



EXIN BCS Artificial Intelligence

FOUNDATION

Certified by


Sample Exam

Edition 201911

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Introduction

This is the EXIN BCS Artificial Intelligence Foundation (AIF.EN) sample exam. The Rules and Regulations for EXIN's examinations apply to this exam.

This exam consists of 40 multiple-choice questions. Each multiple-choice question has a number of possible answers, of which only one is correct.

The maximum number of points that can be obtained for this exam is 40. Each correct answer is worth 1 point. You need 26 points or more to pass the exam.

The time allowed for this exam is 60 minutes.

Good luck!

Sample Exam

1 / 40

The Human Logical Levels was created by which author?

- A) Robert Dilts
- B) Tom Mitchell
- C) Peter Norvig
- D) Stuart Russell

2 / 40

Trustworthy AI, as defined by the EU Guidelines, must...

- A) have at least 3 UN sustainability measures.
- B) be quality assured to ISO standards.
- C) be CE marked.
- D) be technically robust.

3 / 40

An intelligent agent must be ...

- A) subjective.
- B) irrational.
- C) rational.
- D) empathic.

4 / 40

Universal Design or Design-for-all are part of which international organization's sustainability goals?

- A) North American Space Agency
- B) United Nations
- C) European Union
- D) Future of Life Institute

5 / 40

The EU have published guidelines for Ethics and Trustworthy AI.

This is which of the following?

- A) Environment-centric
- B) Business-centric
- C) Social-centric
- D) Human-centric

6 / 40

Which world institution has published seventeen sustainability goals?

- A) United Nations
- B) World Trade Organization
- C) World Economic Forum
- D) World Bank

7 / 40

IBM's Deep Blue has contributed to the success of Machine Learning.

In what year did it beat the world chess champion?

- A) 1977
- B) 2017
- C) 2007
- D) 1997

8 / 40

Who is widely regarded as the person who defined Machine Learning?

- A) Ada Lovelace
- B) Tom Mitchell
- C) Dame Wendy Hall
- D) Marvin Minsky

9 / 40

An intelligent agent uses which of the following to manipulate its environment?

- A) Stereography and actuators
- B) Sound and actuators
- C) Sensors and actuators
- D) Sight and actuators

10 / 40

How many robot paradigms are there?

- A) Three
- B) Four
- C) Five
- D) Six

11 / 40

A utility-based agent differs from a goal-based agent in that it measures an agent's what?

- A) Resource usage
- B) Speed of completion
- C) Learning rate
- D) Happiness

12 / 40

An intelligent robot is a robot that uses which of the following?

- A) Objectivity
- B) Empathy
- C) Autonomy
- D) Artificial Intelligence

13 / 40

In AI, what perceives its environment through sensors and acts on its environment through actuators?

- A) An agent
- B) A human
- C) A chatbot
- D) A machine

14 / 40

Reflex and Model-based are types of what?

- A) Machine learning algorithms
- B) Statistical Data
- C) AI agents
- D) Actuators

15 / 40

The top-down hierarchical paradigm is built from _____, plan and act.

What is the missing term?

- A) understand
- B) sense
- C) feedback
- D) learn

16 / 40

The percept and action in the schematic of an AI learning agent are linked closely to what in the robotic paradigm?

- A) Sense and act
- B) Critic and problem generator
- C) Sensors and learning element
- D) Critic and learning element

17 / 40

Human values will drive change by aligning future AI with our...

- A) sustainability goals.
- B) EU ethical principles.
- C) future of life Utopia goals.
- D) laws.

18 / 40

Finding the balance between under-fitting and over-fitting is part of knowing what is...

- A) fit for consumption.
- B) the Agile Scrum objective.
- C) fit for purpose.
- D) the Waterfall project objective.

19 / 40

An AI project is highly likely to fail if the AI project team does not have which of the following?

- A) Project focus
- B) Domain expert
- C) Facilitator
- D) Business champion

20 / 40

According to Gartner in 2018 what percentage of AI projects 'fail to deliver'?

