

# Advanced Concepts in Artificial Intelligence

Artificial Intelligence · Answer Key · 12 Questions

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**1. Which influential 1950 paper by Alan Turing introduced the 'Imitation Game' as a test for machine intelligence?**

- A) Computing Machinery and Intelligence**
- B) The Analytical Engine
- C) A Mathematical Theory of Communication
- D) On Computable Numbers

**2. In neural network architecture, what is the primary purpose of an activation function such as ReLU or Sigmoid?**

- A) To reduce the number of parameters
- B) To introduce non-linearity into the model**
- C) To normalize input data
- D) To increase processing speed

**3. What is the 'vanishing gradient problem' typically associated with in deep learning?**

- A) Overfitting training data
- B) Memory leakage in GPUs
- C) Training very deep neural networks**
- D) Data bias in datasets

**4. In the context of reinforcement learning, what does the term 'Exploration-Exploitation Tradeoff' refer to?**

- A) Balancing hardware costs and software efficiency
- B) Choosing between known rewards and discovering new strategies**
- C) Switching between training and testing phases
- D) Optimizing data compression vs latency

**5. Which algorithm is the foundational method used to calculate the gradient of the loss function with respect to weights in a neural network?**

- A) Backpropagation**
- B) Principal Component Analysis
- C) K-Nearest Neighbors
- D) Random Forest

**6. What was the first major AI program to defeat a reigning world chess champion in a match under tournament conditions?**

A) AlphaZero

**B) Deep Blue**

C) Stockfish

D) Fritz

**7. In Natural Language Processing, what does the 'Transformer' architecture rely on to weigh the importance of different words in a sequence?**

A) Recurrent feedback loops

**B) Self-attention mechanisms**

C) Fixed length sliding windows

D) Stemming and lemmatization

**8. What is the 'curse of dimensionality' in machine learning?**

A) The tendency of models to be slower as they get older

**B) The difficulty of analyzing data in high-dimensional spaces**

C) The limited availability of training data

D) The inability of computers to read binary

**9. Which mathematical field provides the foundational framework for neural networks and data transformation in AI?**

**A) Linear Algebra**

B) Number Theory

C) Euclidean Geometry

D) Quantum Physics

**10. What is the objective of 'Stochastic Gradient Descent' (SGD)?**

A) To maximize the loss function

**B) To find the global minimum of the loss function**

C) To increase the complexity of the model

D) To prevent the need for labeled data

**11. In AI ethics and development, what is 'Data Poisoning'?**

**A) Intentionally introducing malicious data to compromise a model**

B) The accidental deletion of training sets

C) The use of copyrighted images in training

D) A type of cyberattack on server cooling systems

**12. Which company released the initial research paper 'Attention Is All You Need', which proposed the Transformer architecture?**

- A) OpenAI
- B) DeepMind
- C) Google**
- D) Microsoft