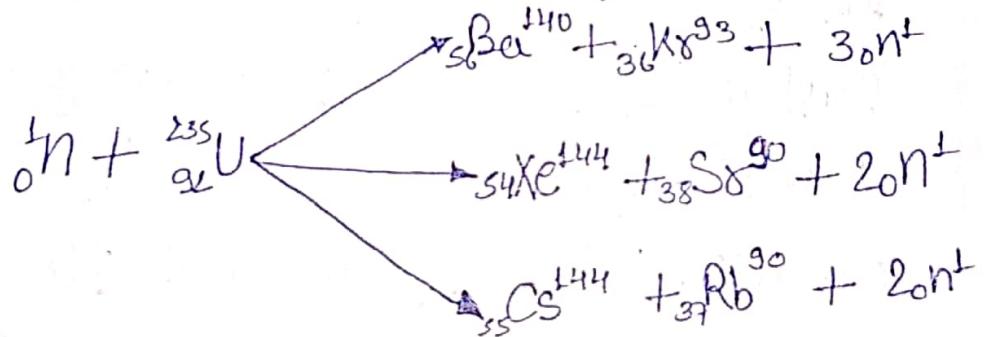


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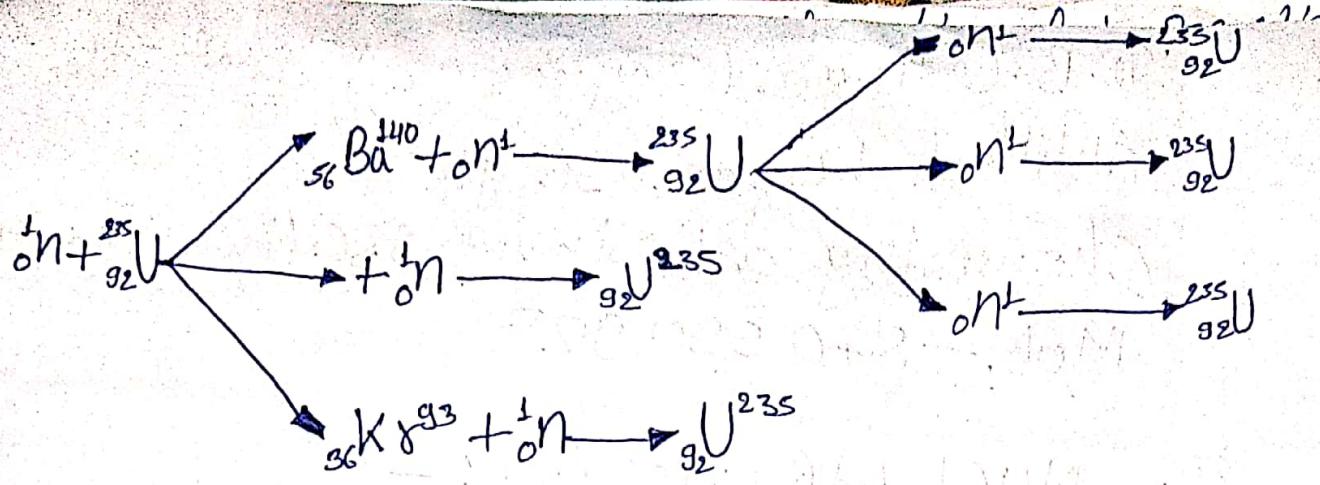
Q9. NUCL.BAR FISSION :-

~~It is nuclear reaction in which~~
It is nuclear reaction in which heavy nucleus splits into lighter nuclei of comparable masses with release of large amount of energy by bombardment with suitable sub-atomic particles, i.e.



If the neutrons from each fission are absorbed by other ${}_{92}^{235}$ nuclei, these nuclei split and release even more neutrons.

Thus a chain reaction can occur. A nuclear chain reaction is a self-sustaining series of nuclear fissions caused by the previous neutrons released from the previous nuclear reactions.



The should be critical amount of the fissionable material to maintain fission chain.

This in turn requires, minimum critical mass of fissionable material. It is the small mass of the fissionable material in which chain reaction can be sustained. If mass is larger than critical mass (supercritical mass), then the number of nuclei that split, multiplies rapidly.

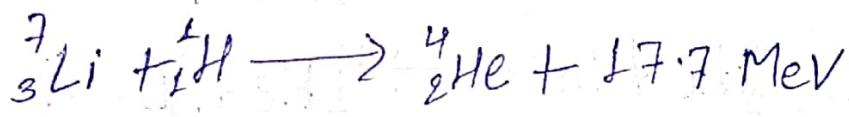
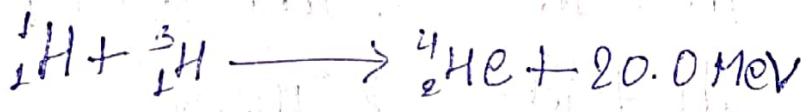
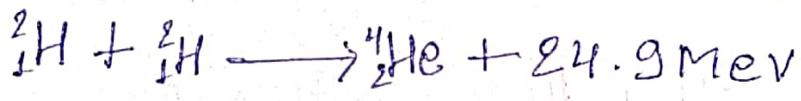
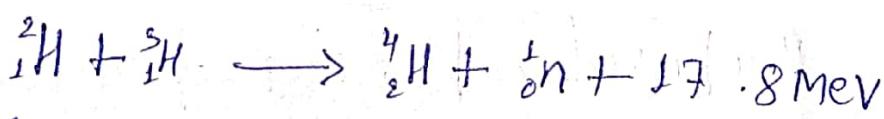
An atomic bomb is detonated with small amount of chemical explosive that push together two or more masses of fissionable material to get a supercritical mass.

A nuclear fission reactor is a device that permits a controlled chain nuclear fission. Control rods made of elements such as boron and cadmium, absorb additional neutrons

and can therefore show the chain reactions.

30. NUCLEAR FUSION:

It is a nuclear reaction in which two lighter nuclei. To achieve this, colliding nuclei must possess enough kinetic energy to overcome the initial force of repulsion between the positively charged core. At very high temperature of the order of 10^8 to 10^9 K, the nuclei may have the sufficient energy to overcome the repulsive forces and fuse. Such reactions are therefore also known as thermonuclear reactions.



The energy of fission process is due to mass defect converted into binding energy. The high temperature required to initiate such reaction may be attained initially through fission process. Hydrogen bomb is based on the principle

at fusion reactions. Energy released is so enormous that it is about 1000 times that of atomic bomb. In hydrogen bomb a mixture of deuterium oxide (D_2O) and tritium oxide (T_2O) is enclosed in space surrounding an ordinary atomic bomb. The temperature produced by the explosion of the fusion reaction between 1H and 3H releasing huge amount of energy. It is believed that the high temperature of stars including the sun is due to fusion reactions. E. Salt peter in 1953 proposed a proton-proton chain reaction.

