Nuclear Fusion Breakthrough: Reactor Hits ‘Crucial Milestone’

Description

A breakthrough in the realm of nuclear fusion was recently announced by French scientists, marking a significant advancement in this elusive field. The achievement involved maintaining plasma at extreme temperatures for an unprecedented 22 minutes, a feat that holds immense promise for the future of energy production.

Nuclear fusion, a process that mimics the energy generation found in stars, has long been touted as a clean, safe, and virtually limitless energy source. The challenge lies in overcoming the technical hurdles associated with creating and sustaining the necessary conditions for fusion reactions to occur. Unlike nuclear fission, which involves splitting atomic nuclei, fusion involves merging nuclei together.

The recent success at the WEST tokamak facility in France represents a notable milestone in the quest for practical fusion energy. By sustaining plasma for over 1,300 seconds, the researchers have demonstrated a high level of control and stability in the process. This achievement surpasses the previous record set in China and signals significant progress in the field.

Despite this breakthrough, considerable challenges remain in the path to achieving net energy gain from fusion reactions. The researchers are focusing on improving plasma duration and temperature levels, with the aim of aligning their experiments with the conditions expected in future fusion reactors.

Looking ahead, the ultimate objective is to pave the way for the International Thermonuclear Experimental Reactor (ITER) project, a collaborative effort involving multiple countries. While initial plans for ITER's operation have faced delays, the scientific community remains committed to advancing fusion technology to realize its full potential as a sustainable energy source.

In sum, the recent achievement in plasma maintenance represents a momentous step forward in the pursuit of nuclear fusion energy, bringing us closer to unlocking the vast possibilities this technology holds for the future.

Vocabulary List:

1. **Breakthrough** /ˈbreɪkˌθruː/ (noun): A significant and dramatic advance in knowledge or technology.
2. **Elusive** /ɪˈluːsɪv/ (adjective): Difficult to find catch or achieve.
3. **Sustaining** /səˈsteɪnɪŋ/ (verb): Maintaining or prolonging something over time.
4. **Fusion** /ˈfjuːʒən/ (noun): The process of combining two or more entities to form a single entity.
5. **Milestone** /ˈmaɪlstoʊn/ (noun): An important event or stage in the development of something.
6. **Obstacles** /ˈɑːbstəklz/ (noun): Things that block one’s way or prevent progress.

Comprehension Questions

Multiple Choice

1. What recent breakthrough in nuclear fusion was announced by French scientists?

   Option: Maintaining plasma for 22 minutes at extreme temperatures
   Option: Splitting atomic nuclei
   Option: Producing energy from stars
   Option: Operating fusion reactors safely

2. What is a key difference between nuclear fusion and nuclear fission?

   Option: Fusion involves merging nuclei, while fission involves splitting them
   Option: Fission generates energy from stars
   Option: Fusion is not considered a clean energy source
   Option: Fission creates limitless energy

3. Where did the recent success in nuclear fusion occur?

   Option: WEST tokamak facility in France
   Option: China
   Option: ITER project headquarters
   Option: United States

4. What is the ultimate goal of the ITER project?

   Option: To advance fusion technology for sustainable energy production
   Option: To develop nuclear fission reactors
   Option: To explore space travel
   Option: To create artificial stars

5. What challenges are researchers focusing on after the recent fusion breakthrough?

   Option: Improving plasma duration and temperature levels
   Option: Developing nuclear weapons
   Option: Exploring solar energy options
   Option: Expanding coal mining operations

6. What is the significance of the recent achievement in plasma maintenance?

   Option: A momentous step forward in nuclear fusion energy

Option: A setback in energy production
Option: No impact on scientific progress
Option: A step towards fossil fuel usage

True-False

7. Nuclear fusion is considered a clean, safe, and virtually limitless energy source.

8. The recent achievement in nuclear fusion occurred at the ITER project headquarters.

9. The recent milestone in plasma maintenance signifies a setback in fusion technology.

10. The WEST tokamak facility is located in China.

11. The ITER project aims to develop nuclear fission reactors.

12. Nuclear fusion involves merging atomic nuclei together.

Gap-Fill

13. The recent success at the WEST tokamak facility in France involved maintaining plasma for over 1,300 _____.

14. The researchers are aiming to align their experiments with the conditions expected in future fusion reactors to achieve net energy gain from fusion _____.

