

**BCS THE CHARTERED INSTITUTE FOR IT**

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

**MANAGEMENT INFORMATION SYSTEMS**

**EXAMINERS' REPORT**

Thursday 1<sup>st</sup> October 2015

Answer **any** THREE questions out of FIVE. All questions carry equal marks.  
The marks given in brackets are **indicative** of the weight given to each part of the question.

Calculators are <b>NOT</b> allowed in this examination.
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**Section A**

**General comments on candidates' performance**

*The standard of answers was higher than in recent examinations, with the overall pass rate at 66%. Fewer candidates provided meaningless answers or answers derived purely from the words of the question. However, a small minority of candidates had clearly not prepared for the examination and failed to provide answers with the required depth of knowledge and understanding. Furthermore, there are some candidates who either failed to attempt all parts of a question or answered a different question to the one set. As always, the highest marks were given to candidates who provided comprehensive, relevant, reasoned, structured and detailed answers.*

*Candidates should be advised that their examination performance is likely to be enhanced if, in addition to reading the recommended material, they study the use of MIS within their own organisation or organisations/companies with which they are familiar. This will put any theoretical knowledge into context, thereby making the whole subject easier to understand and remember.*

*A number of candidates presented excellent papers and should be congratulated on their achievement.*

*An indication is given below of the expected answer points. However, marks were given for alternative answers if relevant to the question.*

## SECTION A

### A1.

a) For EACH of the following roles, discuss the principal duties and justify why each role is important to the development of large enterprise-wide Business Intelligence (BI) systems.

i) Business sponsor. (5 marks)

ii) Project manager. (5 marks)

iii) Meta-data repository developer. (5 marks)

iv) Extract-Transform-Load (ETL) lead developer. (5 marks)

b) Explain THREE key differences between a BI steering group and a BI competency centre.

(5 marks)

### Answer pointers

**Part a)** of the question focuses on the user roles typically associated with large organisation-wide BI systems developments, and their importance to the success of these developments.

The following aspects may be included by candidates under each role:

i) **Business sponsor:** absolutely vital to the success of a large BI development project, as this role champions the system both as a concept (prior to its authorisation/development) and subsequently during development. The sponsor is there to provide top management support in the face of a CBA where the intangible nature of the benefits can make the development look less favourable than others (e.g., TPS) 'on paper'. The role can also seek to facilitate its continuation in the light of challenges and difficulties during development. The business sponsor can also be the signatory at key points in the development process, e.g., to ensure the next phase of a BI project gets the resources it needs to go ahead. The business sponsor forms one role within the extended BI development team. Sponsorship needs to be apparent throughout the development, even if actual input by the sponsor to the development activities is only at specific points in the development cycle.

*(Up to 4 marks for a sound overview of the duties of the role, and up to 2 marks for a sound argument as to the importance of role to the BI systems development, to a combined maximum total of 5 marks)*

ii) **Project manager:** again, this role is absolutely vital to the successful development of the BI system, throughout the entire development. Part of the core team. Manages the project from start to finish, planning the project work and required resources, coordinating resources and monitoring/controlling the project over time to ensure delivery on time, within budget and to the required level of quality. Needs to have suitable experiences of BI development to understand what is required and the complexity of some aspects such as ETL. Needs to be familiar with techniques such as PERT/CPA, resource smoothing, and needs to have sound people management skills.

*(Up to 4 marks for a sound overview of the duties of the role, and up to 2 marks for a sound argument as to the importance of role to the BI systems development, to a combined maximum total of 5 marks)*

- iii) **Meta-data repository developer:** again, this is a very important role in the development of the BI system, particularly regarding the development of appropriate meta-data repository functionality. BI systems and their evolution are only effective when there is due consideration of meta-data: ETL scripts are meta-data as are the data repository schemas and the definitions of the business objects that are stored therein. As each BI project builds upon the previous, meta-data provides the context and standards for such additions.

A specific BI project may necessitate the development of a meta-data repository from scratch (if this is the first BI development to consider corporate-wide meta-data repository requirements) or revisions to be made to an existing meta-data repository. The requirements need to be captured and implemented. The meta-data repository developer will be involved in this implementation. This role is part of the extended BI project team.

