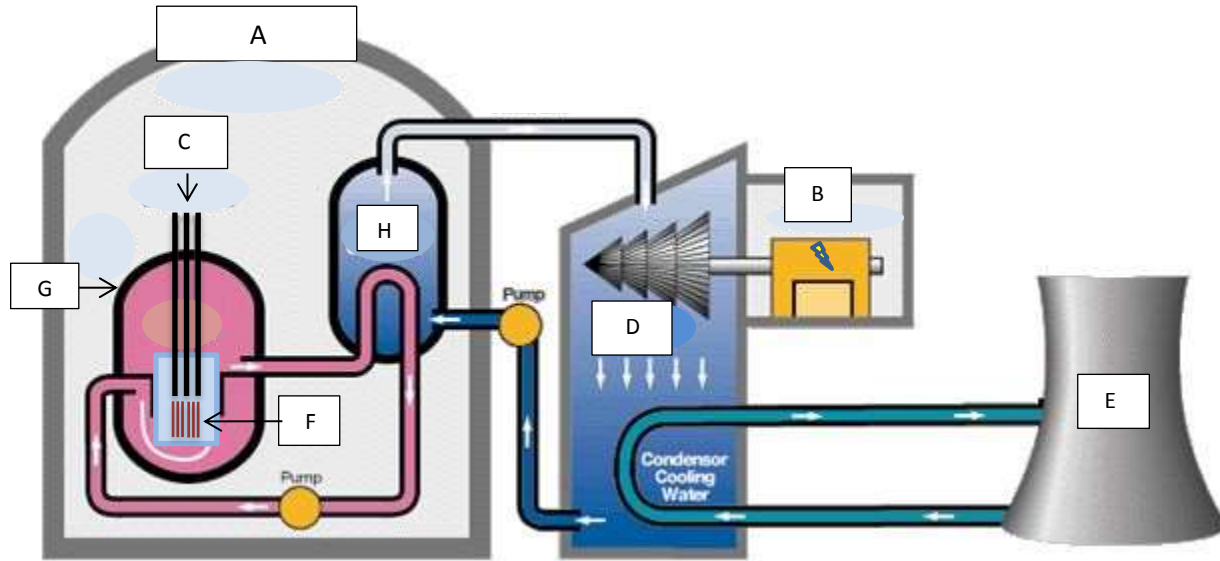
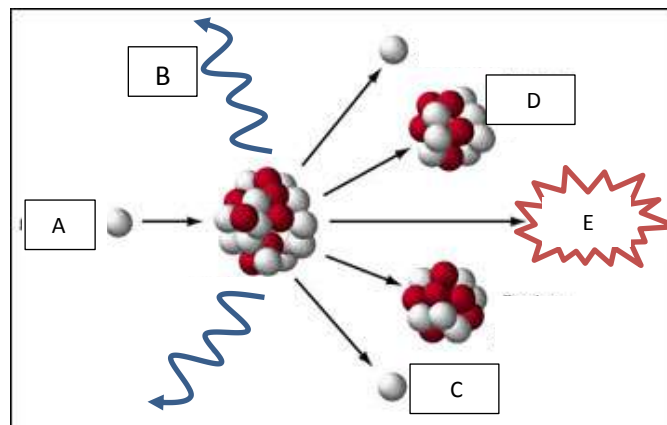


## Nuclear Energy and Renewable Energy Resources Exam Study Guide

1. Be able to classify an energy resource as renewable or nonrenewable.
2. Be able to label a nuclear power plant and know the functions of key parts.



3. How does forced nuclear fission work? Label the key components of the fission diagram shown below.



4. How many half-lives does it take for radioactive materials to decay to safe levels?
5. What countries have the most reserves of uranium?
6. Know how high and low-level radioactive wastes are presently handled.

7. What are 3 historical examples used to argue that nuclear energy is unsafe?

8. Nuclear waste Policy Act of 1982 – What was its main provision?

9. Know how to handle a radioactive decay problem. Here are a few examples:

The table below gives information about the radioactive decay of carbon-14 that is used in dating relatively recent fossil remains.

a. After how many years will  $\frac{1}{128}$  gram of the original carbon-14 remain?

- (A) 22,800 yr
- (B) 28,500 yr
- (C) 34,200 yr
- (D) 39,900 yr
- (E) 45,600 yr

Half-life	Mass of Original Carbon-14 Remaining (grams)	Number of Years
0	1	0
1	$\frac{1}{2}$	5,700
2	$\frac{1}{4}$	11,400
3	$\frac{1}{8}$	17,100
4	$\frac{1}{16}$	
5		
6		
7		

b. A rock sample that originally contained 100 grams of uranium-235 (half-life: 710 million years) now contains only 12.5 grams of uranium-235. Approximately how many years has this rock existed?

- (A) 710 million
- (B) 1.42 billion
- (C) 2.13 billion
- (D) 2.84 billion
- (E) 3.55 billion

c. The half-life of plutonium-239 is 24,100 years. What fraction of Pu-239 will remain after 144,600 years?

- (A)  $\frac{1}{4}$
- (B)  $\frac{1}{8}$
- (C)  $\frac{1}{16}$
- (D)  $\frac{1}{32}$
- (E)  $\frac{1}{64}$

10. What are the key structural parts in the design of a passive solar heating system?
11. What is a PV solar cell? What does it do?
12. What is the efficiency of a typical solar panel?
13. Which is more efficient/energy producing: solar or wind?
14. What are two negative aspects that solar and wind power have in common?
15. How does a high-dam function to generate electrical power?  
(know the parts of the dam and the energy transformations taking place)
16. How does a low-dam function to generate electrical power?
17. Besides power generation, what are other benefits of building dams?
18. How did the building of the Aswan Dam negatively affect the productivity of the Nile Delta?
19. What is the purpose of a fish ladder?
20. Geothermal energy to produce electricity requires “prime locations” – where are these prime locations?

21. In non-prime locations (such as Long Island), how can geothermal energy be used?
22. What gas can be released to the air as a result of tapping into geothermal sources? Why is this bad?
23. What is the main source of household energy used in developing countries?
24. What is ethanol? Why is it added to gasoline?
25. What is biodiesel?
26. What is meant by the term “carbon neutral”? Which energy resource is this term associated with?
27. What is meant by cogeneration?
28. What is the difference between CCP and CHP power generation?
29. What does the R-value of insulation indicate?
30. What are some positives and negatives of hydrogen fuel cells in automobiles?