- A) 65%
- B) 75%
- C) 85%
- D) 95%

21 / 40

Who defines what is 'fit for purpose'?

- A) Chairperson
- B) Project Lead
- C) Scrum Master
- D) Domain Expert

22 / 40

Which of the following is a typical early stage (TRL 1-3) AI project funder?

- A) Charity
- B) Stock market
- C) Investment bank
- D) Building society

23 / 40

Which of the following is useful at all stages of a Machine Learning project?

- A) Object orientation
- B) Data visualization
- C) Cloud computing
- D) Opensource python

24 / 40

Which of the following is an example of Machine Learning software?

- A) Fortran
- B) C++
- C) Tensor flow
- D) Objective C

25 / 40

Which of the following is a task in preparing data?

- A) Delete a random sample of data
- B) Identify missing data
- C) Encrypt data
- D) Publish results

26 / 40

Bayes's networks describe how multiple variables may have influenced a result using what?

- A) The central limit theorem
- B) A probability distribution
- C) Ergodic statistics
- D) Inference

27 / 40

Vector Calculus is the theory that uses...

- A) summation and gradients.
- B) integration and differences.
- C) integration and differentiation.
- D) series and gradients.

28 / 40

Machine Learning (ML), 'learns from experience' by analyzing data.

What is needed to do this?

- A) Functionality, Software and Hardware
- B) Python, Paraview and Linux
- C) Linear algebra, probability/statistics and optimization
- D) Cloud computing, open source software and an algorithm

29 / 40

An artificial neural network (ANN) is made up of what?

- A) Hidden synapses
- B) Inter-connected group of nodes
- C) Nervous edges
- D) Dendritic nodes

30 / 40

Which mathematical subject is associated with machine learning?

- A) Spectral analysis
- B) Complex variable
- C) Number Theory
- D) Linear Algebra

31 / 40

What type of library can be used to build an Artificial Neural Network cost effectively?

- A) Open source
- B) Copyright
- C) Standards
- D) Medical

32 / 40

In statistics, what does the term pdf stand for?

- A) Pointwise Discrete Function
- B) Pointwise Density Function
- C) Probability Discrete Function
- D) Probability Density Function

33 / 40

In supervised learning an agent uses what to learn from?

- A) Random data
- B) Labelled data
- C) Unlabeled data
- D) Experimental data

34 / 40

What type of narrow AI functionality is useful to AI agents?

- A) Conscious AI
- B) Fourier Transform
- C) Artificial General AI
- D) Planning

35 / 40

Robotic surgery is used today and is an example of which of the following?

- A) Human and machines working together
- B) Autonomous AI
- C) Narrow AI
- D) Autonomous robotics

36 / 40

Daugherty and Wilson have identified what in their book on Human Plus Machine?

- A) Monitoring the robots
- B) Missing middle
- C) Menial low value work
- D) Checking the robots work

37 / 40

Which project style is fundamentally 'learning from experience'?

- A) Agile
- B) Waterfall
- C) Mentoring
- D) Autocratic

38 / 40

In Daugherty and Wilson's book Human plus Machine, what is described as a desirable culture?

- A) Desire to be transparent
- B) Desire to experiment
- C) Desire to be sustainable
- D) Desire to be 'right first time'

39 / 40

What is a computer program that works out where to park aircraft at an airport an example of?

- A) Conscious intelligence
- B) Artificial General Intelligence
- C) Narrow (Weak) Intelligence
- D) Automation

40 / 40

Today, ambiguous and creative tasks are better undertaken by what?

- A) Algorithms
- B) Humans
- C) Chatbots
- D) Artificial general intelligence

Answer Key

1 / 40

The Human Logical Levels was created by which author?

- A) Robert Dilts
- B) Tom Mitchell
- C) Peter Norvig
- D) Stuart Russell

- A) Correct. Straight forward question to remember the person who wrote the NLP logical levels. Distractors are other contributors to the field of AI.
- B) Incorrect.
- C) Incorrect.
- D) Incorrect.

