BCS THE CHARTERED INSTITUTE FOR IT

BCS HIGHER EDUCATION QUALIFICATIONS
BCS Level 6 Professional Graduate Diploma in IT

EXAMINERS' REPORT

MANAGEMENT INFORMATION SYSTEMS

September 2017

General comments on candidates' performance:

Candidates answering questions A1 and A2 achieved high marks. However, marks for questions A3, B4 and B5 were lower, possibly as a result of several:

- **Question requirements overlooked.** *The evidence shows that many candidates omitted parts of the question requirement. For example, if the question required a discussion of the advantages and disadvantages, BOTH should have been addressed in the answer.*

- **Minimal answers.** *Candidates are advised to provide answers that cover the question requirements in both depth and breadth. A page of short paragraphs or bullet points would not gain high marks*

- **Repetition.** *The evidence shows some candidates attempted to answer questions by repeating points previously made or by repeating points made in the question. Future candidates are advised that no marks will be gained for such efforts.*

An indication is given below of the expected answer points. As is customary, marks were given for alternative yet appropriate answers.

SECTION A

A1. With the aid of examples, describe and justify a suitable MIS that you would implement to support **EACH** of the following situations found within an international manufacturing company:

a) Senior management's monitoring of the Company's progress towards achieving its strategic objectives.

(9 marks)

b) Middle management's decision-making concerning different aspects of the manufacturing process.

(8 marks)

c) Communication and sharing of manufacturing and product information between managers based at different geographic locations.

(8 marks)

Answer pointers:

This question requires candidates to identify and describe a suitable MIS to match the requirements of the situation presented in the subquestion. The key is in the question, and candidates' answers may be similar to the following (although feasible variations will be marked on merit):

a). As senior management want to monitor the Company's progress towards achieving its strategic objectives, then a possible MIS could be an Executive Information System (EIS) or a BI system that embodies the functionality that was traditionally expected to be found within an EIS (given that the EIS term is no longer in common use). An EIS or EIS functionality is focused on senior management, and it provides a user-friendly way (typically via a very visual GUI dashboard) to enable the monitoring of the organisations' Key Performance Indicators (KPIs) linked to its strategic objectives. The use of traffic light colour coding enables KPIs to be associated with the colour red if they are underperforming, the colour amber if they are borderline in performance, and the colour green is they are at least at a satisfactory level of performance. Drill down can be used to see the underlying details, again using colour coding of red, amber and green. Candidates are expected to give examples to illustrate concepts and visuals.

(For a description of a suitable system – 4 marks, plus for a suitable justification for the description – 3 marks, plus for suitable illustrative examples – 3 marks, to a combined maximum total of 9 marks.)

b). This requires a system that focuses on decision support for middle management in respect to different aspects of the manufacturing process. A model-oriented individual DSS is probably the most appropriate system to employ here, which is based around a simulation model of the Organisation's manufacturing process. Individual DSS are typically middle management systems, and are focussed on support specific individual decisions (one middle manager or intermediary on his/her behalf utilising the DSS at one time). The simulation model enables several different types of questions to be answered, for example:

- What happens if the demand for a product increases, can existing manufacturing processes cope?
- What happens if a production line breaks down, what impact does this have on the Organisation's ability to fulfil its orders?
- If we add another shift to our manufacturing processes, what impact will this have on product manufacturing capacities?
- If one of our machines is to be serviced, what plan can we put in place to maintain our production output rates during that time?

Candidates may provide a DSS diagram (probably of the DDM paradigm) as part of their answers. They may also provide some idea of what an example interface might look like for this system.

(For a description of a suitable system – 4 marks, plus for a suitable justification for the description – 3 marks, plus for suitable illustrative examples – 3 marks, to a combined maximum total of 8 marks.)

c). This system is for all managers, both local and remote, and needs to allow for the communication and sharing of manufacturing and product information. There could be several potential suitable answers to this subquestion and each will be marked on individual merit.   Answers could include one or more of the following:

- The use of a content management system such as Sharepoint, which enables the setting up of a content area with subareas within which documents can be pooled, and from which can be shared by geographically separated managers (subject to access rights) within the Organisation, accessible probably via the Company's intranet facility. Examples of its use within the specified setting may be described.

- The use of email to send and receive document attachments that provide product and manufacturing information. Candidates may talk about the functions found in an email facility, such as being able to broadcast the email to several managers simultaneously and the multi-media nature of attachments that could be sent, etc.. Examples of the Technology's use within the specified setting may be described.

- The use of Skype or similar personal VC facility to converse with one or more other remote managers in real time regarding products and manufacturing. Candidates may talk about the use of windows, screen (document) sharing, group skype set up, etc. Specific examples of the Technology's use within the specified setting may be described.

