BCS Foundation Certificate in Artificial Intelligence

Specimen Paper

Record your surname / last / family name and initials on the answer sheet.

Specimen paper only 20 multiple-choice questions – 1 mark awarded to each question. Mark only one answer to each question. There are no trick questions.

A number of possible answers are given for each question, indicated by either **A. B. C. or D**. Your answers should be clearly indicated on the answer sheet.

Pass mark is 13/20

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1   Which of the following is a stage in a Machine Learning Project?

A   Data visualisation and presentation.
B   Cloud service initiation.
C   Interviewing a chatbot.
D   Hardware selection.

2   Who is often quoted as having defined Machine Learning?

A   Marvin Minsky.
B   Tom Mitchell.
C   Alan Turing
D   Sir James Lighthill.

3   What is an example of Human Intelligence?

A   Applying for a job.
B   Watching a movie.
C   Describing the taste of food.
D   Identifying a horse in a foggy field.

4   Which of the following is a rational agent dependency?

A   The agent's emotional measure.
B   The agent's internal state of the world.
C   The agent's goal.
D   The agent's percept sequence to date.

5   What is a commercial example of an AI robot?

A   Thermostat.
B   Chatbot.
C   Home Boiler.
D   Autonomous Vehicle.

6   An intelligent agent acts on what with its actuators?

A   Process.
B   Machine.
C   Environment.
D   Goal.

7   "Plan, sense, and act" are part of a hierarchical robotic what?

A   Paradigm.
B   Algorithm.
C   Internal World.
D   Performance Measure.

8   The EU have published guidelines for Ethical AI. It is based on which of the following?

A   Human-centric trustworthy AI.
B   Lawful trustworthy AI.
C   A trustworthy design.
D   Standards defined by the International Standards Organisation.

9   What must the "domain expert" specify for an AI system?

A   What is 'Fit for Purpose'.
B   The Training Data Set.
C   The Level of Automation.
D   The Critic.

10   Which project management style is iterative?

A   Autocratic.
B   Democratic.
C   Agile.
D   Waterfall.

11 What element is used to define a vector?

A Scalar.
B Logarithmic.
C Electrical.
D Chemical.

12 Iso-surface and iso-contours are ways of what?

A Determining the height of mountain.
B Identifying extreme values of data.
C Preparing Data.
D Visualising data.

13 In Machine Learning, data should be split into...

A Test and Training Data.
B Visualisation and Optimisation Data.
C Deployment and Learning Data.
D Ensemble and Test Data.

14 Machine Learning limited to one focused task is known as what?

A Optimisation.
B Narrow AI.
C Heuristic AI.
D Ensemble and Test Data.

15 Matrices, Vectors and Scalars are typically associated with which branch of mathematics?

A Fourier Analysis.
B Linear Algebra.
C Numerical Analysis.
D Statistics.

16 Humans and Machines will work together because…

A   they augment each other.
B   they replace a large human team.
C   they replace a large machine team.
D   automation does not work.

17   Why is an agile project style suited to AI?

A   More successful at project delivery than Waterfall project style.
B   It is iterative and involves learning from experience.
C   Outcome is specified at the start.
D   All risks are known and defined from the start.

18   What is **NOT** used to define Heuristic?

A   Child's play.
B   Discovery.
C   Trial and Error.
D   Experimentation.

19   What does the abbreviation TRL mean?

A   Total Regressive Level.
B   Technology Readiness Level.
C   Total Regressive Learning.
D   Technology Readiness Learning.

20   Who is an essential member of an AI agile project team?

A   Chairperson of the company.
B   Product Owner.
C   Marketing Manager.
D   Data Scientist.

End of Paper

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Answer Key and Rationale

Question	Answer	Explanation / Rationale	Syllabus Sections
1	A	Data Visualisation and Presentation is a key element of Machine Learning. Of particular importance is how we reduce large qualities of data to a human audience. The other distractors are plausible but not a stage in a Machine Learning project.	4.1
2	B	Taken from the standard textbook by Tom Mitchell. Public recognition can be seen on sites such as Wikipedia. Distractors are key figures in AI and Machine Learning.	1.5
3	D	A human can identify a horse in a foggy field with only a few examples. Machine learning on the other hand requires an order of magnitude more examples to learn the same thing. The distractors answers are actions or subjective actions.	1.1
4	D	This question is challenging as the learner has to remember what makes an agent rational. The distractors are made up of other, often used, abilities and descriptions of agents	2.1
5	D	Autonomous vehicles are a popular and important commercial application of AI. The distractors are plausible but not able to undertake complex series of tasks.	2.3
6	C	Challenges the learner to remember the agent schematic - humans use their intelligence to manipulate their environment. Distractors are word that are found in the course, are plausible but not in the agent schematic.	2.1
7	A	This tests if the learner can remember the hierarchical paradigm of a robot. The distractors could have a hierarchy but are a robotic paradigm.	2.2
8	A	(a) is the answer, all rights, principles and values come from a human-centric approach. The other distractors are plausible but not based on an ethical approach.	1.2
9	A	'Fit for purpose' is a key part of ensuring a project doesn't fail due to scope creep. The distractors are plausible but not essential.	3.4
10	C	Emphasises the learning from experience and iterative nature of learning can be mirrored in a project management style. The distractors are plausible.	3.6
11	A	Standard definition of a vector taken from a text book. This question tests a learner's ability to remember what a vector is made from. Distractors are plausible.	4.1

Question	Answer	Explanation / Rationale	Syllabus Sections
12	D	This questions tests if the learner can remember a form of data visualisation. Distracters are plausible uses of iso-contours and iso-surfaces.	4.1
13	A	Straight from the Machine Learning Textbook and tests if the learner has remembered typical stages of a Machine Learning project. Distractors are made up of common words in the course.	4.1
14	B	Tests the learner's memory of how AI is described when it has a clear focused application. Distractors are common words used in the course and plausible.	4.2
15	B	Tests if the learner has recognised one of the fundamental subjects in AI. The other areas are topics in mathematics which or often used in numerical methods used by Machine Learning and AI.	4.1
16	A	Practical examples of humans and machines has shown that in the near term humans and machines will augment each other; general intelligence is a long way off. Distractors are plausible but don't capture the future direction of human and machines.	5.2
17	B	Asks the learner to remember that learning from experience is fundamental to Agile projects and AI. The distractors are typical descriptions are Waterfall projects.	5.3
18	A	Playing is what children do for fun and often involves learning. Discovery, Trial and Error and Experimentation are what humans do to understand a problem and learn from. In machine learning a Heuristic can be used to guide an algorithm to the right answer or learn quicker.	1.1
19	B	Standard definition of TRL from NASA. The other distractors are made up from common words in AI and Machine Learning.	3.6
20	B	Asks the learning to identify a key role in agile project management. The distractors are plausible and real roles in either a company or machine learning project.	5.3