

Nuclear Energy Foundations

Nuclear Energy · Answer Key · 25 Questions

1. Which subatomic particle is released during nuclear fission and triggers a chain reaction by striking other nuclei?

- A) Proton
- B) Electron
- C) Neutron**
- D) Photon

2. What is the primary element used as fuel in most commercial nuclear power reactors?

- A) Uranium**
- B) Plutonium
- C) Thorium
- D) Helium

3. In a nuclear power plant, what is the main purpose of the control rods?

- A) To produce electricity
- B) To absorb neutrons**
- C) To cool the reactor
- D) To reflect heat

4. Which material is commonly used as a moderator in nuclear reactors to slow down fast neutrons?

- A) Lead
- B) Graphite**
- C) Copper
- D) Iron

5. What is the physical process that generates heat within the core of a nuclear reactor?

- A) Chemical combustion
- B) Nuclear fusion
- C) Nuclear fission**
- D) Radioactive decay

6. Which state of matter is the coolant primarily in inside a Pressurized Water Reactor (PWR) to prevent it from boiling?

- A) Solid
- B) Liquid**
- C) Gas
- D) Plasma

7. What substance is used to create steam that turns the turbines in a nuclear power plant?

- A) Oil
- B) Natural gas
- C) Water**
- D) Mercury

8. Which component of a nuclear power plant is responsible for converting the mechanical energy of spinning shafts into electrical energy?

- A) Reactor vessel
- B) Turbine
- C) Generator**
- D) Condenser

9. What term describes the mass of nuclear fuel required to maintain a self-sustaining chain reaction?

- A) Critical mass**
- B) Atomic weight
- C) Isotopic threshold
- D) Fissile density

10. Which natural force holds the nucleus of an atom together, which is overcome during nuclear fission?

- A) Gravity
- B) Electromagnetism
- C) Strong nuclear force**
- D) Weak nuclear force

11. What is the byproduct of nuclear fission that requires long-term, specialized storage?

- A) Carbon dioxide
- B) Spent nuclear fuel**
- C) Oxygen
- D) Water vapor

12. Which type of radiation is commonly blocked by the thick concrete containment structures of a nuclear plant?

- A) Gamma rays**
- B) Visible light
- C) Radio waves
- D) Infrared

13. What isotope of Uranium is the most common fissile material found in nature?

- A) Uranium-234
- B) Uranium-235**
- C) Uranium-238
- D) Uranium-239

14. Where does nuclear fusion naturally occur on a massive scale?

- A) The Earth's core
- B) Inside the Sun**
- C) In volcanic vents
- D) In the upper atmosphere

15. What is the primary role of the containment building in a nuclear power station?

- A) To generate electricity
- B) To release excess steam
- C) To prevent radioactive material release**
- D) To store coal

16. Which element is produced as a byproduct in nuclear reactors and is often used as fuel after reprocessing?

- A) Plutonium**
- B) Lead
- C) Gold
- D) Hydrogen

17. What cooling mechanism is used to condense steam back into water after it passes through the turbine?

- A) A heat exchanger**
- B) A chemical solvent
- C) Compressed air
- D) Direct sunlight

18. What is the unit of measure commonly used to quantify radioactivity?

- A) Becquerel**
- B) Watt
- C) Joule
- D) Volt

19. Which part of the reactor regulates the rate of the fission reaction by moving in or out of the core?

- A) Coolant pump
- B) Containment dome
- C) Control rods**
- D) Turbine blades

20. Nuclear power is considered a 'low-carbon' energy source because it does not produce what during operation?

- A) Steam
- B) Electricity
- C) Heat
- D) Carbon dioxide**

21. What happens to the kinetic energy of neutrons when they collide with a moderator?

- A) It increases
- B) It decreases**
- C) It turns into light
- D) It turns into sound

22. What is the function of the 'cladding' around nuclear fuel pellets?

- A) To conduct electricity
- B) To contain fission products**
- C) To speed up the reaction
- D) To store heat

23. What is the term for the process where an atom splits into two smaller nuclei?

- A) Fission**
- B) Fusion
- C) Ionization
- D) Excitation

24. In a nuclear plant, what does the 'secondary loop' contain?

- A) Radioactive fuel
- B) Water to be turned to steam**
- C) Molten metal
- D) Waste gases

25. Which of the following is NOT a primary component of a standard nuclear reactor system?

- A) Core
- B) Turbine
- C) Coal furnace**
- D) Control rods