- The use of chat facilities on devices to allow real-time texting and associated sharing of documents on screen. Candidates may describe how this functions. Note that a limited form of Chat is provided as part of the Skype functionality. Examples of the Technology's use within the specified setting may be described.

(For a description of a suitable system – 4 marks, plus for a suitable justification for the description – 3 marks, plus for suitable illustrative examples – 3 marks, to a combined maximum total of 8 marks.)
(Total Q4 = 9 + 8 + 8 = 25 Marks)

Examiners' comments:

This question was popular, with 68% of candidates attempting it. The average mark was 11 out of 25.

The evidence shows that the overall solid performance of many candidates was predominantly due to the fair answers obtained for Parts a) and c): in these, many candidates picked up the specific clues in the questions (i.e. 'senior management' and 'monitoring strategic objectives' in Part a), and 'communication and sharing' and 'between remote locations' in Part c)) and used these to formulate focused, well described and appropriate solutions.

Part b), however, the answers were weaker. Whilst candidates linked middle management with decision support systems, they often suggested solutions that either focused on only <u>one</u> aspect of manufacturing operations (e.g. an expert system to diagnose faults in the production machinery) or provided fairly limited support in the form of a few fixed management information reports.

A2.

a) With the aid of suitable examples, describe the key features found within an On-Line Analytical Processing (OLAP) tool.

(11 marks)

b) Outline THREE benefits that a company might expect from using an OLAP tool.

(6 marks)

c) Explain the key advantages and disadvantages of the manager directly operating an OLAP tool application, rather than its being operated by someone on his/her behalf.

(8 marks)

Answer pointers:

This question requires candidates to describe the features and benefits of an On-Line Analytical Processing (OLAP) tool, and to evaluate its direct use by management.

Part a) requires an overview of key OLAP features. An answer to this part may include the following points:

- Typically revolves around a multi-dimensional view of data (rather than the two dimensional 'table' view of the relational data model), usually portrayed in the form of a cube (recognising that a cube is three dimensional, but that data could potentially have several dimensions.). Underlying physical storage may be relational (ROLAP) or multi-dimensional (MOLAP) in nature.
- Dimensions can have many levels – this is what enables the drill down and roll up capabilities across the data (the appropriateness of which is determined directly by the defined data structure).
- Can be designed using star or snowflake schema designs.
- Facts (data) are typically numeric and structured in nature. Can be linked to a data warehouse as the source of its data.
- A WIMP GUI is typically provided, with drag and drop facilities, to enable flexible and (relatively) easy manipulation of the data.
- Simple mathematical functions are available, such as count, percentage, rank and sum.
- Principal data manipulation operations provided by an OLAP tool are drill down, roll up (opposite of drill down), slice-and-dice and pivot (although pivot is more about data display than data manipulation).

Candidates may provide specific examples to illustrate the key points and/or to show the interface of an OLAP tool and how it might work.

(For each sound point made regarding OLAP features – up to 2 marks, to a maximum 7 marks, plus up to 4 marks for examples = 11 marks.)

Part b) requires candidates to outline **THREE** benefits that a company might expect from using an OLAP tool. Benefits that may be mentioned include:

- The flexibility of the reporting that you get from OLAP tool application, as opposed to using a fixed reporting facility of an MRS.
- The relative ease of reporting, given the interface of the OLAP tool versus using SQL directly on a relational database application.
- Can be used to enhance business intelligence by enabling drill down to underlying reasons why some value is as it is and by allowing trends to be viewed/identified.

- The efficiency of use, as reports do not have to be created in advance by the MIS department team, saving both time and (developers) money.

*(For each valid benefit outlined – 2 marks * 3 benefits = 6 marks.)*

Part c) requires candidates to consider the key merits and disadvantages of a manager operating the OLAP tool directly (versus an intermediary using it on his/her behalf). The following might be included within candidates' answers:

Key advantages:

- The manager knows more than anybody what information s/he needs to glean from the OLAP tool. Doing this directly means there is no potential for miscommunication between the user and the manager leading to the wrong queries being posed.
- Privacy-wise, the less people involved in gaining access to corporate information the better.
- Using the OLAP tool directly means that there is no delay in the answers being obtained.
- Operating the OLAP tool enables the manager to keep an IT skill going, which can be useful for future use/exploration of the data.

Key disadvantages:

- The manager may not be very proficient in the OLAP tool's use, and therefore could use it incorrectly leading to wrong information and potentially wrong decisions being made.
- The manager can use the time s/he would have spent operating (and learning about) the OLAP tool, to better business advantage.
- The intermediary may be more proficient and be able to suggest additional searches/avenues to consider – leading to a better outcome overall (two heads is better than one!)
- The manager may not want to operate the IT system directly, from an interest and/or image perspective. Making him/her operate it means it may not be used (adequately) and this may lead to wrong decisions due to wrong or missing information.

