



BCS Professional Certificate in Data Analysis

Sample Paper

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

Sample paper only. 20 multiple-choice questions – 1 mark awarded to each question.

Multiple-choice questions allow only one correct answer to be selected for 1 mark.
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: 13/20

Time allowed: 45 minutes

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The Chartered Institute for IT.**

This professional certification is not regulated by the following United Kingdom Regulators
- Ofqual, Qualifications in Wales, CCEA or SQA

- 1 Which of the following statements about data analysis is CORRECT?
 - A Data analysis should only be used if a database solution is proposed.
 - B Data is more stable over time than user's functional requirements.
 - C Data models produce ambiguous representations of requirements.
 - D Business rules are not represented on a data model.

- 2 What characteristic distinguishes conceptual data models from logical data models?
 - A Granularity.
 - B Functionality.
 - C Readability.
 - D Scalability.

- 3 Which of the following is likely to be a class (class type) in an insurance claims handling system?
 - A Claim value.
 - B Customer number.
 - C Make claim.
 - D Payment.

- 4 Which of the following is likely to be an attribute occurrence in a payroll system?
 - A £25,000.
 - B Cheque number.
 - C Employee.
 - D Pay employee.

Scenario One: This scenario is used in conjunction with questions 5 to 9

Here is part of a system to support the operations of an estate agent. The system must record information about properties. Properties are either, commercial, residential or agricultural. Some common information is held about all types of property (for example; vendor, price, date first advertised). However, some information is specific to commercial properties (for example; conditions of use, VAT rate, counter facilities), some information is specific to residential properties (for example; number of bedrooms, garden size) and some is specific to agricultural properties (for example: soil type, acreage, use restrictions).

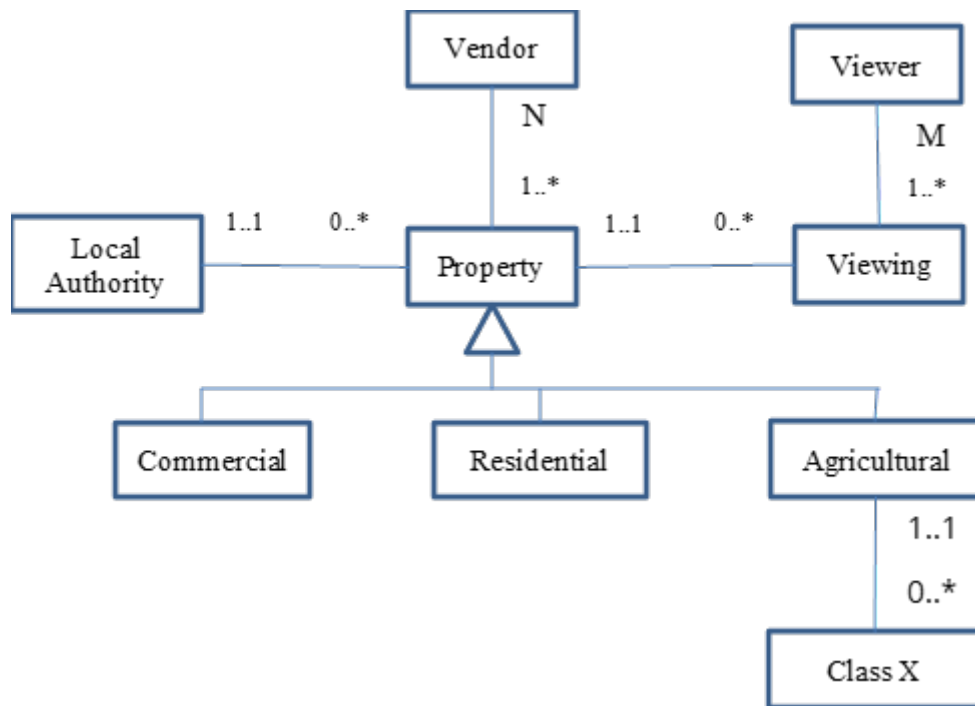
Agricultural properties (but not commercial or residential properties) may be subject to one or more easements (for example; a specific right of way or a specific right concerning flowing water). Each easement is specific to the agricultural property and so only relates to one, and only one, agricultural property.

Commercial properties are subject to commercial town planning restrictions and so the Local Authority of the commercial property needs to be specified. The estate agent would like a list of local authorities of which one could be allocated to a commercial property. A commercial property is allocated to one, and only one, Local Authority. A Local Authority may have one or many properties allocated to it. The list will also include Local Authorities that do not currently have a commercial property allocated to it.

Information has to be specifically held about the vendor(s) of the property. A vendor must be associated with at least one property, but they may be associated with many. Each property must have a minimum of one vendor and a maximum of four (the co-owners of a property).

All properties are subject to viewings. A property may be viewed many times. Information held about each viewing includes date and time of the viewing. Information is also to be stored about the Viewers. These are the people who requested and attended the viewing. Viewer information is only recorded once the viewing has taken place, so a viewer must have made at least one viewing, although of course they can make many. Each viewing must be made by one or more Viewers.

A business analyst has constructed the following class diagram for this scenario.



- 5 What is wrong with the relationship between Local Authority and Property?
- A The multiplicities should be 1..* at the Property end of the association.
 - B It should not be there, Local Authority should link to the sub-type Commercial.
 - C The multiplicities should be 0..* at the Local Authority end of the association.
 - D It should not be there, Local Authority should link to the Vendor class.
- 6 What should the multiplicities be at point N in the diagram?
- A 0..1.
 - B 1..1.
 - C 0..4.
 - D 1..4.