2 / 40

Trustworthy AI, as defined by the EU Guidelines, must...

- A) have at least 3 UN sustainability measures.
 - B) be quality assured to ISO standards.
 - C) be CE marked.
 - D) be technically robust.
-
- A) Incorrect.
 - B) Incorrect.
 - C) Incorrect.
 - D) Correct. The EU guides put technical robustness in the fundamental process of ethical AI. The distractors are plausible alternatives.

3 / 40

An intelligent agent must be ...

- A) subjective.
 - B) irrational.
 - C) rational.
 - D) empathic.
-
- A) Incorrect.
 - B) Incorrect.
 - C) Correct. In AI theory the intelligent AI relies fundamentally on being rational and that it will act rationally. The distractors are the human capabilities on which our future roles will build from.
 - D) Incorrect.

4 / 40

Universal Design or Design-for-all are part of which international organization's sustainability goals?

- A) North American Space Agency
 - B) United Nations
 - C) European Union
 - D) Future of Life Institute
-
- A) Incorrect.
 - B) Incorrect.
 - C) Correct. The European Union is the leading international organization that puts Design for All as a key requirement in AI. The other organizations have similar goals or principles.
 - D) Incorrect.

5 / 40

The EU have published guidelines for Ethics and Trustworthy AI.

This is which of the following?

- A) Environment-centric
 - B) Business-centric
 - C) Social-centric
 - D) Human-centric
-
- A) Incorrect.
 - B) Incorrect.
 - C) Incorrect.
 - D) Correct. AI is rational and must have a goal. In order for these to follow the EU ethical guidelines the goals must be human centric. The distractors are plausible and from subjects such as sustainability and business.

6 / 40

Which world institution has published seventeen sustainability goals?

- A) United Nations
 - B) World Trade Organization
 - C) World Economic Forum
 - D) World Bank
-
- A) Correct. The answer is a straightforward recall of information. The other distractors are organizations that play a part elsewhere in the course.
 - B) Incorrect.
 - C) Incorrect.
 - D) Incorrect.

7 / 40

IBM's Deep Blue has contributed to the success of Machine Learning.

In what year did it beat the world chess champion?

- A) 1977
- B) 2017
- C) 2007
- D) 1997

- A) Incorrect.
- B) Incorrect.
- C) Incorrect.
- D) Correct. The answer is a straightforward recall of information.

8 / 40

Who is widely regarded as the person who defined Machine Learning?

- A) Ada Lovelace
- B) Tom Mitchell
- C) Dame Wendy Hall
- D) Marvin Minsky

- A) Incorrect.
- B) Correct. Again, a straightforward recall of information on Machine Learning. The distractors are other people described in the course.
- C) Incorrect.
- D) Incorrect.

9 / 40

An intelligent agent uses which of the following to manipulate its environment?

- A) Stereography and actuators
- B) Sound and actuators
- C) Sensors and actuators
- D) Sight and actuators

- A) Incorrect.
- B) Incorrect.
- C) Correct. This question is to test a candidate's recall of the AI learning agent. Distractors are plays on the correct answers.
- D) Incorrect.

10 / 40

How many robot paradigms are there?

- A) Three
- B) Four
- C) Five
- D) Six

- A) Correct. There are three robotic paradigms, this plays an important part in the understanding of how robotics and AI have similar concepts.
- B) Incorrect.
- C) Incorrect.
- D) Incorrect.

11 / 40

A utility-based agent differs from a goal-based agent in that it measures an agent's what?

- A) Resource usage
- B) Speed of completion
- C) Learning rate
- D) Happiness

- A) Incorrect.
- B) Incorrect.
- C) Incorrect.
- D) Correct. Although agents rely on rationality, a utility measure can be used to measure how happy a person is in achieving a goal. Distractors are plausible but incorrect.

12 / 40

An intelligent robot is a robot that uses which of the following?