*(For each sound advantage/disadvantage – up to 2 marks * number of advantages/disadvantages, to a combined maximum of 8 marks.)*
(TOTAL Q5 = 11 + 6 + 8 = 25 Marks)

Examiners' comments:

This was also a popular question on the paper, again with approximately 68% students attempting it. Again, the average mark was around 11 out of 25.

The evidence shows that Part a) was generally well attempted, with some good and clear descriptions of the key features of OLAP. Examples to support answers were variable in level, however. For instance, several diagrammatic examples of OLAP cubes, which should have been useful, were not annotated sufficiently or clearly.

There were some excellent answers to Part c), which numbered and described clearly both advantages and disadvantages. However, some candidates gave lists without any description and clarity. In Part b), candidates frequently gave benefits in relation to a particular OLAP application rather than in more general terms.

A3. A company is considering outsourcing all future MIS application developments.

a) Discuss the advantages and disadvantages of outsourcing the Company's future MIS application developments, clearly stating within your answer any assumptions you make regarding the Company and its operations.

(13 marks)

b) Business Intelligence (BI) systems developments should 'start small, aim big'.

i) Define what is meant by this statement.

(6 marks)

ii) Explain the role that a metadata repository plays in ensuring that BI systems can 'start small, aim big'.

(6 marks)

Answer Pointers:

This question centres on aspects of MIS development, specifically outsourcing of development, BI systems development approaches and the role of a metadata repository in BI systems development.

Part a) requires candidates to discuss the advantages and disadvantages of outsourcing a company's future MIS application developments. Some of the points that could be discussed include:

Advantages:

- Involve external developers that are far more knowledgeable in MIS provision than in-house IT staff (assuming that an IT department already exists within the company) and better equipped to produce MIS of high quality and robustness.
- Takes the development time away from existing IT department staff, enabling them to concentrate on other development/support work within the company.
- No need to hire further staff, and with this taking on the additional pension, legal and other HR/management-related aspects entailed.
- Costs are fixed, as stated within the contract. This enables more certain financial planning.
- Poor previous experiences with in-house development of MIS (assumption made here) have brought into question the pragmatism of entering into further in-house MIS developments.

Disadvantages:

- Internal IT department staff may feel aggrieved that the opportunities of developing future MIS provisions has been 'taken away from them'; opportunities which may have given them additional and highly attractive skills, and may have given them positive variations in their duties (beyond the mundane day-to-day activities they currently perform (assumption here)).
- Internal IT department staff may also feel demotivated that the 'exciting' work is outsourced leaving the 'mundane, less well-regarded' work to them.
- The costs involved in out-sourcing the development; it may cost significantly more than if developed in-house.
- After the development, what happens with any maintenance activities? The company becomes dependent on the outsource provider for maintenance, as there is limited (or

no) in-house expertise in the underlying workings of the MIS. This can cost dearly – and what happens if the developer pulls out of any servicing/maintenance contract?

- The MIS developments can be given to those MIS developers that have excess capacity in their workload (assumption here) and therefore do not incur additional finances for staff.

(For a sound discussion of each merit/disadvantage – up to 3 marks, * number provided, to a combined maximum of 13 marks)

Part b) requires candidates to justify why Business Intelligence (BI) systems developments should 'start small, aim big', by first defining what we mean by this statement and then explaining how a metadata repository helps to achieve BI systems that 'start small, aim big'. The phrase - Business Intelligence (BI) systems developments should 'start small, aim big' – refers to the fact that BI systems are enterprise-wide systems (not isolated silos). However, to develop a comprehensive enterprise-wide BI system in one go would invariably mean a huge data conformance exercise incurring significant time delay (maybe years) before any tangible products are ready to use (by which time, they may already be out-of-date). Furthermore, it may be impossible to articulate at the outset the required nature of all the BI system functionality and associated data sources. To enable an enterprise-wide view of BI systems to occur yet develop the specific BI system functionality/data provision in a more realistic 'piecemeal' (incremental) manner, the development should 'aim big, start small'. By aiming 'big', that is seeing each BI system development project as a piece of 'the jigsaw' forming the enterprise BI system, it ensures that all data objects and associated processes (e.g., ETL) are in conformance with already defined company-wide standards (or sets new company standards where such do not yet exist, that future projects will adopt) enabling a 'single version of the truth' to form across BI system projects and the Enterprise. Although BI system development is incremental, this still ensures that an enterprise-wide BI system evolves.
(For a sound definition of the meaning of the phrase - maximum 6 marks)

Metadata (i.e., data about data) is vital to BI systems developments and their achievement of 'starting small, aiming big'. As stated in answer to Part b)i. above, there needs to be standards that are defined across the organisation, which future projects adhere to. This adherence enables common definitions of data objects and underlying processes for their population within a data warehouse. Metadata is that which embodies the organisation-wide definitions, standards and associated descriptions that each BI systems development project needs to be aware of so that it can ensure its conformance. A metadata repository is the repository that houses metadata associated with its BI systems. Access to this is vital during development work to ensure appropriate standards/definitions are known and applied effectively.