*(Up to 4 marks for a sound overview of the duties of the role, and up to 2 marks for a sound argument as to the importance of role to the BI systems development, to a combined maximum total of 5 marks)*

- iv) **ETL lead developer:** again, this is a very important role in the development of the BI system, not only regarding the development and operation of appropriate ETL scripts but also, as lead developer, to represent the ETL perspective at other times during the development, for example when discussing possible data sources within business case assessment (feasibility) and during BI system information requirements gathering activities. The old adage of ‘garbage-in-garbage-out’ applies here: if the ETL scripts are not effective in producing clean, complete and relevant source data, then the decision making upon which it relies, will be less effective. ETL script development is not usually a simple task: the source data can be quite dirty, and derived from several heterogeneous sources. The ETL lead developer leads and manages his/her team in developing quality ETL scripts: project management skills as well as technical skills will be needed to effectively perform this post.

*(Up to 4 marks for a sound overview of the duties of the role, and up to 2 marks for a sound argument as to the importance of role to the BI systems development, to a combined maximum total of 5 marks)*

*(Total Part a): 5 + 5 + 5 + 5 = 20 Marks)*

**Part b)** is about the concepts of the BI steering group and the BI competency centre. Key differences that candidates could mention are the following:

<b>BI Steering Group</b>	<b>BI Competency Centre</b>
Set up to facilitate the development of a particular BI systems project or initiative	Set up to facilitate the development of BI competency across the organisation over time: a resource for potentially several BI projects to utilise/capitalise on.
Contains many business and technical people across the organisation, including top management in the form of the business sponsor.	Contains technical personnel predominantly.
Transient structure for the duration of the project	Semi-permanent structure

Predominantly development-focussed	Training and support-focussed, training available on BI systems awareness, BI systems usage, etc.
Used as an arbitration board, when disputes during BI systems project development.	No such arbitration responsibility. Can only offer guidance and support.

*(For a sound description of a key difference – 2 marks \* 3 differences, to a maximum total of 5 marks)*

*(Total: 20 + 5 = 25 marks)*

### **Examiners' comments**

*This was attempted by 42% of the candidates, and the pass rate was disappointingly low at just over 33% (with the average mark being 8 out of 25). The poor performance was principally due to the following reasons:*

*With respect to Part a):*

- *The 'business sponsor' description was not related to BI systems development: instead, a view of a general business (financial) sponsor for an organisation was provided.*
- *Surprisingly, very few candidates realised that the meta-data repository developer was about developing/extending a meta-data repository facility, instead considering the role to be about the creation and use of meta-data or about developing the main data warehouse/repository of a BI system.*
- *Only a small minority of candidates picked up and discussed the lead (developer) role in sub-part a) iv).*
- *Many candidates omitted to discuss the importance of the roles to an enterprise-wide BI systems development.*

*With respect to Part b):*

- *Only a handful of candidates knew anything about these concepts, and hence their differences.*
- *The majority of answers in this part of the question were left blank.*

**A2.**

- a) Describe THREE levels of management, and explain the differing information requirements at each level.

**(9 marks)**

- b) With the aid of suitable examples, describe the ways in which the Internet can enable MIS provision.

**(16 marks)**

**Answer pointers**

**Part a)** is about management levels within a typical organisation, and the differing needs for information of personnel at the different levels. Answers may include some or all of the following:

Management Levels:

- Top (Strategic)
- Middle (Tactical)
- Lower (Operational)

Information needs at:

**Lower (Operational) level:**

- Very detailed and refers to day-to-day operations of the organization.
- Usually factual and with a pre-defined structure.
- Usually internal in nature.
- Very related to current operations.
- Planning horizon being managed is very short – week or fortnight at most.

**Middle (Tactical) level:**

- Helps in decisions regarding allocation of resources.
- Planning horizon is longer than operational, but not so long as strategic (months, to possibly one or two years).
- Usually predictive, focusing on short-term trends.
- Sources both internal and external.
- Partly current and partly historical.

**Strategic Level:**

- Needed for making choices among business options.
- Is predictive in nature, and relies heavily (but not exclusively) on external sources of data.
- Has a long-term (years) perspective, and is mostly in summary form.
- Can require historical data going back several years.

*(1 mark for a correctly named level, plus 1 mark for any appropriate management level description, plus up to 2 marks for appropriate information characteristics for the named level = 4 Marks \* 3 levels, to an overall maximum total of 9 Marks)*

**Part b)** is an open-ended discussion question which provides candidates with an opportunity to describe aspects of the Internet which can enable MIS provision within an organisation.

