

Advanced Philosophy of Science and Logic

Philosophy Of Science · Practice Test · 25 Questions

1. Which theorem by Kurt Gödel demonstrates that in any consistent formal system capable of basic arithmetic, there are true statements that cannot be proven within that system?

- A) Incompleteness Theorem
- B) Completeness Theorem
- C) Compactness Theorem
- D) Fixed-point Theorem

2. In the context of the philosophy of physics, what does the 'Bell's Theorem' prove regarding local hidden variable theories?

- A) They are compatible with quantum mechanics
- B) They are logically impossible under local realism
- C) They are proven to be the fundamental structure of space
- D) They resolve the measurement problem

3. The 'Hard Problem of Consciousness', as coined by David Chalmers, primarily argues that physicalism fails to account for which phenomenon?

- A) Neural firing patterns
- B) Qualia
- C) Synaptic plasticity
- D) The function of the prefrontal cortex

4. Which principle states that for any physical theory, the laws of physics are the same in all inertial frames of reference?

- A) Principle of Relativity
- B) Equivalence Principle
- C) Heisenberg Uncertainty Principle
- D) Pauli Exclusion Principle

5. In epistemology, what is the 'Gettier problem' specifically designed to challenge?

- A) The reliability of sensory input
- B) The justified true belief account of knowledge
- C) The coherence theory of truth
- D) The existence of objective reality

6. According to the 'Church-Turing thesis', what is the nature of a function that is 'effectively calculable'?

- A) It can be computed by a Turing machine
- B) It is solvable only by human cognition
- C) It is non-algorithmic
- D) It requires infinite time to compute

7. Which philosophical position asserts that the fundamental constituents of reality are not matter or energy, but rather information?

- A) Panpsychism
- B) Digital Physics
- C) Vitalism
- D) Logical Positivism

8. In thermodynamics and information theory, what does 'Landauer's Principle' establish as the minimum energy required to erase one bit of information?

- A) $kT \ln 2$
- B) $h \cdot \text{frequency}$
- C) mc^2
- D) Boltzmann constant

9. What is the central claim of 'Quinean Holism' regarding empirical verification?

- A) Individual statements can be tested in isolation
- B) Our beliefs about the external world face the 'tribunal of sense experience' as a corporate body
- C) Mathematics is separate from the physical world
- D) All synthetic statements are analytic

10. Which experiment famously demonstrated that the wave-like or particle-like behavior of light depends on whether an observer is present?

- A) Michelson-Morley experiment
- B) Double-slit experiment
- C) Stern-Gerlach experiment
- D) Cavendish experiment

11. The 'Tarski's Undefinability Theorem' proves that truth within a language cannot be defined by what?

- A) The language itself
- B) A metalanguage
- C) Formal logic
- D) Syntactic axioms

12. Which philosophical view, championed by Bas van Fraassen, argues that science aims to provide theories that are 'empirically adequate' rather than necessarily true?

- A) Scientific Realism
- B) Constructive Empiricism
- C) Logical Atomism
- D) Instrumentalism

13. In neurophilosophy, what does the 'Libet experiment' challenge regarding human agency?

- A) The existence of free will
- B) The capacity for linguistic abstraction
- C) The neuroplasticity of the brain
- D) The role of the cerebellum

14. What is the 'No-Communication Theorem' in quantum mechanics?

- A) States that quantum states cannot be used for superluminal communication
- B) States that quantum information is local
- C) States that entanglement does not exist
- D) States that measurement is subjective

15. Which logical fallacy assumes that because a property is true for the parts of a whole, it must be true for the whole itself?

- A) Fallacy of Composition
- B) Fallacy of Division
- C) Equivocation
- D) Ad Hominem

16. What concept describes the limit beyond which an event cannot be observed by an outside observer in general relativity?

- A) Event Horizon
- B) Planck Length
- C) Singularity
- D) Ergosphere

17. Which philosopher proposed that scientific progress occurs through 'paradigm shifts' rather than a linear accumulation of knowledge?

- A) Karl Popper
- B) Thomas Kuhn
- C) Imre Lakatos
- D) Paul Feyerabend

18. In the philosophy of language, what is the 'Reference' of a name, as distinguished from its 'Sense' by Gottlob Frege?

- A) The object to which the name points
- B) The way the object is presented
- C) The syntactic structure
- D) The psychological state of the speaker

19. The 'Problem of Induction', as formulated by David Hume, addresses which logical limitation?

- A) The inability to justify the assumption that the future will resemble the past
- B) The impossibility of deductive reasoning
- C) The non-existence of causal laws
- D) The subjectivity of mathematical constants

20. Which scientific principle suggests that the most likely explanation for a set of data is the one with the fewest assumptions?

- A) Occam's Razor
- B) Hanlon's Razor
- C) Hitchens's Razor
- D) Newton's Flaming Laser Sword

21. What is the primary focus of 'Mereology' within analytic philosophy?

- A) The study of parts and their wholes
- B) The study of moral agency
- C) The study of temporal perception
- D) The study of linguistic tokens

22. Which theorem states that in a closed system, entropy can never decrease over time?

- A) Second Law of Thermodynamics
- B) First Law of Thermodynamics
- C) Third Law of Thermodynamics
- D) Zeroth Law of Thermodynamics

23. In quantum field theory, what is the 'Vacuum State'?

- A) A state with zero energy
- B) The state with the lowest possible energy
- C) A state devoid of all quantum fields
- D) An imaginary state with infinite energy

24. What does 'Functionalism' in the philosophy of mind posit about mental states?

- A) They are defined by their functional role rather than their physical makeup
- B) They are identical to brain states
- C) They are non-physical substances
- D) They are purely linguistic constructs

25. The 'EPR paradox' was intended to demonstrate that quantum mechanics is:

- A) Incomplete
- B) The final theory of physics
- C) Deterministic
- D) Consistent with local realism