History of Thermodynamics

Thermodynamics · Answer Key · 20 Questions

1. Who published 'Reflections on the Motive Power of Fire' in 1824, introducing the theoretical cycle that bears his name?

A) Nicolas Léonard Sadi Carnot
B) Rudolf Clausius
C) Lord Kelvin
D) James Prescott Joule

2. Which scientist is credited with formulating the Second Law of Thermodynamics in 1850?

A) Ludwig Boltzmann
B) Rudolf Clausius
C) William Thomson
D) Max Planck

3. What is the name of the experimental apparatus used by James Prescott Joule in 1845 to demonstrate the mechanical equivalent of heat?

A) Torsion balance
B) Paddle-wheel calorimeter
C) Vacuum flask
D) Leyden jar

4. In 1848, William Thomson (Lord Kelvin) proposed the creation of a thermodynamic temperature scale based on what principle?

A) The thermal expansion of mercury
B) The properties of an ideal gas
C) The absolute zero of energy
D) The change in density of water

5. The term 'entropy' was introduced to scientific literature in 1865 by which physicist?

A) Rudolf Clausius
B) James Clerk Maxwell
C) Josiah Willard Gibbs
D) Henri Poincaré

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6. Which fundamental thermodynamic concept did Ludwig Boltzmann define using the relation S = k log W?

A) Enthalpy
B) Internal Energy
C) Entropy
D) Gibbs Free Energy

7. In 1876, who published the seminal paper 'On the Equilibrium of Heterogeneous Substances', laying the foundation for chemical thermodynamics?

A) Walther Nernst
B) Josiah Willard Gibbs
C) Antoine Lavoisier
D) Robert Boyle

8. Which scientist conducted the 'Rumford's cannon-boring' experiment in 1798, which challenged the caloric theory of heat?

A) Benjamin Thompson
B) John Dalton
C) Humphry Davy
D) Michael Faraday

9. The Nernst Heat Theorem, which led to the Third Law of Thermodynamics, was formulated in what year?

A) 1888
B) 1906
C) 1922
D) 1945

10. What was the primary focus of the 18th-century 'caloric theory' of heat?

A) Heat as a form of motion
B) Heat as a weightless fluid
C) Heat as a type of radiation
D) Heat as an electromagnetic wave

11. Who coined the term 'thermodynamics' in an 1854 paper titled 'On the Dynamical Theory of Heat'?

A) Lord Kelvin
B) Rudolf Clausius
C) James Clerk Maxwell
D) Hermann von Helmholtz

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12. Which experiment conducted in 1852 by James Prescott Joule and Lord Kelvin demonstrated the temperature change of a gas expanding without doing work?

A) Joule-Thomson effect
B) Stefan-Boltzmann effect
C) Seebeck effect
D) Peltier effect

13. The 'Maxwell's Demon' thought experiment was first proposed by James Clerk Maxwell in a letter written in what year?

A) 1852
B) 1867
C) 1889
D) 1901

14. Which scientist successfully calculated the value of the Boltzmann constant?

A) Max Planck
B) Albert Einstein
C) Niels Bohr
D) Enrico Fermi

15. What century saw the development of the steam engine, which served as the practical impetus for the study of thermodynamics?

A) 16th century
B) 17th century
C) 18th century
D) 19th century

16. The Stefan-Boltzmann law, relating the power radiated by a black body to its temperature, was experimentally proposed in 1879 by whom?

A) Josef Stefan
B) Ludwig Boltzmann
C) Gustav Kirchhoff
D) Wilhelm Wien

17. Which scientist is known for developing the concept of 'exergy' in the late 19th century under the name 'available energy'?

A) Zoran Rant
B) Josiah Willard Gibbs
C) Lord Kelvin
D) Sadi Carnot

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18. Before the term 'entropy' was adopted, what did Clausius call the quantity that represented the 'transformation content' of a system?

A) Caloric

B) Verwandlungswert

C) Vis Viva

D) Enthalpy

19. In 1929, Leo Szilard published a paper that resolved the paradox of 'Maxwell's Demon' by linking thermodynamics to what?

A) Information theory

B) Quantum mechanics

C) Relativity

D) Statistical mechanics

20. Who received the Nobel Prize in Physics in 1920 for his discovery of the anomalies in specific heat at low temperatures, related to the Third Law?

A) Walther Nernst

B) Max Planck

C) Johannes Diderik van der Waals

D) Heike Kamerlingh Onnes

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