

Biometric Security and Human Physiology

Biometrics · Answer Key · 18 Questions

1. Which layer of the human skin is primarily responsible for the unique patterns used in fingerprint identification systems?

- A) Dermis
- B) Epidermis**
- C) Hypodermis
- D) Stratum basale

2. In iris recognition technology, which part of the eye provides the unique, complex patterns used to authenticate a user?

- A) Sclera
- B) Pupil
- C) Iris stroma**
- D) Cornea

3. What physiological aspect of human speech is analyzed in speaker recognition to verify identity?

- A) The shape of the vocal tract**
- B) The volume of the lungs
- C) The speed of brain signaling
- D) The length of the tongue

4. Which component of the human ear is utilized in ear-shape recognition security systems?

- A) The auditory nerve
- B) The pinna**
- C) The tympanic membrane
- D) The cochlea

5. Human gait analysis in security measures focuses on which biological system?

- A) The endocrine system
- B) The cardiovascular system
- C) The musculoskeletal system**
- D) The lymphatic system

6. What unique chemical signature is sometimes explored for authentication due to the varying composition of amino acids and proteins?

A) Sweat secretion

- B) Gastric acid
- C) Saliva viscosity
- D) Tear pH

7. Vein pattern recognition relies on the anatomy of which system beneath the skin surface?

- A) The digestive system
- B) The nervous system

C) The circulatory system

- D) The skeletal system

8. Which part of the human hand, aside from fingerprints, is used in hand geometry biometrics?

- A) The density of sweat glands

B) The length and width of fingers

- C) The color of the nail bed
- D) The number of nerve endings

9. In facial recognition, which underlying biological structure remains relatively stable for identification purposes?

- A) Adipose tissue thickness

B) Bone structure

- C) Skin melanin concentration
- D) Muscle tone

10. What property of human DNA is leveraged in high-security biometric research for identification?

A) The sequence of nucleotide base pairs

- B) The weight of the chromosomes
- C) The rate of cell division
- D) The temperature of the nucleus

11. Retinal scanning relies on the pattern of which biological feature located at the back of the eye?

- A) The aqueous humor

B) The blood vessels

- C) The eyelid
- D) The lens

12. Keystroke dynamics, a behavioral biometric, is influenced by the physiological control of which body part?

A) The motor cortex

- B) The autonomic nervous system
- C) The endocrine glands
- D) The sensory receptors in the skin

13. Which factor makes heart-rate-based authentication unique to an individual's physiology?

A) The volume of blood pumped per minute

B) The specific electrical timing of the cardiac cycle

- C) The oxygen saturation level
- D) The cholesterol content in the blood

14. What physiological limitation affects the reliability of facial recognition in elderly individuals?

- A) Changes in bone density
- B) Atrophy of facial muscles

C) Loss of skin elasticity

- D) Reduction in melanin

15. The study of 'odortypes' in digital security focuses on which physiological process?

A) The release of volatile organic compounds

- B) The rate of perspiration
- C) The shedding of skin cells
- D) The secretion of hormones

16. Which part of the human brain is responsible for the fine motor skills measured in behavioral biometric keystroke analysis?

A) Cerebellum

- B) Hippocampus
- C) Thalamus
- D) Medulla oblongata

17. What is a primary physiological challenge in using voice recognition for users with throat health issues?

A) Change in lung capacity

B) Alteration of the vocal fold vibration

- C) Decrease in salivary flow
- D) Reduced brain-to-larynx signaling

18. In thermal face recognition, what physiological feature of the skin is mapped?

A) Heat radiation patterns

B) Depth of wrinkles

C) Amount of subcutaneous fat

D) Distribution of nerve endings