

# Renewable Energy Fundamentals

Renewable Energy · Answer Key · 23 Questions

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**1. Which renewable energy source directly harnesses the Earth's internal heat?**

- A) Solar thermal power
- B) Geothermal energy**
- C) Biomass energy
- D) Hydroelectric power

**2. The process of converting sunlight into electricity using semiconductor materials is known as:**

- A) Photovoltaic effect**
- B) Thermoelectric generation
- C) Electromagnetic induction
- D) Photosynthesis

**3. Ocean thermal energy conversion (OTEC) utilizes the temperature difference between:**

- A) Surface water and deep ocean water**
- B) Freshwater rivers and saltwater oceans
- C) Air temperature and ocean currents
- D) Underground reservoirs and surface lakes

**4. Which of the following is a primary byproduct of anaerobic digestion of organic matter for biogas production?**

- A) Carbon dioxide and methane**
- B) Oxygen and nitrogen
- C) Hydrogen and helium
- D) Sulfur dioxide and nitrous oxide

**5. Concentrated solar power (CSP) systems typically use mirrors or lenses to focus sunlight onto a:**

- A) Receiver to heat a fluid**
- B) Photovoltaic panel array
- C) Wind turbine rotor
- D) Geothermal heat exchanger

**6. The kinetic energy of moving water is captured by turbines in which type of renewable energy generation?**

- A) Tidal power
- B) Wave power
- C) Hydroelectric power**
- D) Ocean thermal energy conversion

**7. Which renewable energy technology converts the kinetic energy of air movement into electricity?**

- A) Wind turbines**
- B) Solar panels
- C) Biomass burners
- D) Geothermal plants

**8. What is the primary challenge associated with the intermittency of solar and wind power?**

- A) Unpredictable energy output**
- B) Overheating of equipment
- C) High fuel costs
- D) Noise pollution

**9. The 'bedrock' of geothermal energy extraction relies on accessing:**

- A) Hot rocks and underground steam**
- B) Surface water currents
- C) Solar radiation intensity
- D) Organic waste materials

**10. Biomass energy is derived from:**

- A) Organic materials, such as plants and animal waste**
- B) Fossil fuels formed over millions of years
- C) Radioactive isotopes
- D) The Earth's magnetic field

**11. Which of these is a significant environmental benefit of using renewable energy sources compared to fossil fuels?**

- A) Reduced greenhouse gas emissions**
- B) Increased air pollution
- C) Depletion of natural resources
- D) Higher water consumption

**12. The 'cut-in speed' for a wind turbine refers to the:**

- A) Minimum wind speed at which it begins to generate power**
- B) Maximum wind speed it can withstand
- C) Speed at which the blades rotate
- D) Speed required for maintenance

**13. What is a common method for storing excess electricity generated from intermittent renewable sources?**

- A) Battery storage systems**
- B) Burning natural gas
- C) Increased coal consumption
- D) Releasing excess heat into the atmosphere

**14. Tidal energy harnesses the power of:**

- A) The rise and fall of sea levels**
- B) Ocean surface waves
- C) Deep sea currents
- D) Thermal gradients in the ocean

**15. Which renewable energy source involves burning organic matter to produce heat or electricity?**

- A) Biomass energy**
- B) Solar energy
- C) Geothermal energy
- D) Wind energy

**16. The efficiency of a photovoltaic solar panel is primarily determined by the material's ability to:**

- A) Absorb photons and generate electron flow**
- B) Withstand extreme temperatures
- C) Reflect sunlight
- D) Conduct heat

**17. Hydropower dams generate electricity by utilizing the potential energy of water stored at a:**

- A) Higher elevation**
- B) Lower elevation
- C) Constant elevation
- D) Underground reservoir

**18. What is the primary gas component of biogas produced from organic waste?**

- A) Methane**
- B) Oxygen
- C) Nitrogen
- D) Carbon dioxide

**19. The 'capacity factor' of a renewable energy generator indicates:**

- A) The ratio of actual energy output to its potential maximum output over a period**
- B) Its physical size and footprint
- C) The average temperature it operates at
- D) The rate at which it degrades over time

**20. Wave energy converters capture the energy from:**

- A) The up-and-down motion of ocean surface waves**
- B) Subsurface ocean currents
- C) The gravitational pull of the moon
- D) Changes in ocean salinity

**21. Which of the following is NOT a form of direct solar energy utilization?**

- A) Geothermal energy**
- B) Solar thermal power
- C) Photovoltaic power
- D) Concentrated solar power

**22. The 'triple junction' solar cell is an advanced type of photovoltaic technology designed to:**

- A) Absorb a broader spectrum of sunlight**
- B) Operate efficiently in low light conditions
- C) Withstand extreme weather
- D) Generate heat for direct use

**23. What is a key factor in determining the viability of a geothermal energy project?**

- A) Proximity to underground heat sources**
- B) Availability of strong winds
- C) Access to large bodies of water
- D) Abundant sunshine throughout the year