Possible aspects that could be included are:

- The fact that there are several external databases available via the Internet (e.g., Dow Jones) that could be tapped into as part of the data sources of an MIS, for example a DSS, and will enhance MIS provision and support.
- The availability of legacy systems via the Internet, with middleware used to enable an MIS to access data from one or more of these legacy systems in response to a specific management reporting query.
- The use of Software-as-a-Service (SaaS) across the Internet, so that the organisation does not have to purchase MIS software but does have to pay an annual fee to be able to continue to access the software year on year.
- Video conferencing can take place via facilities such as Skype across the Internet, enabling group decision making and management information sharing activities.
- Email can be used to exchange management information/data between participants, leading to more informed users/decision makers and more informed decision making as a result.
- Internet used as mechanism to provide management support/e-training to users that are notoriously difficult to contact and gather in one place. This in turn enables MSS to be more effectively used.
- Web portal set up to list appropriate MIS applications, from which the ones most relevant to the user at this particular moment in time can be selected. The selected MIS is then made available through the Web portal.
- The use of Internet systems, such as e-commerce and static information websites, with the ability to gain data about their operation/use, such as the number of clicks per day, for subsequent management analysis, decision making and action.
- The use of social media and other unstructured data gathering mechanisms as data sources for further content analysis.

*(Up to 3 marks for each relevant aspect covered,  
to a combined maximum of 16 marks)*

*(Total: 9 + 16 = 25 Marks)*

### **Examiners' comments**

*This question was very popular (attempted by 75% of the candidates). Approximately 57% of those attempting the question reached a pass standard. The overall average mark attained by candidates was just below the pass mark of 10 out of 25. Although there were many good answers, no candidates managed to gain more than 80% (i.e., 20 or more marks) on the question. The reasons for this situation are principally due to the generally poorer answers to Part b).*

*With respect to Part a), most candidates were able to distinguish three appropriate levels of management (even if they used different labels) and to provide a brief overview of each level. Some candidates described the type of decision making undertaken by each level or the source data/MIS tools that they might use, rather than describing the differing information needs between the levels(as requested by the question), thus reducing the number of marks attained for the Part.*

*With respect to Part b), the examiner was looking for ways in which the Internet can help/enhance MIS provision; this was rarely found in candidates' answers. Rather, many candidates saw this question as an opportunity to a list and describe as many business uses of the Internet that they could, with little regard as to their ability to enhance management information/decision support capabilities within organisations. Some of the answers for this Part repeated the same use/capability several times: marks can only be rewarded for relevant points once!*

### A3.

a) For EACH of the following MIS development approaches, provide an overview of the approach and explain to which MIS development situations the approach is most suited.

- i) Traditional approach.
- ii) Evolutionary approach.
- iii) Phased approach.

(3x5 marks)

b) The finance manager of a local company wishes to develop his own spreadsheet-based Decision Support System (DSS) that will help determine the financial feasibility of any potential project the organisation is considering. Discuss the benefits and potential problems that might arise as a result of the DSS being developed by the finance manager.

(10 marks)

### Answer pointers

This question is about MIS development approaches, and their respective strengths and weaknesses. It covers the traditional approach, the evolutionary approach, the phased approach and End User development.

The outline of each approach for **part (a)** might include the following points:

- i) **Traditional approach:** development is undertaken in a series of steps, with each one being completed before the next starts. Steps may be requirements determination, design, coding, testing and installation. Maintenance can be seen as the next cycle, or the last of the series of steps. Another name used for the traditional approach is the waterfall approach, as it can be depicted as a waterfall from one stage to the next in the development process. The motto of this approach is to “get things right first time” and backtracking to a previous stage is seen as weakness in the quality of the work within the previous stage. The approach is suitable for developments that have static and clear requirements at the outset of the development. A Management Reporting System (MRS) that has fixed and standardised reporting requirements may adopt this approach for its development.
- ii) **Evolutionary approach:** where a series of prototypes are produced and examined by the users, feedback is received and the prototype amended, and this cycle of “creation and feedback” continues until the final prototype becomes the actual system to be used. The motto of this approach is “don’t expect to get things right first time”, as iteration is expected until the prototype is deemed acceptable to satisfy the needs of the users. Normally, this approach is used with small scale systems that have dynamic or initially unclear user requirements. Small-scale data-oriented Decision Support Systems (DSSs) may regularly adopt this approach.
- iii) **Phased approach:** A project is carved up into phases of development, so that each phase is suitably manageable, and can be delivered within a relatively short timescale. Each phase may undergo development in accordance with the traditional development approach, or even more in line with an evolutionary development approach (where detailed requirements are less certain, for instance). Users then gain benefits earlier than in the traditional approach. This approach is suitable when the project has defined aspects that can be separated and developed at different times. The overall requirements still need to be clear and well defined, so that phases can be identified and appropriately scheduled. Business Intelligence (BI) developments often adopt this approach to development.

