BCS Higher Education Qualification

Certificate in IT

April 2022

EXAMINERS' REPORT

Information Systems

General comments

Questions Report:

Question	Comment
A1	When asked about a structured method most answers gave a fairly concise version of the waterfall method and so scored a reasonable mark for this section. When asked about an iterative method most answers were along the lines of "it's the waterfall method and we repeat it". Most answers missed out on focusing on a limited subset of functionality, sprints, parallel running of subsections etc. A useful resource on Agile, which utilises Iterative development can be found on the UK Governments web site https://www.gov.uk/service-manual/agile-delivery/agile-tools-techniques For the second part of the question very few candidates actually drew a Data Flow Diagram which was asked for in the question. A small section drew a content diagram, a few drew a ELH but most drew a flow chart. A DFD is time independent and therefore does not flow from top to bottom or left to right. Most candidates who actually drew a DFD added externals and processes, few added data stores and therefore were not awarded marks for missing these. The biggest area of concern was that elements were missed, for example room booking and teachers / independent teachers were often omitted, and therefore these diagrams were awarded lower marks. One the key areas of any systems analysis is to check that different diagrams contain the same information and therefore the project has consistency. The third part of the assignment was to develop a list of entities and their attributes. Very few answers used the second part (DFD) which has (external) entities and data stores (which are entities). Again, It may show that candidates are taught subjects in isolation or as per previous exam question are not be taught how diagrams etc fit into the development process.
a)	Reasonable attempts overall. Most candidates could distinguish the two methods, but many answers struggled to articulate a comprehensive description and show awareness of all the stages involved. Many simply listed the stages. Candidates need to stretch beyond knowledge recall and must understand how the methods work. Very few could

	identify the techniques used. The iterative method was less distinguished, and many ignored this part. This is often a popular method in the industry. Candidates must be encouraged to develop their awareness and practical knowledge of it.
b)	Diagrams were generally poor, with many presenting confused notation and accurate representation of the system. Many candidates interpreted a "high-level DFD" as a context diagram and missed the details expected.
c)	Candidates showed confused understanding of entities and most could not identify their attributes. The majority could not relate their answers to the data stores they had already identified in A1.b, which indicates a lack of a joined-up understanding of the various modelling stages and how they relate. Focus seems to be on knowledge recall without sufficient understanding of purpose and how the various components are used.
A2	The first part of the question was really well answered, most candidates knew about questionnaires, interviews, observation etc. There was some overlap with the 4 ways of obtaining the information which were asked for. For example, a candidate may have stated that questions (open and closed) was a method as was questionnaires (which ask open and close questions). Prototyping is not considered to be a fact finding method, it is used after the initial requirements stage and is used to focus on obtaining functional requirements. Marks were not awarded for prototyping answers in this section. It appears that for the majority of candidates a project manager is someone who does everything else on a project that a software developer doesn't. There are a lot of extremely poor answers as to what a project manager is. They do not train, test, complete all the documentation, hand over the application etc. They manage the project. Few answers referenced project planning, or using project management tools to assist etc. There seemed to be a lack of project management education within the answers. No mapping to any PRINCE2 style or AGILE style project management. An interesting starting point would be to look at the contents page (page 2) of the BCS foundation cert in IS Project Management https://www.bcs.org/media/1875/ppso-pm-foundation-syllabus.pdf Very few answers come anywhere close to the 8 sub sections of the syllabus. It seemed that SWOT analysis is being covered well by providers and this section score highly. Again to highlight that the basics of project management are not being taught less than a handful attempted the section on CPM. A useful resource for Critical Path Management (CPM) can be found at https://www.projectmanager.com/guides/critical-path-method
a)	A popular question which was generally adequately answered. Most candidates could distinguish the different methods and articulate appropriate descriptions, including their advantages/disadvantages. Marks were lost mainly for confused and repetitive descriptions where the techniques for a method were listed as separate methods instead.

