# BCS THE CHARTERED INSTITUTE FOR IT

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

## MANAGEMENT INFORMATION SYSTEMS

**September 27th 2018**
Answer **any** THREE questions out of FIVE. All questions carry equal marks.
Time: THREE hours

**Answer any Section A questions you attempt in Answer Book A**
**Answer any Section B questions you attempt in Answer Book B**

The marks given in brackets are **indicative** of the weight given to each part of the question.

## EXAMINERS' REPORT

### General comments on candidates' performance

The overall pass rate of the paper was higher than previous sessions at 65%. However, marks for question A3 were disappointing this session, with average marks on other questions around the pass mark of between 10 and 11 out of 25. The reasons for this are several, including:

- **Question requirements.** There is evidence that many candidates omit parts of the question requirements. For example, if the question explicitly requires an overview of the key features of a data-oriented DSS (as Question A1 did), then this must be provided (as marks are allocated for this). There is evidence that some candidates provide answers that do not fit the question set, and candidates gain little or no marks for these. Candidates need to respond to the question they are being asked.

- **Minimal answers.** Candidates have an hour to complete each question and the examiners are seeking answers that cover the question requirements in both depth and breadth. A short paragraph or a list of one-phrase bullet points will not receive high marks.

- **Not answering the question.** Evidence shows several candidates provide overviews of concepts/issues that are not tailored to the question. For instance, in answer to Question A3 candidates failed to provide attributes of a project manager that would be specifically required for effective management of a *large BI systems* project.

An indication is given below of the expected answer points for this examination. However, marks were given for additional points or for valid alternative answers relevant to the question.

## SECTION A

A1. Explain EACH of the following concepts, evaluating their usefulness within the development of a data-oriented Decision Support System (DSS).

- ERP system.
- Prototyping.
- Extract-Transform-Load (ETL) operations.

Include an overview of the key features of a data-oriented DSS, and support your answer with relevant illustrative examples.

**(25 marks)**

**Answer pointers**

This question requires candidates to explain some fundamental MIS concepts and see how useful each is to the development of a data-oriented DSS. Some of the concepts may not always be described explicitly within the literature associated with the data-oriented DSS, and therefore this requires candidates to think about the concept deeply to assess its usefulness in the specific context.

Answer could include some of the following:

**Key features of a data-oriented DSS:**

- It is a decision support system for individual users (managers or their intermediary acting on the manager's behalf) – supporting Intelligence, Design and/or Choice phases of Simon's decision making model.
- Based on the DDM paradigm model – Data, Dialog, Model, as all DSS are.
- The focus of a data-oriented DSS is simple analysis across large data sets. Typically, this type of DSS contains a relatively large pool of multi-layered and multi-faceted data. Modelling involves several basic mathematical models – simplest being averages, percentages, rankings, etc – by which to analyse the data (some form of forecasting model may also be employed).
- Candidates may give some examples of such a DSS in support of their description.

**ERP system and its usefulness to data-oriented DSS:**

- An ERP system is built to support the basic operations of an organisation as an integrated whole. ERP software may provide several modules, each of which may provide support for a principal function within the organisation (e.g., HR, finance, sales, production, distribution). Organisations may buy one or more of the standard modules offered which are then tailored to the specific needs of the organisation where this is possible. The biggest strength of ERP lies in its ability to offer an integrated data repository upon which all modules are developed. The data repository allows for one integrated view of the operational data to be present within the organisation, enabling functions to communicate data between each other easily.
- Candidates may give some examples of the use of ERP within such a DSS, in support of their description.
- Data-oriented DSS rely on data being rich and of good quality. The ERP could be a really good source of quality integrated internal data for the DSS but would probably not be its only data source. External data may be provided through other suitable sources. As it only supplies current data, anybody setting up a DSS that analyses data over several years will also have to locate sources for the historical content.

**Prototyping and its usefulness to data-oriented DSS:**

- Prototyping involves the construction of a series of prototypes in order to understand what the customer wants the computer system (in this case a data-oriented DSS) being built to do or look like. It may also be building the system, where the final version of the prototype becomes the system that is delivered to the customer. Alternatively, the prototype once it has performed its stated purpose could be thrown away and a new system developed.
- The idea is to get something to the user very quickly which allows the user to review and, in some case, explore the prototype. This leads to feedback from the user, which will be taken into account within further prototype versions.
- Prototypes can be horizontal (broad functionality coverage, but each functionality implemented to a very limited extent), vertical (deep implementation of a subset of possible functionality), or a mix if both. They may be 'show and tell' in nature or actually available to explore and experiment first hand.
- Prototyping can certainly be very useful within the development of a data-oriented DSS. The prototype may provide a view of the interface for the user to view and comment on. The modelling functions may be implemented one by one, allowing for user exploration and feedback.