- A) Objectivity
- B) Empathy
- C) Autonomy
- D) Artificial Intelligence

- A) Incorrect.
- B) Incorrect.
- C) Incorrect.
- D) Correct. This question is a simple recall of information in the course. Distractors are plausible alternatives.

13 / 40

In AI, what perceives its environment through sensors and acts on its environment through actuators?

- A) An agent
- B) A human
- C) A chatbot
- D) A machine

- A) Correct. Again, a straightforward recall of information on the AI learning agent. The distractors are mentioned in the course but are not part of the formal definition of an agent in AI.
- B) Incorrect.
- C) Incorrect.
- D) Incorrect.

14 / 40

Reflex and Model-based are types of what?

- A) Machine learning algorithms
- B) Statistical Data
- C) AI agents
- D) Actuators

- A) Incorrect.
- B) Incorrect.
- C) Correct. From the basic idea of an agent we need different types of agent to describe how they operate. The question asks if the candidate can identify two types of AI agent.
- D) Incorrect.

15 / 40

The top-down hierarchical paradigm is built from _____, plan and act.

What is the missing term?

- A) understand
- B) sense
- C) feedback
- D) learn

- A) Incorrect.
- B) Correct. Can the candidate remember an element from the robotic paradigms, other answers are distractors based on possible alternatives ways to describe a robot.
- C) Incorrect.
- D) Incorrect.

16 / 40

The percept and action in the schematic of an AI learning agent are linked closely to what in the robotic paradigm?

- A) Sense and act
- B) Critic and problem generator
- C) Sensors and learning element
- D) Critic and learning element

- A) Correct. This question is to test if the candidate can identify the similar concepts of robotics and AI agents.
- B) Incorrect.
- C) Incorrect.
- D) Incorrect.

17 / 40

Human values will drive change by aligning future AI with our...

- A) sustainability goals.
- B) EU ethical principles.
- C) future of life Utopia goals.
- D) laws.

- A) Correct. Can the candidate use the information from the EU guidelines, UN sustainability goals and NLP Human modelling subjects to pick the answer. The distractors are plausible but not as powerful as aligning Eu, UN and human values to achieve sustainable goals.
- B) Incorrect.
- C) Incorrect.
- D) Incorrect.

18 / 40

Finding the balance between under-fitting and over-fitting is part of knowing what is...

- A) fit for consumption.
- B) the Agile Scrum objective.
- C) fit for purpose.
- D) the Waterfall project objective.

- A) Incorrect.
- B) Incorrect.
- C) Correct. This question asks the candidate to recall the important part the domain has in defining what is fit for purpose. Distractors are plausible alternatives.
- D) Incorrect.

19 / 40

An AI project is highly likely to fail if the AI project team does not have which of the following?

- A) Project focus
- B) Domain expert
- C) Facilitator
- D) Business champion

- A) Incorrect.
- B) Correct. This question asks the candidate to recall the important part the domain has in defining what is fit for purpose. Distractors are plausible alternatives.
- C) Incorrect.
- D) Incorrect.

20 / 40

According to Gartner in 2018 what percentage of AI projects 'fail to deliver'?

- A) 65%
- B) 75%
- C) 85%
- D) 95%

- A) Incorrect.
- B) Incorrect.
- C) Correct. Test the recall of a candidate about the likelihood of AI projects being successful.
- D) Incorrect.

21 / 40

Who defines what is 'fit for purpose'?

- A) Chairperson
- B) Project Lead
- C) Scrum Master
- D) Domain Expert

- A) Incorrect.
- B) Incorrect.
- C) Incorrect.
- D) Correct. Asks the candidate if they have understood fully what the role of the domain expert is. Distractors are plausible

22 / 40

Which of the following is a typical early stage (TRL 1-3) AI project funder?

- A) Charity
- B) Stock market
- C) Investment bank
- D) Building society

- A) Correct. Test if the candidate had remembered who is likely to fund an early research stage project. Distractors are typical funders of later stage projects
- B) Incorrect.
- C) Incorrect.
- D) Incorrect.

