1. Artificial intelligence is defined as the machine-generated ability to accomplish complex goals.

*True* orFalse

1. The Greek philosopher Aristotle taught that patterns of logically valid reasoning can be formalized by rules. This insight is also valid with respect to artificial intelligence today.

*True* orFalse

1. The Turing Test, named after Alan Turing, states that if there is a clear and unambiguous difference in the response of a machine and a human to the same question, artificial intelligence is in operation.

True or *False*

1. The orderly development of artificial intelligence requires ethical guidelines governing human behavior in commerce and national defense.

*True* orFalse

1.2

1. “Winter” in artificial intelligence is broadly defined as a period of disillusionment in the technology resulting in less funding.

*True* orFalse

1. AI Winters can be caused by non-performance of publicly visible artificial intelligence projects and the development of cheaper alternatives.

*True* orFalse

1. All AI winters are categorically bad all the time.

True or *False*

1. Two distinct periods of reduced funding for artificial intelligence have been identified since 1956.

*True* orFalse

1. An alternative view of an AI winter is described in terms of a normal business cycle and limits in data and computer capacity.

*True* orFalse

1.3

1. Major advances in artificial intelligence include expert systems and the near instant language translation of the most popular languages spoken worldwide today.

*True* or False

1. To understand language well enough to engage in a simulated human-computer conversation, the machine must be provided with domain or subject knowledge and context-like circumstances.

*True* orFalse

1. Artificial intelligence has proven itself fit for playing games like chess and Go at superhuman performance levels. Which of the following statements is not true?
   1. Incorporating human knowledge in the training of gaming AIs has proven counterproductive.
   2. Humans use the playing capacity of systems like AlphaZero to learn new facets of the game.
   3. *Humans have given up playing games like chess or Go entirely.*
2. The Internet of Things (IoT), by or in itself, qualifies as artificial intelligence.

True or *False*

1. Progress in the field of artificial intelligence is limited by corresponding progress in quantum computing and IoT only.

True or *False*

1. Expert systems had their prime in
   1. the 1950s and 1960s.
   2. *the 1980s and 1990s.*
   3. the 2000s and 2010s.
2. Which of the following is not a part of an expert system?
   1. knowledge base
   2. inference Engine
   3. *utility function*
3. Which of the following statements about knowledge bases in expert systems is true?
   1. Knowledge bases are easy to scale to arbitrary numbers of rules and facts.
   2. *Maintaining and drawing inferences from a knowledge base gets exceedingly more difficult the more facts and rules it contains.*

## 2.2.

* + 1. Prolog was implemented to aid software development in

1. *artificial intelligence and natural language processing.*
2. high performance scientific computing.
3. commercial applications.
   * 1. Which paradigm is implemented by the Prolog language?
   1. imperative programming
   2. *declarative programming*
   3. structured programming
      1. Which of the following statements is true?
   4. *Prolog**has been used for the implementation of production software in a wide variety of applications*.
   5. Prolog has only been used in academia for the implementation of research projects.

## 2.3

* + 1. Which of the following types of learning is not part of machine learning?

a. reinforcement learning

b. unsupervised learning

c. supervised learning

d. *developmental learning*

1. Machine learning typically does not employ approaches from
   1. *symbolic logic.*
   2. statistics.
   3. mathematics.
   4. computer science.
2. Which of the following statements is true?
   1. Machine learning is a discipline that developed after the year 2000.
   2. *Machine learning is as old as artificial intelligence itself.*

## 2.4

1. Which of the following statements is true?
   1. The artificial intelligence technologies described in this unit only affect industrial automation.
   2. *The artificial intelligence technologies described in this unit affect many production and service industries throughout the entire economy.*
      1. Which of the following banking services has not been named in this section as being affected by artificial intelligence?

a. signature verification

b. fraud detection

c. investment advice

*d.* *ATM payouts*

## 3.1

1. A neuron is defined as a nerve cell that receives, transforms, and passes on signals. Which of the following statements is not correct?
   1. Input signals arrive at the neuron via dendrites.
   2. Output signals leave the neuron via the axon.
   3. *Signals can move backwards from the axon to the cell body (the soma).*
   4. The cell body generates an output signal depending on its inputs.
2. The two halves of the brain are
   1. *highly symmetrical with respect to their function.*
   2. highly specialized with respect to their function.
   3. highly differentiated with respect to their function in that logical and analytical thinking resides on one side and creativity on the other.

## 3.2

* + 1. Which of the following statements about cognitive science is true?