**Extract-Transform-Load (ETL) operations and its usefulness to data-oriented DSS:**

- ETL is the process of populating a data repository (e.g. data warehouse or data mart) with data that has been consolidated from different data sources. The process involves:
    - the extract operation, which identifies and extracts the relevant data portions from the source systems,
    - the transform operation, which transforms the source data portions into a consistent, clean and integrated view that is required for the target repository, and
    - the load operation, which loads the data into the target repository.
- Transformation includes cleaning the data to remove omissions/inconsistencies of content, etc., and making sure it is translated into the consistent view where it comes from sources that have different meanings/attributes/formats. Some of the operations that may need to be undertaken on source data include:
    - Translating coded values (e.g., translating male as "1" and female as "2" into male as "M" and female as "F").
    - Encoding values to what is required (e.g., encoding "Male" as "M")
    - Deriving a new calculated values: (e.g., sale_amount = qty * unit_price)
    - Aggregating or merging data
- ETL has been associated directly with data warehousing, so in that context it is not a term that is often used with required to a DSS which has its own independent database. However, the ETL process as a process still applies to DSS as much as in situations where a data warehouse is present. Data still needs to be taken from source systems, and transformed and loaded into the DSS database component, upon which simple analysis is performed. Therefore, ETL, in this context, is extremely useful for data-oriented DSS.

**Marks:**

**Poor/fail (0-7):** Little or no understanding of what data-oriented DSS are, let alone the MIS concepts to be considered with respect to this type of DSS. Some aspects not attempted or completely wrong. Limited effort expended.

**Not quite pass level (8-9):** Some understanding of what data-oriented DSS are, although little understanding evident of the MIS concepts to be considered with respect to this type of DSS. Limited description and/or examples given. Effort has, however, been made to answer the question.

**Basic Pass (10-14):** Basic understanding of what data-oriented DSS are, and some understanding evident of at least one of the MIS concepts to be considered with respect to this type of DSS, albeit this being limited. One or two relevant examples may be provided.

**Good Pass (15-17):** Solid understanding of what data-oriented DSS are, and a reasonable understanding conveyed of at least two MIS concepts considered in respect of this type of DSS, with some relevant examples given.

**Excellent Pass (18-21):** A very sound understanding conveyed of what data-oriented DSS are, and all three MIS concepts understood and assessed in respect of their usefulness for this specific type of DSS, and including some relevant illustrative examples to support comments made.

**Outstanding Pass (22-25):** An excellent understanding conveyed of what data-oriented DSS are, and of the three MIS concepts assessed in respect of their usefulness for this specific type of DSS. Arguments are sound and complete. Examples are comprehensive, useful and clear. Overall, a complete and comprehensive answer.

**TOTAL QA1 = 25 Marks**

**Examiner's comments:**

This question was popular with 69% of candidates attempting it, 55% of which passed. The average mark was just over the pass mark at 10.5 out of 25. The evidence shows that many candidates were unable to explain all three MIS-related concepts, but did manage to provide sufficient description of two for basic competence to be demonstrated (i.e., awarded a bare pass). ERP was frequently not understood, it being considered a planning, rather than an integrated enterprise-wide operational support, system. In some cases, prototyping was not described in respect of MIS (this is, after all, an MIS paper). Most candidates were able to enumerate some of the key aspects of ETL, although many gave simplistic descriptions of the transform function.

In addition, there is evidence that several candidates did not provide any real overview of DSS features. Of those that did provide some correct DSS definition/description, a large proportion omitted to distinguish a data-oriented (as opposed to model-oriented) DSS. This distinction is important for the next element of the question; the linking of the aforementioned MIS concepts to their applicability for (data-oriented) DSS. As a consequence, several gave erroneous statements (e.g., referred to prototyping within model-oriented DSS. There were also many vague statements provided concerning the linkage to data-oriented DSS that had not concrete foundation. Several candidates failed to attempt this aspect of the question.