23 / 40

Which of the following is useful at all stages of a Machine Learning project?

- A) Object orientation
- B) Data visualization
- C) Cloud computing
- D) Open source Python

- A) Incorrect.
- B) Correct. Data visualization plays an important role in machine learning, this question test the recall of the candidate as to this fact. The distractors are other areas of Machine Learning.
- C) Incorrect.
- D) Incorrect.

24 / 40

Which of the following is an example of Machine Learning software?

- A) Fortran
- B) C++
- C) Tensor flow
- D) Objective C

- A) Incorrect.
- B) Incorrect.
- C) Correct. Tensor flow is a specific example of Machine Learning software. The distractors are general software codes or types of coding style.
- D) Incorrect.

25 / 40

Which of the following is a task in preparing data?

- A) Delete a random sample of data
- B) Identify missing data
- C) Encrypt data
- D) Publish results

- A) Incorrect.
- B) Correct. This question emphasizes the task of identifying missing data when undertaking a machine learning project. The distractors are plausible tasks but not correct.
- C) Incorrect.
- D) Incorrect.

26 / 40

Bayes's networks describe how multiple variables may have influenced a result using what?

- A) The central limit theorem
- B) A probability distribution
- C) Ergodic statistics
- D) Inference

- A) Incorrect.
- B) Incorrect.
- C) Incorrect.
- D) Correct. From the basic theory of statistics, this question asks the candidate to recall what popular Machine Learning technique is derived from Bayes' theorem. The distractors are topics in the mathematical subject of statistics.

27 / 40

Vector Calculus is the theory that uses...

- A) summation and gradients.
- B) integration and differences.
- C) integration and differentiation.
- D) series and gradients.

- A) Incorrect.
- B) Incorrect.
- C) Correct. Asks the candidate to recall what vector calculus is as a mathematical subject. The distractors are plausible alternatives but are not correct.
- D) Incorrect.

28 / 40

Machine Learning (ML), 'learns from experience' by analyzing data.

What is needed to do this?

- A) Functionality, Software and Hardware
 - B) Python, Paraview and Linux
 - C) Linear algebra, probability/statistics and optimization
 - D) Cloud computing, open source software and an algorithm
- A) Correct. The candidate is asked to recall what are three main topics to a machine learning project. The distractors are subjects or elements of functionality, software and hardware
- B) Incorrect.
- C) Incorrect.
- D) Incorrect.

29 / 40

An artificial neural network (ANN) is made up of what?

- A) Hidden synapses
 - B) Inter-connected group of nodes
 - C) Nervous edges
 - D) Dendritic nodes
- A) Incorrect.
- B) Correct. When building an artificial neural network, the candidate is asked what it is made up of. The distractors are words used to describe the schematic of a Neural Network but are not correct
- C) Incorrect.
- D) Incorrect.

30 / 40

Which mathematical subject is associated with machine learning?

- A) Spectral analysis
 - B) Complex variable
 - C) Number Theory
 - D) Linear Algebra
- A) Incorrect.
- B) Incorrect.
- C) Incorrect.
- D) Correct. Linear Algebra is a fundamental subject that is required in order to undertake Machine Learning on a computer. The candidate is asked to recall this. The distractors are other mathematical subjects but are not fundamental to Machine Learning.

31 / 40

What type of library can be used to build an Artificial Neural Network cost effectively?

- A) Open source
- B) Copyright
- C) Standards
- D) Medical

- A) Correct. The candidate is asked to recall that open source software is cost effective in building a Machine Learning ANN. The distractors are plausible distractors but not correct.
- B) Incorrect.
- C) Incorrect.
- D) Incorrect.

32 / 40

In statistics, what does the term pdf stand for?

- A) Pointwise Discrete Function
- B) Pointwise Density Function
- C) Probability Discrete Function
- D) Probability Density Function

- A) Incorrect.
- B) Incorrect.
- C) Incorrect.
- D) Correct. The candidate is asked to recall accurately that pdf stands for probability density function. The distractors are deviations of the true definition with one of the words changed.