b)	Mostly limited answers, with only a few covering points beyond directing personal and feedback. Many confused the responsibilities/tasks of system analysts for those of a project manager. A common point overlooked is risk management. Only two referred to this. Candidates generally showed limited awareness of the requirements of the different job roles and this is another area for improvement.
c)	Again generally limited answers. It appears candidates have learnt the SWOT acronym without clear understanding of its purpose. Very few recognised CPM. Most ignored this part or confused it for "Corporate Performance Management". Again showing limited awareness of essential techniques use in project management.
A3	There were some very good answers for normalisation but it again is clear that it is being taught rote and the answers are note dumps. One key recurring quote is that normalisation reduced storage. It can lead to increased storage as the results of 3NF is to create more PK and FKs and therefore more storage. Candidates simply stating there are 3 levels (which itself is incorrect, we typically use 3NF but we could as easily insist on using 6NF) scored lowly. They needed to explain for higher marks why we used 3NF (remove duplication of data, avoid insert, update and delete issues etc) and perhaps use examples. The section part of the question where candidates were to explain the different types of relationships was mixed. Some candidates ignored the requirement to map to the scenario in question 1 and were marked down accordingly. Most were able to state there are 3 typically relationship (if you ignore the optional type) of 1:1, 1:M, and M:N. A number of the examples were incorrect and therefore marked down. Again, the final part of the question was mixed. A data warehouse is not a backup of a company's data. The purpose of a data warehouse is to provide time dependant, subject orientated data. In other words, the data in the warehouse is processed, aggregated, summaries etc in order to provide data for companies to make decision. Most of the answers simply stated it was a data store and therefore did not score highly. The data mining was perhaps answer slightly better. A lot comments on the searching / querying of the data but were limited. Very few mentioned machine learning or decision trees or any technique that would aid in discovering new or hidden information. Most answers read like data mining was standard SQL queries.
a)	Candidates clearly knew the general purpose of normalisation. Most could identify the normalisation stages but failed to articulate why it should be used along with logical data modelling. Generally indicating a lack of a joined-up understanding of the various modelling stages.
b)	Generally well answered, with some good illustrations. There were, however, a few that described OO relationships and lost marks accordingly. Overall, the majority could

	not identify any contingencies within the relationships, which suggests the concept may not have been covered and learnt.
c)	A poorly answered question, with many apparently guessing the answer. There were only a few attempts. Of those, very few understood either technology, and the answers were generally off-topic. Some work is needed to improve the understanding of the topics here.
d)	Reasonably well answered overall, but most failed to give examples of typical data handled by each department. It appears candidates did not thoroughly read the question requirements, which seems to be a recurring issue.
A4	Most candidates failed to read the questions and primarily note dumped on white and black box testing. The question was about a test strategy and very few addressed this part of the question. Black box and white box traditionally just test the code, the question asked for the system to be tested. I would expect references to stress testing, loading / performance testing, security testing, useability / user testing etc etc. Most answers were very narrow in focus, rote in style and therefore scored poorly. A lot of answers for the documentation question talked about internal and external documentation but never actually described what these documents are. Candidates who simply stated this fact scored poorly as the section of the question which asked for typical manuals to be discussed was missed or not attempted. Again a question where candidates rote learn a list and when the question asks for something different there is no extended learning to be able to apply to a question or scenario. A poorly answered section. The final section was also answered poorly. The question asked for security threats from the internet and a significant portion of answers referenced internal rather than external issues. There was a significant number of questions that answered with viruses, malware, trojan horses etc. Whilst on topic their answers were very narrow in scope and therefore were awarded limited marks. If the question had been discussed how to deal with viruses etc, to secure the data candidates would have scored highly.
a)	The answers demonstrate that candidates generally understand the various testing methods and when they may be used. However, only a few described an overall testing strategy. Most provided a listing of different methods or just named them without exposition. These candidates were still able to gain marks here, but would have scored higher had they discussed a systematic strategy.
b)	A widely misunderstood question and generally poorly answered. Most candidates described the system analysis documentation required at the analysis and design phases of a project and generally missed the point. Marks were lost as a result. The more accurate answers often missed examples of types of manuals and contents expected. Again, indicating that questions are not being read thoroughly.

c)	Very limited answers, with only a few covering more than two or three points. Very few mentioned hardware and physical aspects. The area of data security probably needs more cover and learning.
Q5	Comment – Statistical methods are important in the area of system metrics within system design and development. Descriptions of each mathematical term is expected including a relevant set of values and their results.
a)	Give a simple definition and range of values showing how the average is calculated and the result of that calculation.
b)	This is a measure of the dispersion of a range of numbers. The formula and calculation should be provided.
c)	A frequency table will show how the mode is computed and what it is.
d)	The example should show how the median is calculated and include the possibility of an even or an odd number within the data set.
Q6	It was clear from the answers that very few students had read the question correctly as only a few students addressed the fact that they were to outline a job advert outlining the skills the DBA requires. There was very little content in the answers to this question and in most cases there was a lack of technical content and they did not reflect the amount of detail needed for the allocation of 12 marks, some students just listed 3 or 4 relevant skills, and others included irrelevant content to the question. Again, marks were awarded for any reasonable answers where applicable.