Examples were generally given. However, these were not always MIS-focussed and therefore less strong in illustrating aspects of the answer.

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A2. With the aid of illustrative examples, explain EACH of the following concepts and how they interrelate.

- Critical Success Factors (CSFs)
- Key Performance Indicators (KPIs)
- Electronic Dashboard.
- Business Performance Management (BPM).

**(25 marks)**

**Answer pointers:**

This question allows candidates to demonstrate their understanding of interrelated aspects of business performance management and the BI systems' concepts that serve to support business performance monitoring/measurement. The following might be given by candidates in response to this question:

**Critical Success Factors (CSFs):** CSFs are those few key things (activities or factors) that need to go right in order for an organisation to be successful. They therefore represent those managerial or enterprise areas that must be given special and continual attention to ensure high performance of an organisation. An example of a CSF could be customer loyalty or customer service efficiency.

**Key Performance Indicators (KPIs):** Although sometimes defined to be synonymous with CSFs, most KPI definitions refer to them as measurable values that demonstrate how effectively a company is achieving key business objectives. Organizations therefore use *KPIs* to evaluate their success at reaching targets. Example KPIs might be 100% customer satisfaction with a defined product or service, zero defects in production, and 50% of orders coming from repeat custom.

**Electronic Dashboard:** An electronic dashboard is an interface that provides a manager with a view of the key aspects that they need to monitor at a glance on a single screen. It needs to be very easy to understand and offer a manager a quick and easy way to gauge the situation of those critical success factors/key performance indicators that are relevant to him/her. The dashboard is usually graphical/iconic in nature (e.g., use of graphs to show trends and dials for performance levels), and uses traffic light colour coding (i.e., red, amber, green) to indicate current performance. Design of the dashboard needs to consider making sure the space of the dashboard is effectively used, with the most important aspects in the 'prime real estate' area of the screen (top left) and non-data items de-emphasised and kept to a minimum.

**Business Performance Management (BPM):** BPM is *"business processes, methodologies, metrics and technologies used by enterprises to measure, monitor, and manage business performance* " (p. 196, Sharda et al., 2014). It provides a process by which management can ensure business operations are aligned with corporate strategic objectives. Plans resulting from strategic planning activities are associated with quantifiable metrics that can be measured by the organisation to gauge current performance and its sustainability for the future. Further actions and plans may result from the view of performance obtained. Candidates may mention Balanced Scorecard as a methodology that can be adopted within BPM, as well as the critical role BI systems can play.

The interrelationships may have been identified as part of the descriptions of the four concepts. Essentially, KPIs are measurable metrics that are associated with CSFs: one CSF can have several KPIs. BPM requires the definition of KPIs from the strategic plans (and identified CSFs therein). The electronic dashboard is the medium through which management may monitor the performance of the organisation on those identified KPIs. A dashboard KPI monitoring system is a critical support system for BPM.

**Marks:**

**Poor/fail (0-7):** Little or no understanding of what was needed to answer the question. Maybe the odd glimmer of understanding of one or two of the concepts in those answers at the higher end of the marks, but limited effort expended. No attempt to interrelate.

**Not quite pass level (8-9):** At least one of the two concept descriptions attempted even if not very strong. One or two examples given, but again this is not strong.

Attempts have, however, been made to answer the question. An attempt to interrelate but very weak.

**Basic Pass (10-14):** At least two of the concepts descriptions provide basic understanding of the concept, and supported by a couple of relevant examples. Interrelationships between these concepts are attempted, with some relevant description.

**Good Pass (15-17):** At least three of the concepts descriptions provide basic understanding of the concept, one of which may be well described, and supported by some relevant and supportive examples. Interrelationships between these concepts are attempted with some relevant and sound description.

**Excellent Pass (18-21):** All concepts descriptions provide at least a basic understanding of the concept, at least one of which may be well described, and supported by some relevant examples. Interrelationships between these concepts are generally explained well.

**Outstanding Pass (22-25):** All concepts well described and demonstrate very good understanding of each concept and supported by an excellent number of relevant examples. Interrelationships between these concepts are excellently explained. An outstanding answer overall.

**TOTAL QA2 = 25 Marks**

**Examiner's comments:**

This question was attempted by under half (45%) of the candidates, 60% of which passed. The average mark was again just over the pass mark at 10.6 out of 25.

