

Renewable Energy Principles

Environmental Science · Practice Test · 10 Questions

1. Which physical phenomenon allows solar photovoltaic cells to directly convert light energy into electricity?

- A) Photovoltaic effect
- B) Thermoelectric effect
- C) Piezoelectric effect
- D) Photoelectric emission into a vacuum

2. According to Betz's law, what is the theoretical maximum percentage of kinetic energy that a wind turbine can extract from wind?

- A) 45.2%
- B) 59.3%
- C) 72.8%
- D) 88.5%

3. Which type of geothermal power plant creates steam by pumping high-pressure hot water into a low-pressure tank?

- A) Dry steam
- B) Flash steam
- C) Binary cycle
- D) Enhanced geothermal

4. In hydroelectric power generation, what is the term for the vertical drop distance between the upstream reservoir level and the turbine?

- A) Hydraulic head
- B) Draft length
- C) Surge height
- D) Penstock gradient

5. Which microorganism is most commonly used in the industrial fermentation of biomass sugars to produce bioethanol?

- A) *Escherichia coli*
- B) *Saccharomyces cerevisiae*
- C) *Rhizobium leguminosarum*
- D) *Nitrosomonas europaea*

6. What heat-transfer fluid is used in high-temperature Concentrated Solar Power (CSP) tower systems to store energy efficiently?

- A) Distilled water
- B) Molten salt
- C) Compressed nitrogen gas
- D) Mineral oil

7. Ocean Thermal Energy Conversion (OTEC) generates electricity by taking advantage of temperature differences between which two marine layers?

- A) Warm surface water and cold deep ocean water
- B) Intertidal surface water and ocean floor sediment
- C) Polar surface water and equatorial surface water
- D) Coastal estuary water and open ocean water

8. When green hydrogen is processed in a Proton Exchange Membrane (PEM) fuel cell, what is the primary byproduct emitted?

- A) Carbon dioxide
- B) Methane
- C) Water
- D) Nitrogen dioxide

9. What parameter measures the ratio of actual energy produced by a power plant over a period to its maximum theoretical output at full capacity?

- A) Capacity factor
- B) Thermal efficiency
- C) Grid tolerance
- D) Power density

10. Which primary celestial mechanism supplies the mechanical energy harnessed by tidal power plants?

- A) Atmospheric pressure changes from solar heating
- B) Gravitational interactions between Earth, the Moon, and the Sun
- C) Coriolis forces driven by Earth's rotation
- D) Geothermal heating of the ocean floor