Comment – A sample advertisement is expected, defining the job including the qualifications of appropriate applicants. The expected duties should be outlined with skills required. The range of duties should include the overall responsibilities of the DBA |
| Q7 | The question was split into 4 sections, Q7a (3 marks), Q7b (3 marks), Q7c (3 marks), Q7d (3 marks). This was the least popular question asking for explanations of the meaning for IBM's definition of Big Data.

There were some good answers to this question but also some very poor, not all parts of the question were attempted by the candidates and some answers were trivial resulting in poor marks. Marks were awarded for any reasonable answers where applicable.

Comment – The term Big Data is used to describe large complex data sets containing a variety of data, its speed, size and accuracy. Various companies use slightly different ways of describing the principles. The question expects the IBM definitions. |
| a) | The different types of data that need to be processed should be described and examples provided. |
| b) | A discussion of the algorithms, accuracy, value and trustworthiness of the data used in analysis is required. |

c)	Meaningful patterns can be obtained from the amount of processed data. Storage can be a problem which can be overcome by various identifiable methods.
d)	Problems with how quickly information can be gathered from differing sources should be included.
Q8	This question was split into 3 sections, Q8a (2 x 2 marks), Q8b (2 x 2 marks), Q8c (2 x 2 marks), 3 times 2 marks for advantages and 3 time 2 marks for disadvantages with respect to Human Computer Interaction (HCI). Overall, these questions were answered satisfactorily both good advantages and disadvantages. Those who received poor marks was due to them not answering all parts of the questions or including answers that were not with respect to HCI. Comment – The way in which data is entered or displayed using the differing input/output media is expected. Concentrate on the practicalities of each type and the diversity of users.
a)	Explain for what and why keyboards and a mouse are used. There are some physical disadvantages, but these mainly outweigh the advantages.
b)	Examples of the use of touch screens is expected which will help describe the advantages and disadvantages.
c)	This is the most natural interface but has limited use in terms of data entry. Language is an issue despite technological advances. Discuss these issues.
Q 9	This question asked for the differences in management structures and most of the students only addressed part a of the question. Answers ranged from reasonable to very poor. As it was an open question, there were varying answers to the model answers, but marks were awarded for any reasonable answers where applicable. Comment - Management structures have evolved from the traditional pyramid inflexible reporting mechanisms to the flatlining approach. There are advantages and disadvantages of each which should be discussed
a)	Describe the typical hierarchical structure potentially using a diagram as an option giving examples and the functions of each level.
b)	A diagram could have been used as an alternative to narrative to show the way management roles change according to their responsibilities and the issues can occur within this structure.
Q 10	This question was split into 3 sections, Q10a (4 marks), Q10b (4 marks), Q10c (4 marks), and asked for the meaning of 3 different RAD terms. The answers were good in most cases and excellent in several cases although not all parts of the question were answered and lack of knowledge of the terms resulted in poor marks being awarded. Marks were awarded for any reasonable answers where applicable. Comment – There are various RAD methodologies, tools and techniques which have

	been adapted over the years resulting in the more recent Agile approach.
a)	A short definition of JAD is required along with the way a project is developed between the developers and the stakeholders.
b)	CASE tools have been available in various guises for many years. Describe the differing types of tools and the assistance they provide within project development.
c)	This approach is part of the functional development process. A discussion of how this works to support the process is expected.
Q11	The question was an open question with 1 section (12 marks). This was about Codes of Conduct and answers were expected to start the discussion with reference to the BCS Code of Conduct.

There were some good answers outlining the different sections of the code with good explanations of the meaning of each. As it was an open question, there were varying answers with a wide range of marks, but marks were awarded for any reasonable answers where applicable.

Comment – The BCS code of conduct is referred to in the following web address on the BCS website: http://www.bcs.org/category/6030.

The discussion should cover the basic principles of professional conduct and behaviour within the computing profession. These can be related to practices within the organisation. It should also include ethics, legality and morals within a person's working life. |
| Q12 | The question was an open question with 1 section (12 marks). This was the second least popular question.

A number of the candidates did not read this question adequately as they should have outlined the processes and stages for a company to follow to migrate from an internally based computer system to one that is entirely located in a third-part cloud. There were some reasonable answers where students did outline a process etc. but there were several poor answers where there was little content relating to the answer pointers. Marks were awarded for any reasonable answers where applicable.

Comment – The emphasis of this question is on the various processes a company should follow when migrating from in-house computer systems to a third-party cloud provider, not the advantages and disadvantages of such a procedure. There are several important issues which must be covered before the migration can take place. These need to be described. |