1. *Cognitive science**is an interdisciplinary endeavor that draws upon a diverse set of research methods.*
2. Cognitive science is a monolithic scientific discipline with a unique and exclusive set of research methodologies.
   * 1. The majority of empirical findings in cognitive science are derived from brain imaging, behavioral experiments, and simulation via computational modeling.

*True* orFalse

## 3.3

* + 1. Comparing the brain’s estimated 1011 neurons to today’s computer chip’s 1010 installed transistors is
  1. *no more than an interesting metric*.
  2. clear indication that one day computers will be smarter than people.

2. The human mind is essentially the same thing as the human brain.

True or *False*

3. One approach to reaching machine creativity is via generative adversarial networks. Under this regime:

* 1. One (1) artificial intelligence agent is exposed to the worst possible situations to see how it reacts.
  2. *Two (2) neural network agents are programmed to pursue* *opposing objectives in order to optimize the generation of lifelike artificial data.*
  3. Many (>2) neural network agents are programmed to pursue identical objectives to find the winner.
  4. All of the above approaches are valid and apply to machine learning.

## 4.1

1. At the current time, both hardware and software are likely to be merged into one commercial service product offering.

*True* or False

1. Cloud computing
   * 1. belongs to the science of weather forecasting because it deals with clouds.
     2. *involves the use of distributed computing resources.*
2. The abbreviation “VM” stands for the term “virtual machine”, which is
   * 1. a physical stand-alone computer given to a client to use as needed.
     2. a concept identical to time sharing.
     3. a computer scam.
     4. *the full emulation of a computer and its operation system on another machine.*

## 4.2

1. Artificial Narrow Intelligence is found in
   1. *all artificial intelligence applications operational at this time.*
   2. all artificial Intelligence applications far into the future.
2. The word narrowin Artificial Narrow Intelligence refers to the condition of
   1. *being valid in only one field of specialization.*
   2. being valid in many fields of specialization but only superficially.

## 4.3

1. For computer vision to qualify as true artificial intelligence, it
   1. must have eyeglasses.
   2. must be able to make logical decisions without explanation.
   3. *must identify semantically meaningful content in still or video images.*
   4. must first have a commercial application.
2. Applied computer vision requires the intermediate step of feature extraction.

True or False

1. One difference between pinhole cameras and digital cameras is
   1. pinhole cameras have no lens while digital cameras have at least one lens.
   2. pinhole cameras have no lens while digital cameras have at least two lenses.
2. The science of computer vision is not connected to the sciences of
   1. pattern recognition.
   2. image processing.
   3. mathematics.
   4. *lens opening.*
3. Commercial applications of computer vision
   1. are yet to be invented.
   2. *are currently on the market.*

## 5.1

1. Which of the following statements concerning the application of artificial intelligence for mobility is correct?
   1. The impact of artificial intelligence in mobility is limited to autonomous vehicles.
   2. *Artificial intelligence impacts many aspects in the future of mobility, including the smart combination of multi-modal transport options and the control of traffic flows.*
2. Which of the following ownership and usage models for future mobility assets will likely increase?
   1. Full ownership and primary usage of one mobility asset by one main user.
   2. *Shared ownership or usage by many users.*

3. Fully autonomous vehicles

* + - * 1. *increase per vehicle utilization via sharing and around the clock availability.*
        2. decrease per vehicle utilization.

## 5.2

1. Which of the following trends will artificial intelligence in healthcare not affect?
   1. precision medicine
   2. personalized medicine
   3. computational drug discovery
   4. *The application of empirically unjustified forms of medicine such as homeopathy.*
2. Which of the following assertions is true?
   1. *Artificial intelligence supports the development of personalized treatments and precision medicine*.
   2. Artificial intelligence will lead to a greater standardization of medicine and one-size-fits-all approaches.

## 5.3

1. Which term is related neither to Fintech nor artificial intelligence?
   1. *Return on Investment (ROI)*
   2. credit scoring
   3. cryptocurrencies
   4. crowdlending
2. The term “robo-advising” denotes
   1. *Artificial intelligence generated suggestions for portfolio composition and trading.*
   2. Artificial intelligence generated advice on responsible and sound behavior in personal finance.

5.4

1. Artificial intelligence in retail is solely focused on the in-store experience of customers.
   1. True
   2. *False*
2. The application of artificial intelligence in retail will not only benefit the customer in terms of better prices and improved services, but also poses important ethical questions with respect to ethics and privacy rights.
   1. *True*
   2. False