*(4 marks for suitable approach overview, plus 2 marks for appropriate MIS development situations articulated = 6 marks each approach, \* 3 approaches, to a combined maximum total of 15 marks)*

**Part b)** requires candidates to consider the positives and negatives of the end user spreadsheet development by the finance manager. They may include the following points within their answer:

Positives:

- He can tailor the spreadsheet to suit his particular needs, if he is suitably knowledgeable of the spreadsheet tool.
- He knows the decision situation and does not need to communicate it to anybody else to develop it.
- There is no training requirement once developed.
- Less costly, as he does it himself.
- He is totally aware of the capabilities and limitations of the resultant tool; there is no 'black box' feeling here.
- Changes can be made by the finance manager as situations require: no need to commission and wait for somebody else to do it.

However:

- The finance manager may not be very knowledgeable of how the spreadsheet software works. He may therefore make mistakes when setting up the system. This may lead to wrong decisions being made, which could cost the company significantly.
- The system is known only to the finance manager, and he probably will not have documented it rigorously. If he leaves, there may be a significant period of time needed for another to understand the system and its nuances/constraints, and to take over its maintenance.
- He will not consider the compatibility of the system with others in the organisation: it can become another data 'silo' rather than something set up with the potential to integrate 'in mind'.

*(up to 2 marks per salient point made \* however many points made, to a combined maximum of 10 marks)*

*(Total: 15 + 10 = 25 marks)*

### **Examiners' comments**

*This was also a very popular question; approximately 75% of candidates attempted it, and around 67% obtained a pass. Marks ranged from 1 to 24 out of 25, and the overall average mark was respectable at just under 12 out of 25.*

*With respect to Part a), many candidates were familiar with the traditional and evolutionary approaches to MIS development. However, there were several candidates that were less familiar with the phased approach to MIS development; these candidates either did not attempt the sub-part or incorrectly described it as a phased changeover implementation process.*

*With respect to Part b), there were some really good answers to this question. Poorer answers were typically due to candidates either providing a vague list of issues without further explanation (e.g., writing 'cost' as a strength without any further information as to what cost is being referred to and why this is a strength, etc.), or not recognising that the question is about assessing the strengths/weaknesses of an end-user MIS spreadsheet development versus it being undertaken by IT specialists, and thereby providing answers that are largely irrelevant to the question set (for instance, candidates describing the strengths/weaknesses of outsourcing versus in-house MIS development by the IT department, or assessing the benefits/costs of undertaking financial feasibility assessments within organisations - neither of which are what the question is about).*

## SECTION B

### B4.

In the context of MIS, describe each of the following applications and evaluate their benefits.

- a) Data warehousing. **(8 marks)**
- b) Customer Relationships Management (CRM) systems. **(8 marks)**
- c) Enterprise Resource Planning (ERP) systems. **(9 marks)**

### Answer pointers

#### a) Data warehousing.

A data warehouse is a database with software tools that can store current and historical data extracted from many operations of a business and allow easy access for reporting and analysis. It enables data previously locked in legacy systems to be made available. The data structures for each legacy system are analysed and then transferred to the data warehouse, reformatted to a common form and duplicates removed.

Data warehousing has the following benefits:

- Improved provision of data
- Easy access to information
- Can remodel existing data
- Permits access to data without affecting routine operation
- Allows tracking of data
- Can combine data from a variety of sources
- Provides an organisation with a better understanding of customer behaviour
- Can show geographic demand patterns

*(Description 4 marks, benefits 4 marks, total 8 marks.)*

#### b) Customer Relationships Management (CRM) system

CRM enables an organisation to understand its client base. This is achieved by storing and manipulating customer information of many different kinds, including customer contact details, promotional material sent to the customer, purchases made, date of purchase and method of purchase. CRM systems are used extensively by on-line book retailers and supermarkets.

Having a complete picture of a customer's buying habits enables the organisation to use MIS to predict potential suitable products/promotions, communicate in a more informed manner and determine trends. MIS reports, including the numbers of repeat customers making orders during a particular month and comparing this to a year ago, can be provided efficiently as a bi-product of supporting operational functions. Data mining functionality identifies customers' trends and habits, leading to more effective and intelligent decisions regarding promotions, marketing and other business aspects.