Like Question A1, the evidence shows that most candidates were unable to explain all the MIS-related concepts but did manage to provide sufficient description of a subset for basic competence to be demonstrated (i.e., awarded a bare pass). BPM was the least understood concept, instead considering it to be a term denoting the general monitoring of business performance (many candidates omitted that it also encompasses planning activities). There is evidence that many candidates were unable to articulate what a Critical *Success* Factor was, incorrectly considering it to be about minimising failure rather than maximising business success but were able to describe KPIs and dashboards to a competent level. Sound and relevant examples were generally provided to enhance candidates' descriptions.

Regarding the interrelationships between the concepts, again KPIs to dashboards was most effectively articulated. Given the misunderstandings mentioned in the previous paragraph regarding BPM, it is no surprise that the descriptions of the interrelationships between this concept and the rest were the least effective. However, interestingly some candidates fared better on the interrelationships than they did the concept descriptions.

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A3.

a) Identify and justify FIVE key attributes you would expect a project manager of a large BI system project to possess.

**(15 marks)**

b) Describe the purpose of, and the key aspects, you would expect to be covered within an MIS feasibility report.

**(10 marks)**

**Answer pointers:**

Part a) is about the attributes expected to be present within an effective project manager of a large BI system development. Aspects that candidates may discuss include:

- Experience in managing BI system projects and/or enterprise-wide developments using a spiral methodology (so that s/he understand the importance of an enterprise view of the development, seeing the current project as part of a bigger journey, including the importance of building up the persistent data repository incrementally and capturing/managing meta data effectively.)
- Experience in managing large-scale MIS developments that involve significant complexity – BI system projects are not for the 'faint hearted'.
- Being able to deal with the responsibility and accountability that may come with the role.
- Strong people management skills, as well as communicating/organisation/planning skills. Project management is about managing people, as well as other resources. The project manager may have to exhibit strong negotiating skills when necessary, in an attempt to influence team members and management about some aspect of development. Communication may be required at different levels, from senior management reports to individual team members. Project managers need to be able to explain complex concepts clearly to others. Organisation and planning are integral to the role.
- Knowledge of, and skills in, the effective use of project management techniques such as work breakdown structures, Gantt Charts and PERT diagrams.
- Skills in the use of contemporary project management software such as MS project.
- Fair, honest, open, collegiate where possible and decisive where necessary, etc. – all these attributes could be mentioned as part of the project managers arrays of attributes and values.

1 Mark for a reasonable suggestion of an attribute, plus two marks for justification/description = 3 marks * 5 attributes = 15 Marks

Part b) requires candidate to consider the purpose of, and key contents expected within, an MIS feasibility report.

A feasibility study is a preliminary study undertaken to determine and document a project's overall viability. The feasibility report therefore refers to the document that is produced as a result of a feasibility study. In this case, we are considering the feasibility of an MIS project, and documenting this within an MIS feasibility report. The document forms the principal basis upon which decision is made to proceed or otherwise with the MIS project. It may suggest various alternative solutions in the light of a business problem that involves MIS, and evaluate their relative viability. Financial, social and technical issues invariably need to be considered as part of the feasibility evaluation.

Overall purpose outlined – maximum 4 marks

Feasibility report may contain:

- Introduction, executive summary and conclusions/recommendations.
- Overview of the business problem being addressed.
- The alternative MIS solutions being considered, each evaluated on several dimensions such as economic (CBA), technical and social, and risk. These may be assessed against the 'do nothing, carry on as usual' option.
- Preferred solution presented with reasons (should at least one be feasible).

Each relevant section maximum 2 marks to a total maximum of 8 marks
Total QA3(b) = 4 + 8, to a maximum of 10 marks

**TOTAL QA3 = 15 + 10 = 25 Marks**

**Examiner's comments:**

This question was very popular with 71% of candidates attempting it. However, only 36% of those attempting it passed and the average mark was a low 8.7 out of 25.

Part (a) has evidence of many candidates providing generic statements such as 'must be friendly' or 'honest' or 'communicate' or 'time management'– with no accompanying explanation/justification. Other candidates offered more than five attributes in the form of a long list of one-line phrases; the best five answers were therefore taken and resulted in low marks due to their brevity. The best answers offered five specific and detailed answers, which demonstrated sound understanding of project management *within the context of a 'large BI system project'* (i.e., what the question asked for).

