

Physics of the Human Body and Health

Physics · Answer Key · 18 Questions

1. What physical property determines the color of light that our eyes perceive, and is crucial for processes like photosynthesis in plants that indirectly affect our health?

- A) Amplitude
- B) Frequency
- C) Wavelength**
- D) Phase

2. The pressure exerted by blood in our arteries is measured in millimeters of mercury (mmHg). This measurement relates to which fundamental physical concept?

- A) Momentum
- B) Force**
- C) Torque
- D) Power

3. When you hear a doctor's stethoscope, you are primarily experiencing which type of wave propagation?

- A) Transverse waves
- B) Electromagnetic waves
- C) Mechanical waves**
- D) Surface waves

4. The human body contains about 60% water. Water's ability to dissolve many substances is due to its polar molecular structure, a key concept in which branch of physics?

- A) Optics
- B) Thermodynamics
- C) Electromagnetism**
- D) Mechanics

5. X-rays, used in medical imaging, are a form of electromagnetic radiation with very short wavelengths. This places them near what on the electromagnetic spectrum?

- A) Radio waves
- B) Visible light
- C) Gamma rays**
- D) Microwaves

6. When lifting weights, your muscles exert a force over a distance to perform work. The rate at which this work is done is known as:

- A) Energy
- B) Momentum
- C) Power**
- D) Velocity

7. The transmission of nerve impulses throughout the body involves the movement of charged ions across cell membranes. This electrical phenomenon is a fundamental aspect of:

- A) Fluid dynamics
- B) Acoustics
- C) Electrostatics**
- D) Kinematics

8. The bending of light as it passes from air into the cornea of the eye is a phenomenon explained by:

- A) Diffraction
- B) Reflection
- C) Refraction**
- D) Interference

9. The sensation of heat or cold we feel is due to the transfer of thermal energy. The primary mechanism of heat transfer through direct contact, like touching a warm surface, is:

- A) Convection
- B) Radiation
- C) Conduction**
- D) Evaporation

10. Ultrasound, used for imaging fetuses and organs, relies on sound waves with frequencies higher than what humans can hear. This is an application of:

- A) Optics
- B) Acoustics**
- C) Magnetism
- D) Thermodynamics

11. The buoyant force exerted by the water helps support a person when swimming. This force is described by:

A) Newton's First Law

B) Archimedes' Principle

C) The Doppler Effect

D) The Law of Conservation of Energy

12. The human heart acts as a pump, creating a pressure difference to circulate blood. This is a practical example of:

A) Static electricity

B) Fluid mechanics

C) Nuclear physics

D) Quantum mechanics

13. When you feel the vibration of your vocal cords producing sound, you are experiencing:

A) Electromagnetic induction

B) Oscillation and wave motion

C) Relativistic effects

D) Chemical bonding

14. The force of gravity keeps us grounded and affects how our bodies move. This force is described by Newton's Law of:

A) Reflection

B) Universal Gravitation

C) Electromagnetic Induction

D) Conservation of Momentum

15. The electrical activity of the brain, measured by an EEG, involves the collective behavior of billions of charged particles. This relates to the principles of:

A) Thermodynamics

B) Kinetic theory

C) Electrophysiology

D) Optics

16. The process of breathing involves the expansion and contraction of the lungs, which changes the volume and pressure inside. This is an application of which gas law?

A) Newton's Law of Motion

B) Boyle's Law

C) Ohm's Law

D) Pascal's Principle

17. Magnetic resonance imaging (MRI) uses strong magnetic fields and radio waves to create detailed images of the body's internal structures. This technology is based on the principles of:

A) Acoustics

B) Optics

C) Nuclear Magnetic Resonance

D) Thermodynamics

18. The energy we obtain from food is converted into mechanical energy for movement and thermal energy to maintain body temperature. This is an illustration of the Law of Conservation of:

A) Mass

B) Momentum

C) Energy

D) Charge