33 / 40

In supervised learning an agent uses what to learn from?

- A) Random data
- B) Labelled data
- C) Unlabeled data
- D) Experimental data

- A) Incorrect.
- B) Correct. The candidate is asked to recall what type of data is used on supervised learning. This is labelled data. The other types of data that make up the distractors are plausible but not correct.
- C) Incorrect.
- D) Incorrect.

34 / 40

What type of narrow AI functionality is useful to AI agents?

- A) Conscious AI
- B) Fourier Transform
- C) Artificial General AI
- D) Planning

- A) Incorrect.
- B) Incorrect.
- C) Incorrect.
- D) Correct. In Machine Learning planning is a typical type of functionality that an AI agent would use to achieve a goal. The distractors are plausible but are made up from other area of Artificial Intelligence and Mathematics.

35 / 40

Robotic surgery is used today and is an example of which of the following?

- A) Human and machines working together
- B) Autonomous AI
- C) Narrow AI
- D) Autonomous robotics

- A) Correct. Robots are helping surgeons in medical procedures, enhancing their capability, this is an example of humans and machines working together. The distractors are plausible but not correct.
- B) Incorrect.
- C) Incorrect.
- D) Incorrect.

36 / 40

Daugherty and Wilson have identified what in their book on Human Plus Machine?

- A) Monitoring the robots
- B) Missing middle
- C) Menial low value work
- D) Checking the robots work

- A) Incorrect.
- B) Correct. In writing their book on human and machines working together, Daugherty and Wilson have identified the missing middle where machines and humans complement each other. The distractors are plausible but not correct.
- C) Incorrect.
- D) Incorrect.

37 / 40

Which project style is fundamentally 'learning from experience'?

- A) Agile
- B) Waterfall
- C) Mentoring
- D) Autocratic

- A) Correct. The candidate is asked to recall that agile projects are based on an iterative and learning from experience model. The other distractors are management styles or waterfall
- B) Incorrect.
- C) Incorrect.
- D) Incorrect.

38 / 40

In Daugherty and Wilson's book Human plus Machine, what is described as a desirable culture?

- A) Desire to be transparent
- B) Desire to experiment
- C) Desire to be sustainable
- D) Desire to be 'right first time'

- A) Incorrect.
- B) Correct. An experimental culture is conducive to learning from experience which is at the heart of machine learning and AI. Distractors are not relevant to the book but are plausible.
- C) Incorrect.
- D) Incorrect.

39 / 40

What is a computer program that works out where to park aircraft at an airport an example of?

- A) Conscious intelligence
- B) Artificial General Intelligence
- C) Narrow (Weak) Intelligence
- D) Automation

- A) Incorrect.
- B) Incorrect.
- C) Correct. This question asks the candidate to recall the definition of narrow AI - the example is a machine learning technique focused on one specific task. The distractors are either not AI or are sophisticated AI that is still not possible.
- D) Incorrect.

40 / 40

Today, ambiguous and creative tasks are better undertaken by what?

- A) Algorithms
- B) Humans
- C) Chatbots
- D) Artificial general intelligence

- A) Incorrect.
- B) Correct. This question asks the candidate to recall what humans are better than machines at. The distractors are plausible but not correct.
- C) Incorrect.
- D) Incorrect.

Evaluation

The table below shows the correct answers to the questions in this sample exam.

Question	Answer	Question	Answer
1	A	21	D
2	D	22	A
3	C	23	B
4	C	24	C
5	D	25	B
6	A	26	D
7	D	27	C
8	B	28	A
9	C	29	B
10	A	30	D
11	D	31	A
12	D	32	D
13	A	33	B
14	C	34	D
15	B	35	A
16	A	36	B
17	A	37	A
18	C	38	B
19	B	39	C
20	C	40	B

Contact EXIN

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