The evidence shows that part (b) was particularly poorly attempted by many candidates. Some chose not to answer this part at all (losing 10 marks straightaway), and others saw this as an opportunity to write about detailed requirements specification and fact finding. Some candidates were able to articulate the purpose of an MIS feasibility study and when it may take place within the systems development lifecycle, but very few of these were able to outline its contents effectively.

## SECTION B

B4. Corporate organisations are finding it increasingly necessary to use social media as a means of communicating with their customers. However, not all organisations have managed their use of social media successfully.

a) Discuss THREE examples you have studied where either GOOD or BAD use of management information via social media by a corporate organisation has gained wider publicity.

**(12 marks)**

b) Write a document outlining THREE essential guidelines for managing corporate social media use in the context of MIS.

**(13 marks)**

**Answer pointers:**

a) These examples will reflect the wider experience and understanding of the candidate with respect to social media and MIS. Numerous examples exist in the media to enable a full and varied answer – so the candidate is expected to provide good examples. Up to FOUR marks will be awarded for each of THREE examples.

b) This answer should be in the form of a standard business document. Up to FOUR marks are available for overall style and format. Each essential guideline, which should be demonstrably different, will attract up to THREE marks.

The guidelines could include, but are not limited to:

- Corporate social media accounts being monitored continuously
- Timely and thoughtful responses to problems raised to corporate social media accounts
- Ensuring that responses are not easy to misinterpret
- Training social media managers to avoid responses which could be interpreted as discriminatory

**Examiner's comments:**

This was the most popular question in the current paper, being attempted by over 75% of candidates. The pass rate was nearly 63%.

A number of candidates scored well in this question, but the evidence shows that many candidates presented poor answers and did not reach a pass grade. In most cases, this was largely due to the candidate presenting inadequate depth of content – which did not qualify to reach a pass mark. In other cases, the material presented was confused or irrelevant – which received low marks.

Candidates at this level are expected to be able to present cogent, well-structured arguments. While many did reach this standard, there is space for improvement.

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B5. In his retirement speech recently, the outgoing Chief Information Officer (CIO) from a major accounting firm remarked that "rapid application development has caused more problems in MIS than it has ever solved".

a) Describe in detail what is meant by the term "rapid application development".
**(12 marks)**

b) For an article you hope will be published in the company magazine, discuss the extent to which you agree or disagree with the opinion of the CIO. You should provide examples to support your views and state any assumptions which you make.
**(13 marks)**

**Answer pointers:**

a) Any reasonable description of RAD can be given. It is likely that it will be generally based upon this:

RAD emerged in the wake of evolutionary systems and the arrival in the late eighties of software tools that could facilitate prototyping and program code generation.

Prototyping overcomes many of the problems associated with systems development, where any user may experience difficulties in understanding hypothetical situations and where systems designers could have difficulty in communicating their solutions. Prior to RAD, prototyping of systems was possible only at the expense of wasted time and effort necessary to design and mimic screen layouts and the proposed reports. Changing the prototype was difficult and, when the design was agreed, the prototype had to be thrown away and the operational system developed.

The introduction of graphical user interfaces (GUI) simplified the process of prototyping and RAD software tools enabled the completed prototype to form the basis of the system. For the first time, every percentage of effort resulted in the same percentage of the completed system. Current RAD methods and tools enable all stages of systems development to occur more or less in parallel. By prototyping a series of incremental system improvements, over a period of time, each can evolve into a completed system.

Up to TWELVE marks are available for a complete answer.

b) The stated intention is that this should be a popular article for a house magazine. The format and language should be appropriate to this use. Up to THREE marks will be available for format and overall style.

There is no expectation as to whether the candidate should agree or disagree with the statement. The requirement is for a reasoned discussion, for which up to SIX marks are available.

Up to FOUR marks are available for relevant examples which support the stated position of the candidate.

**Examiner's comments:**

This question was the least popular on the current paper, being attempted by only 43% of candidates. The overall quality of the answers obtained was good, with over 67% achieving a pass mark.

The evidence shows that the majority of those answers provided were well structured and well argued, with good descriptions being made of RAD and its impact on the industry.

Those who scored poorly in this question generally gave very short, inadequate answers and appeared unsure of the nature of the question. Candidates are encouraged to read the question carefully, and to provide a response which is within the parameters expected