- 7 Which of the following would be a suitable class name for the class currently represented as Class X on the diagram?
- A Easement.
 - B Agricultural Property.
 - C Agricultural Viewing.
 - D Estate Agent.
- 8 Which of the following would not be supported by the class model as it stands?
- A A vendor who has two properties to sell.
 - B A viewer who has not viewed a property.
 - C A property which has never been viewed.
 - D A viewing by a group of people (at the same time).
- 9 In which class (or sub-class) will the price of a property be recorded?
- A Residential.
 - B Property.
 - C Vendor.
 - D Viewing.

Scenario Two: This scenario is used in conjunction with questions 10 to 12

The International Standard Book Number (ISBN) uniquely identifies a book. In a library, each individual physical book is allocated an accession number to make it unique. This is because the library might hold several copies (each with a unique accession number) of the same book (all copies of that book have the same ISBN). Library members (borrowers) are given a unique identifier (borrower number) so that an individual borrower can be uniquely identified. Borrowers may be of different types (Students, Pensioners, Teachers, etc.) with each type uniquely identified by a code (for example; P for Pensioners). Authors are also given unique identifiers (author number). Authors can write more than one book, but the library only currently records one author against each book.

10 Which of the following tables is **NOT** normalised?

- A Author number, author name, author address, author date of birth.
- B ISBN, book title, *author number.
- C Accession number, *ISBN, date purchased, book title.
- D Accession number, date loaned, time loaned, *borrower number, date due back.

11 Consider the following data set. If this data set is normalised, what would not be permitted?

ISBN, book title, *author name, date first published

- A More than one ISBN.
- B Two books with the same book title.
- C A book with more than one author.
- D A first published date before the author was born.

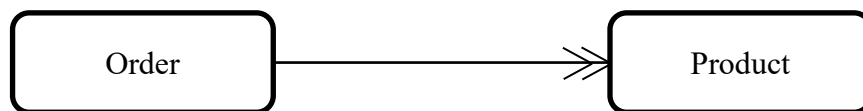
12 It now transpires that a book can have more than one author, each of which gets a share of the royalties. Sometimes the royalties are split equally between co-authors, but sometimes they are not. Which of the following tables is normalised and supports this need to split royalties?

- A** ISBN, author number, royalty share.
- B** ISBN, *author number, royalty share.
- C** Royalty share, ISBN, *author number.
- D** Author number, *ISBN, royalty share.

13 What does the U represent on a CRUD matrix?

- A** Use cases cross-referenced to requirements.
- B** Updating a previously created attribute value.
- C** Undoing (or deleting) an incorrect attribute value.
- D** Underlining a key attribute (or identifier).

14 Why does the line between Order and Product on a Data Navigation Diagram have a double headed arrow next to Product?



- A** Because an order may be for many products.
- B** Because the order quantity is greater than 1.
- C** Because a product will appear on many orders.
- D** Because an order is for a minimum of one product.

15 A motor insurance company wants to discover if there will be a demand for self-driving cars insurance. The market research survey returned records for 1,000 subjects and included answers to the following questions, per respondent:

- 1) Do you hold a full driving license? Yes/No/Prefer not to say.
- 2) If yes, for how many whole years have you held a full driving license? Give a number.
- 3) Apart from parking tickets, have you ever been penalised for driving offences? Yes/No/Prefer not to say.

In answer to question 3) 154 answered Yes, 731 answered No, and 115 preferred not to say.

If a record is picked at random, what is the probability that it is someone who might have a clean driving license?

- A** More than 26.9%.
- B** 73.1%.
- C** Between 73.1% and 84.6%.
- D** 84.6%.

16 An estate agent system compares the percentage rise in house prices between 4 different regions in England over a period of 3 years. There was a mean percentage price rise of 17% between these 4 regions. When 2 more regions were added, the mean price rise changed to 20%.

Which of the following was the mean price rise of Regions 5) and 6)?

- A** 32%.
- B** 23%.
- C** More data needed to calculate the mean price rise.
- D** 26%.

17 Which of the following is the definition of an outlier?

- A** A generic term for irrelevant and null values.
- B** An extreme value at either end of a distribution.
- C** A type of variable that cannot be quantified.
- D** A type of variable that makes no contribution to any correlation.

18 An insurance company publishes an annual study on how the rate of accidents per driver changes by age group. Between the ages of 19 and 65, they find that the older the driver, the fewer accidents they have.

What type of correlation exists between age and accident rate?

- A** Negative correlation.
- B** Positive correlation.
- C** There is no correlation.
- D** Causation.

19 A cybersecurity services company published findings on ransomware attacks for the years 2015 - 2016.

- 2015, average number of attacks per day = 933, mean average ransom demand = \$294
- 2016, average number of attacks per day = 1217, mean average ransom demand = \$1,007

What was the change in the total amount of money demanded in ransomware attacks per day between 2015 to 2016?

- A** \$274,302.
- B** \$951,217.
- C** \$1,279,897.
- D** \$939,531.

- 20 Which of the following is **NOT** a data protection principle?
- A Personal data must be used fairly, lawfully and transparently.
 - B Personal data must be accurate and, where necessary, kept up to date.
 - C Personal data must be backed up at regular intervals.
 - D Personal data must be kept for no longer than necessary.

End of Paper

Marking Scheme

Question	Answer
1	B
2	A
3	D
4	A
5	B
6	D
7	A
8	B
9	B
10	C
11	C
12	A
13	B
14	A
15	C
16	D
17	B
18	A
19	B
20	C