(For a sound view of metadata and metadata repository, plus explanation of the reason why it is important – max total of 6 marks)
(TOTAL Q6 = 13 + 6 + 6 = 25 Marks)

Examiners' comments:

Again, this was a popular question at around 68% of candidates attempting it, with a 32% pass rate and an average mark of just shy of 8.5 out of 25. The evidence shows that these marks were primarily due to the weak (and often absent) answers to Part b): no understanding of what 'start small, aim big' means with regards to BI systems development implies was shown. The only aspect of the answer to part b) that most candidates recalled (and therefore were able to gain a couple of marks) was that meta-data is 'data about data'.

Answers to Part a) were generally satisfactory in that candidates were able to articulate some relevant advantages and disadvantages clearly. There is evidence that several candidates neglected the fact that the outsourcing was for future MIS <u>applications development only</u>, instead considering <u>all</u> MIS operations, or both MIS development <u>and</u> <u>maintenance</u>, were to be outsourced. Some answers were unclear in description, making it difficult to understand why some aspect was being considered an advantage or a disadvantage. Some were candidates provided lists, with little accompanying description. This restricted the amount of marks that could be gained.

SECTION B

B4.

a) In the form of a report to senior management, compare and contrast the concepts of data protection and information security management as they apply to MIS in an internet based commercial organisation.

(15 marks)

b) With reference to relevant examples, describe how you would ensure that policies covering these activities are regularly reviewed and tested.

(10 marks)

Answer pointers:

a). The key words here are "compare" and "contrast". The candidate is likely to wish to refer to the provisions of the UK Data Protection Act and the EU legislation which supports it. Further, the difference between "personal" and "sensitive personal" data should be explored. This is, however, only a small part of the much wider information security management framework which an organisation will need to have in place. In this regard, the candidate may refer to the model expressed in the ISO 27000 family of standards.

Up to 5 marks for the report format.
Up to 5 marks for each of how the candidate "compares" and "contrasts" the two areas.

b) Examples for this section may range widely, depending on the experience of the candidate. It is likely that data management and retention policies will form part of the analysis. Again, the basis of ISO 27000 standards in the ISO 9000 family will provide guidance on continual improvement.

Up to 6 marks for review of policy.
Up to 6 marks for how testing could be managed.

Examiners' Comments:

This question was answered by only 29% of candidates. and the evidence shows that many candidates were unable to articulate the specific features of data protection and information security management. Those who addressed this question provided highly generic comments about "security" of some sort and as a result only attracted very low marks.

A few well constructed responses were received, and these showed an understanding of both the relationship between the concepts of data protection and information security management and how the policies governing them could be managed within an organisation.

B5. *"A company which refuses to engage with its customers using social media will fail within five years."*

    a)   Using appropriate examples, discuss the extent to which you either agree or disagree with this statement.

(13 marks)

    b)   Write a report to MIS managers explaining how a commercial organisation can enhance its traditional Customer Relationship Management system by developing social media relationships with customers.

(12 marks)

Answer pointers:

a)   Traditional models of MIS generally seek to protect data and transactions by keeping them closely managed within the network directly controlled by the organisation. The rise in social media adoption may require MIS managers to address this assumption and find other models which extend the reach of their systems without compromising security. The question seeks to test the degree to which candidates can debate disruptive technologies and give reasoned arguments for their deployment.

Up to 6 marks for the use of examples
Up to 6 marks for the argument presented.

b)   This section tests the ability of candidates to present a cogent set of arguments which will lead to a managed change of service provision. Note that the target audience is composed of MIS managers.

Up to 5 marks for the format and structure of the document.
Up to 8 marks for the relevance and quality of the argument.

Examiners' Comments:

This was a popular question, which was attempted by over 90% of those candidates who attended. The candidates who scored best in this question were able to provide balanced, well-argued answers which would be credible when presented in a commercial environment. There is evidence that several candidates merely provided very general information regarding the various tools which currently form the social media platforms, which did not adequately explore the question.

Many candidates lost marks in part (a) by not providing suitable examples as required by the question.