*(Description 4 marks, benefits 4 marks, total 8 marks.)*

#### c) ERP Systems

An Enterprise Resource Planning (ERP) system is a fully integrated, company-wide system solution that aims to meet all organisational IT requirements at all levels. Rather than being replicated across departments, data are held only once and are “owned” by the organisation as a whole and used by different departments. In other words, all systems access and update the same data source. An ERP system should therefore cover all core business functions for an organisation. To be considered an ERP system, a systems solution should:

- be fully integrated and operate on-line
- access one database
- have no redundant data
- have the same look and feel

However, for most organisations ERP is an aspiration, rather than a reality. Organisations frequently extract copies of data from ERP systems for end user computing, such as financial modelling, or for sending to external companies for mailshots. Once data are extracted and duplicated in this way, there is no longer a “pure” ERP system, as the copied data will not be updated by day-to-day business transactions.

The benefits of ERP include:

- Reduced data input
- Low requirement for training
- No duplication of data
- Fewer errors
- Integrated systems
- Easier access to information

*(Description 5 marks, benefits 4 marks, total 9 marks.)*

*(Total: 8+8+9 = 25 marks)*

### **Examiners' comments**

*A very popular question with 92% of candidates making an attempt at an answer. Most candidates described data warehousing adequately. However, only the more able candidates provided an evaluation of the benefits.*

*For CRM systems, in particular, many candidates provided a business answer rather than MIS answers, which did not attract marks as a result. Some candidates provided answers based purely on the words “customer” “relationship” and “management”. For example, “CRM systems manage the relationship between the customer and the business. This relationship is vital as the needs of the customer need careful management.....” Future candidates should be advised that this type of answer is unlikely to attract marks.*

*Many candidates failed to provide a reasonable description of ERP systems, with only the better prepared candidate achieving high marks.*

## **B5.**

A firm of solicitors wishes to develop a knowledge-based system for use by its customers. Competing firms of solicitors only provide telephone or face-to-face advice. The solicitors would be responsible for entering the knowledge data and for answering any queries beyond the scope of the new knowledge-based system.

The firm broadly agrees with this approach but is concerned that its reputation could suffer if the knowledge-based system gave the wrong advice.

As an independent consultant brought in to advise the firm of solicitors-

- a) Describe knowledge-based systems and explain how such systems could be implemented. **(12 marks)**
- b) Explain how the knowledge-based system should be tested. **(13 marks)**

### **Answer pointers**

Answers are not prescribed for Parts a) and b) of this question, but an understanding of the issues is sought:

#### **a) Knowledge-based systems**

Answers should include the following, although alternative definitions to those used below are acceptable if the meaning is the same:

- Knowledge-based systems (KBS) are computer systems programmed to imitate human problem-solving by means of artificial intelligence and reference to a database of knowledge on a particular subject.
- KBS use a knowledge base of human expertise for problem solving. Their success is based on the quality of the data and rules obtained from the human expert. In practice, expert systems perform both below and above that of a human.
- KBS derive answers by running the knowledge base through an inference engine. This is software that interacts with the user and processes the results from the rules and data contained in the knowledge base.
- The firm needs to train its solicitors to become “subject matter experts” who will work with knowledge engineers to input their expertise into a KBS database. The knowledge engineers will agree with the solicitors how best to represent the knowledge to the customers. The firm may also need to engage a key customer to assist with the development of an appropriate user interface.

*(12 marks. Some examiner discretion.)*

#### **b) Testing knowledge-based systems**

The difficulties in testing KBS should be acknowledged.

An overview and explanation of a standard testing process should be given, namely:

- Unit testing

- Integration testing
- Functional testing
- Acceptance testing
- User testing 1 - Alpha testing
- User testing 2 - Beta testing
- Regression testing

The issue of providing live test data for the KBS should be discussed and a possible solution proposed.

One solution could be simulation of a live operation. The solicitors could examine past requests for advice and the responses given. These past requests could then be input to the KBS to ensure that advice given is the same as past advice.

*(8 marks for describing a testing process, 5 marks for explaining how the testing of a KBS differs from other types of development, maximum 13 marks.)  
(Total: 12+13 = 25 marks)*

### **Examiners' comments**

*Very few candidates (24%) attempted to provide an answer to this question, almost all of whom provided very poor answers. Some candidates provided superficial answers, particularly for Part b). Many candidates inadequately described KBS and failed to relate their answers to the scenario set and the special nature of KBS. A few candidates provided suitable answers and reached almost maximum marks for the question.*

*Also, given the hour available to answer this question, many answers were surprisingly brief.*