

Fundamentals of Nuclear Energy

Nuclear Energy · Practice Test · 25 Questions

1. Which element is the primary fuel used in most conventional nuclear power reactors?

- A) Uranium
- B) Plutonium
- C) Thorium
- D) Radium

2. What physical process do nuclear power plants use to generate heat?

- A) Nuclear fusion
- B) Chemical combustion
- C) Nuclear fission
- D) Geothermal extraction

3. In a nuclear reactor, what is the purpose of control rods?

- A) To heat the water
- B) To absorb neutrons and regulate the reaction rate
- C) To provide structural support
- D) To convert electricity into light

4. What is the role of the 'moderator' inside a nuclear reactor?

- A) To increase the temperature
- B) To slow down neutrons
- C) To accelerate the chain reaction
- D) To store spent fuel

5. Which part of a nuclear power plant is responsible for generating electricity using steam?

- A) The core
- B) The cooling tower
- C) The turbine
- D) The containment dome

6. What is the main environmental benefit often cited for nuclear power compared to fossil fuels?

- A) Zero greenhouse gas emissions during operation
- B) It is cheaper to build
- C) It requires less water
- D) It can be built anywhere

7. What material is most commonly used as a coolant in nuclear reactors?

- A) Liquid helium
- B) Mercury
- C) Water
- D) Liquid nitrogen

8. What is the term for the byproduct of nuclear power generation that requires careful long-term storage?

- A) Nuclear waste
- B) Biomass
- C) Coal ash
- D) Hydrocarbon residue

9. Which subatomic particle is released during nuclear fission and triggers further fission events in a chain reaction?

- A) Proton
- B) Electron
- C) Neutron
- D) Positron

10. Where is the majority of the heat produced in a nuclear power plant?

- A) In the turbine
- B) In the reactor core
- C) In the cooling towers
- D) In the electric generator

11. What is the function of the containment structure in a nuclear power station?

- A) To generate steam
- B) To prevent the release of radioactive materials
- C) To house the administrative staff
- D) To store the fuel rods

12. Nuclear power plants produce electricity using which of the following energy transformations?

- A) Nuclear to chemical to electrical
- B) Nuclear to thermal to mechanical to electrical
- C) Chemical to thermal to electrical
- D) Solar to thermal to electrical

13. What is the term for a reactor configuration where the chain reaction is kept at a steady, constant level?

- A) Criticality
- B) Meltdown
- C) Fission instability
- D) Exothermic collapse

14. Which heavy metal is sometimes produced from uranium in a reactor and can also be used as a nuclear fuel?

- A) Lead
- B) Plutonium
- C) Gold
- D) Iron

15. What is the primary substance that absorbs heat from the fuel rods to create steam?

- A) Oil
- B) Natural gas
- C) Water
- D) Molten salt

16. Approximately what percentage of global electricity is currently produced by nuclear power?

- A) 5-10%
- B) 10-15%
- C) 25-30%
- D) 40-50%

17. Which country currently operates the largest number of nuclear power reactors?

- A) France
- B) United States
- C) Japan
- D) China

18. What happens to the kinetic energy of neutrons during the moderation process?

- A) It increases
- B) It decreases
- C) It remains constant
- D) It converts into light

19. What type of radioactive decay is involved in the fission of Uranium-235?

- A) Alpha decay
- B) Beta decay
- C) Gamma decay
- D) Neutron-induced fission

20. Which of these is a common isotope used in nuclear fuel?

- A) Uranium-238
- B) Uranium-235
- C) Carbon-14
- D) Hydrogen-3

21. What component of a power plant releases excess heat into the atmosphere, often seen as white clouds?

- A) Reactor vessel
- B) Cooling tower
- C) Control rod assembly
- D) Transformer

22. What is the process called when two light atomic nuclei combine to form a heavier nucleus, releasing energy?

- A) Fission
- B) Fusion
- C) Radioactive decay
- D) Ionization

23. Which agency is the international body that promotes safe, secure, and peaceful nuclear technologies?

- A) UNICEF
- B) WHO
- C) IAEA
- D) NATO

24. What is the typical lifespan of a modern nuclear power plant before decommissioning or license renewal?

- A) 10-20 years
- B) 30-40 years
- C) 60-80 years
- D) 5-10 years

25. How is high-level nuclear waste primarily stored after it is removed from the reactor?

- A) It is buried in the ocean
- B) In cooling pools followed by dry casks
- C) It is burned in incinerators
- D) It is recycled into household batteries