

2024 Area 2 Envirothon: CEI – “Renewable Energy for a Sustainable Future”

1. Assuming an average solar panel efficiency of 20%, and that the solar panels receive an average of 5 peak sunlight hours per day, 1 acre of solar farm could potentially produce about how many kilo-watts of energy per hour?
 - A. 250-300 kilowatt-hours
 - B. 500-600 kilowatts-hour
 - C. 100-150 kilowatts-hour
 - D. 1000-1300 kilowatts-hour

2. Which of the following is NOT a resulting effect of solar installation on forage production?
 - A. More shade
 - B. Increased soil moisture
 - C. Late flower blooms
 - D. Increased seed spreading

3. What is the lifespan of a wind farm?
 - A. 5 years
 - B. 20 years
 - C. 75 years
 - D. 100 years

4. What is the lifespan of a solar panel?
 - A. 25-30 years
 - B. 8-15 years
 - C. 30-50 years
 - D. 60-100 years

5. Which of the following is a potential disadvantage of using a solar fountain in a bird bath?
(PROP # 5)
 - A. Increased risk of bird collisions due to the movement of water.
 - B. Limited availability of sunlight affecting the fountain's performance.
 - C. Excessive noise generated by the solar fountain disturbing birds.
 - D. Higher maintenance requirements for cleaning solar panels.

6. What is the lifespan of coal-gas plants/fossil fuel plants?
 - A. 60-70 years
 - B. 10-25 years
 - C. 30-50 years
 - D. 17-34 years

7. What is the average wind speed necessary for wind energy production?
 - A. 15 MPH
 - B. 2 MPH
 - C. 9 MPH
 - D. 30 MPH

8. What is the difference between electrical production between tracking and stationary solar panels?
- A. Tracking systems offer greater levels of energy output compared to fixed arrays
 - B. Fixed arrays offer greater levels of energy output compared to tracking systems
 - C. They create the same energy output
 - D. Tracking systems don't exist and Stationary solar panels do
9. What percent of Ohio's energy is from Solar panel arrays?
- A. Less than 5%
 - B. 50%-60%
 - C. 20%-25%
 - D. 100%
10. Out of the 50 states, where does Ohio rank for number of Solar panel fields (1 being the most and 50 being the least)?
- A. 12th
 - B. 22nd
 - C. 50th
 - D. 5th
11. What percent of Ohio's energy is from wind farms?
- A. 40%-50%
 - B. 70%-80%
 - C. 100%
 - D. Less than 2%
12. Which of the following is NOT one of the reasons Northwest Ohio is the best place for wind farms in the state?
- A. Wind off of the great lakes
 - B. Flat glaciated land
 - C. Rural area/less space used for cities
 - D. None of the above
13. All of the following are examples of sustainable energy except?
- A. Solar
 - B. Wind
 - C. Fossil Fuels
 - D. Geothermal Energy
14. In the context of solar power, what is the significance of the term "capacity factor"?
- A. The efficiency of converting sunlight to electricity
 - B. The maximum output of a solar panel
 - C. The ratio of actual energy produced to the maximum possible output
 - D. The lifespan of a solar panel

15. Wayne County, along with other counties such as Holmes, Geauga, and Tuscarawas, is known for its sizable Amish population and the presence of Amish businesses, farms, and communities. Here at Kidron Park, there is a buggy shed for horses and buggies to park/hitch. Amish also walk and ride bikes as modes of transportation. Which of the following statements accurately reflects the Amish community's stance on the use of e-bikes (electronic bikes)?

- A. The Amish community widely embraces e-bikes as a modern means of transportation, integrating them seamlessly into their daily lives.
- B. The Amish community strictly prohibits the use of e-bikes due to their reliance on electricity, which contradicts their traditional values.
- C. Some members of the Amish community have begun to adopt e-bikes for certain tasks, while others maintain a more traditional approach to transportation.
- D. The Amish community has petitioned against the use of e-bikes within their settlements, advocating for solely horse-drawn carriages as their preferred mode of transport.

16. All the following are climate change indicators except:

- A. Decrease of greenhouse gases in atmosphere
- B. Sea level rise
- C. Ocean Acidification
- D. Increase of greenhouse gases in atmosphere

17. What is the term used to describe the process of converting organic waste into biogas and fertilizer through anaerobic decomposition?

- A. Biomimicry
- B. Pyrolysis
- C. Anaerobic digestion
- D. Fermentation

18. Which one of the following is a sustainable and renewable resource?

- A. Oil
- B. Gas
- C. Coal
- D. Wood

19. What is the role of energy storage technologies, such as batteries, in supporting renewable energy integration?

- A. To increase energy production from renewable sources
- B. To store excess energy for use during periods of low renewable generation
- C. To convert renewable energy into a more stable form
- D. To reduce the need for renewable energy subsidies

20. Which of the following factors can affect the lifespan of batteries in electric lawn mowers?

(PROP)

- A. Frequency of blade sharpening.
- B. Type of grass being mowed.
- C. Storage temperature when not in use.
- D. Color of the lawn mower's housing.

21. Which renewable energy source is often associated with geothermal power plants?
- A. Biomass
 - B. Underground coal gasification
 - C. Tidal energy
 - D. Heat from the Earth's interior
22. What primary raw material is commonly used in the production of biodiesel?
- A. Corn
 - B. Soybeans
 - C. Algae
 - D. All of the above
23. Which of the following is a major environmental benefit of using biodiesel over traditional petroleum diesel?
- A. Increased greenhouse gas emissions
 - B. Reduced carbon dioxide emissions
 - C. Higher levels of sulfur emissions
 - D. Lower oxygen content
24. Which of the following is a potential environmental challenge associated with large-scale deployment of wind turbines?
- A. Noise pollution
 - B. Visual impact
 - C. Bird and bat collisions
 - D. All of the above
25. When considering the environmental impact of electric lawn mowers versus gas-powered ones, which of the following statements is true? **(PROP)**
- A. Gas-powered mowers are generally more energy-efficient than electric mowers.
 - B. Electric mowers tend to have a higher carbon footprint over their lifetime compared to gas-powered mowers.
 - C. Gas-powered mowers contribute less to noise pollution compared to electric mowers.
 - D. Electric mowers offer a greener alternative with zero emissions during operation

☺ All done! Special Thanks to Test Writers:

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