

Name: _____

Class: _____

Due Date: _____

E.4 Fission

Understandings

- Energy is released in spontaneous and neutron-induced fission.
- The role of chain reactions in nuclear fission reactions.
- The role of control rods, moderators, heat exchangers, and shielding in a nuclear power plant.
- The properties of the products of nuclear fission and their management.

The solutions can be found on the YouTube channel Go Physics Go:

<https://www.youtube.com/@gophysicsgo/playlists>

1. C: Define *nuclear fission*.
2. C: Give two examples of *nuclear fission*.
3. C: Define *chain reaction*.
4. C: Define *critical mass*. Units?
5. C: Define *induced process*.

6. C: What are the uses of the following objects in a nuclear reactor?

a. *control rod*

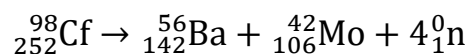
b. *moderator*

c. *heat exchanger*

d. *fuel rod*

7. C: State two benefits and two drawbacks to using *nuclear power*.

8. E: Below is one example of a fission reaction:



Given the information below determine the change in binding energy to three decimal places.

Total binding energy of Californium-252: 1881.274575 MeV

Total binding energy of Barium-142: 1180.144060 MeV

Total binding energy of Molybdenum-106: 898.95878 MeV

Total binding energy of a neutron: 0 MeV

9. E: A typical fission of one californium-252 nucleus releases about 184.07 MeV of energy. Determine the amount of energy, in Joules, which is released from 10.000 kg of pure californium-252.