BCS Higher Education Qualification

Professional Graduate Diploma

April 2023

EXAMINERS' REPORT

Advanced Database Management Systems

Questions Report:

A1	
	This question was not a popular choice, with a third of candidates attempting it, and a third of those passed. Marks were lost by candidates by not attempting sub-questions; usually when an answer is given there is an opportunity to identify a few marks so leaving questions unanswered is not advantageous. Part a) was answered reasonably well, but lacked detail in some answers (i.e. the answer might have said how one or the other looked but not discussed similarity of expressiveness or it might have lacked the detail of how statements in the 'languages' look like). Part b) should have focused on how data is structured in the respective framework and how it is queried. This was not always explored and answers were often too brief (one or two bullet points or several paragraphs paraphrasing the same statement) to show good understanding of the different data models. Answers for the relation model were often stronger. Part c) - most students identified persistent data as that which does not change, but many answers spoke about backup solutions rather than the data itself.
A2	
	The question was attempted by about half of all candidates with over two thirds passing. Part a) was reasonably well understood and many answers were good; some answers provided optimised SQL queries, but at this point the requirement was for a query that represents what was shown in the tree. Part b) looked for explanations of the cause of inefficiency along with an optimised solution – again, that was generally well answered, with most candidates identifying that joining before projecting/ selecting leads to a need for handling bigger tables. Some answers did not work with the example but just stated some principles as to how to optimise queries. Part c) answers showed a good understanding of cost based and rule-based optimisation. Again, there were many missing answers for this section. A few candidates did not make clear the difference between the approaches, and some did not identify the advantages and disadvantages but focused purely on the approach.

A3	
	This question was answered by the majority of candidates with half of those passing. Part a) required two definitions with an exploration of advantages and drawbacks – answers focused on providing definitions but did not always outline the respective ups and downs and hence only partially answered the question. Part b) required a fragmentation model to be identified, justified and then executed on a set of tables – while many candidates identified part of what was needed correctly and properly explained why their approach was appropriate, they did not see this through on the example. Many candidates identified the need of the branches that only needed their own data, but did not correctly identify the need of the HQ. A small number of candidates provided generic answers unrelated to the example. Part c) explicitly asked for use of a lightweight database in mobile apps – while many apps were identified that could be seen as relevant most answers did not focus on the database aspect but rather on the lack of communication and how that is difficult for applications (e.g. when an online messaging application is not connected, messages cannot be sent). There were also several answers that suggested it would be better for apps to crash rather than hold out-of-date data, which would not be appropriate. Answers were expected which discussed situations in which data needed by an app is held in the local database and synchronised back to the global database when connectivity is returned.
B4	
	A popular question (selected by about 90% of candidates). Overall performance was good with around 70% candidates gaining a pass mark (>=10/25). This shows a good level of preparation amongst most candidates in this topic. Parts a (ii) and b) - When answering both these questions, there needed to be an example, which most candidates provided. The weaker attempts provided a diagram without any commentary or provided a complicated explanation that could have been better explained by a diagram. Part c) was answered well, with most candidates able to recall the two phase commit protocol but there was a significant number who didn't answer.
B5	
	Another popular question (about 70% of candidates attempting the question). Overall performance was slightly better than QB4 with around 80% of candidates gaining a pass mark. The average mark was slightly lower than QA4. Part a) – Overall, well answered by candidates, however some did not differentiate data masking from data redaction. The stronger answers showed examples of the use of data masking (e.g. substituting credit card numbers for x's) and data redaction (e.g. remove or "black out") sensitive data. In part a (iii) some candidates did not display an understanding of the context to the question that concerned software testing, and rather than choosing to discuss the benefits (such as reducing the risk of hacking, easier to manage) instead concentrated on explaining security of sensitive data and encryption techniques.

	Part b) - A fairly good response with a range of answers with the best answers addressing how auditing is applied to ensuring legislation such as GDPR is applied in practice. Part c) - Most candidates could differentiate data authentication from data authorisation which enabled discussion of the measures needed to address the possible breach in security described in the scenario. Therefore most candidates realised that authorisation was unlikely to be the cause as the worker continued to work for the same company. Thus it can be assumed they were still authenticated, but the role assigned during authorisation should have been updated. Part d) - The SQL code in subparts i), ii) and iii) contained directives through GRANT and REVOKE that needed translating into a single sentence in plain English. Most candidates showed a good understanding of these directives though more than half of candidates understood the WITH GRANT OPTION which provides Amy the right to provide the right to UPDATE to other users. Part d) iv) - Many answers were quite simplistic and did not adequately explain how Views restrict access and protect data within the context of the question.