15. The ultimate objective of the ITER project is to advance fusion technology for sustainable energy _____.

16. Unlike nuclear fission, which involves splitting atomic nuclei, fusion involves merging nuclei _____.

17. Nuclear fusion has long been touted as a clean, safe, and virtually limitless energy

_____.

18. The challenges in achieving net energy gain from fusion reactions require improving plasma duration

and temperature _____.

Answer

Multiple Choice: 1. Maintaining plasma for 22 minutes at extreme temperatures 2. Fusion involves merging nuclei, while fission involves splitting them 3. WEST tokamak facility in France 4. To advance fusion technology for sustainable energy production 5. Improving plasma duration and temperature levels 6. A momentous step forward in nuclear fusion energy
True-False: 7. True 8. False 9. False 10. False 11. False 12. True
Gap-Fill: 13. seconds 14. reactions 15. production 16. together 17. source 18. levels

Vocabulary quizzes

Multiple Choice (Select the Correct answer for each question.)

1. What is a significant advancement called?

Option: A
Option: Breakthrough
Option: Obstacle
Option: D

2. What is the process of merging two or more things into a single entity?

Option: A
Option: B
Option: C
Option: Fusion

3. What term refers to the state of being subject to death?

Option: A
Option: Mortality
Option: B
Option: D

4. What are slight shaking movements of the earth’s surface?

Option: Tremors
Option: A
Option: B
Option: D

5. What term is used for changing something radically or fundamentally?

Option: Revolutionizing
Option: A
Option: B
Option: D

6. What is a type of polysaccharide found in cell walls of bacteria fungi yeasts algae lichens and plants such as oats and barley?

Option: Beta-glucan
Option: B
Option: C
Option: D

7. What are things that stand in the way of progress or success?

Option: A
Option: B
Option: Obstacles
Option: D

8. What are things that deviate from what is standard normal or expected?

Option: A
Option: Anomalies
Option: C
Option: D

9. What is a viral infection that affects the respiratory system?

Option: Influenza
Option: B
Option: C
Option: D

10. What is the action or process of producing a list or book by assembling information from other sources?

Option: A
Option: Compilation
Option: C
Option: D

Gap-Fill (Fill in the blanks with the correct word from the vocabulary list.)

11. The solution to the problem remained _____ despite numerous attempts.

12. Continuous _____ of the patient's vital signs is crucial in the ICU.

13. The scientist's _____ research in the field of robotics earned her international recognition.

14. The _____ surrounding the outcome of the negotiations created anxiety among the team members.

15. The marathon runner experienced extreme _____ after completing the race.

16. The long hours of work led to physical and mental _____ among the employees.

17. The sudden disappearance of the lake was a natural _____ that baffled scientists.

18. The new policy had far-reaching _____ for small businesses in the region.

19. The stock market experienced significant _____ throughout the trading day.

20. The local _____ came together to support the victims of the natural disaster.

Matching Sentences (Match each definition to the correct word from the vocabulary list.)

21. Conserving natural resources and reducing waste are crucial for the environment for future generations.
22. The study aims to investigate the underlying the biological process of cell division.
23. The region was hit by a event that caused widespread damage to buildings and infrastructure.
24. The success of the experiment relies on the of the measurements taken by the instruments.
25. The patient claimed to have visions while under the influence of a hallucinogenic drug.
26. The captain skillfully the ship through the treacherous waters of the storm.

27. Continuous of the construction site is essential to ensure safety regulations are followed.
28. The drone is programmed to fly without human intervention once the flight path is set.
29. The of data from various sources helped researchers identify patterns in the market trends.
30. The strenuous physical activity led to extreme and fatigue.

Answer

Multiple Choice: 1. Breakthrough 2. Fusion 3. Mortality 4. Tremors 5. Revolutionizing 6. Beta-glucan 7. Obstacles 8. Anomalies 9. Influenza 10. Compilation
Gap-Fill: 11. elusive 12. monitoring 13. groundbreaking 14. uncertainty 15. fatigue 16. exhaustion 17. phenomenon 18. implications 19. fluctuations 20. community
Matching sentence: 1. sustaining 2. mechanisms 3. seismic 4. accuracy 5. hallucinated 6. navigating 7. monitoring 8. autonomously 9. compilation 10. exhaustion

CATEGORY

1. Health - LEVEL5

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