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BCS HIGHER EDUCATION QUALIFICATIONS
BCS Level 4 Certificate in IT

INFORMATION SYSTEMS

Examiner Report

Tuesday 29th September 2015

General comments on candidates' performance

The majority of candidates demonstrated their understanding of the rubrics and did not use time answering too many questions in a section. Candidates must still take notice of the number of marks per question and not spend too much time on low marked parts of each question. The number of marks relate to the number of main points in an answer.

Below are suggested answers pointers to each question. Full marks were given for alternative valid answers.

SECTION A
(Candidates were required to answer TWO out of the four questions set)

A1

Answer Pointers
a) A prototyping approach would be the most suitable method. Investigation of the required processes would need to be done on an informal basis. The database and simple screens will be designed to support these processes. The development can take the form of meeting with the clients demonstrating the system and obtaining their feedback in an iterative manner. Ongoing training would be carried out including the use, backup and security of the system. Simple documentation should be provided.

b) A structured system analysis method (hard methodology) would be the most suitable. This will be a complex system which would take time to develop. The stages of the method would include requirements analysis, logical and physical design using typical techniques such as data flow diagrams/UML diagrams, entity modelling or object modelling, normalisation. The use of CASE tools is acceptable. The Agile method could be used as it is an iterative and incremental approach to the project management enhancing requirements throughout the process. A soft system approach would assist in problem definition.

c)

i)   An entity model would include entities, attributes, keys and relationships between them; e.g., passenger makes a booking. An entity life history of the booking indicating its creation, life and closure is also acceptable.

ii) An object model would include the object, attributes and methods; e.g. booking, booking details and the processes of making the booking, cancelling, paying etc.

Examiner's Comments
Part a) and b) were open-ended and credit was given to examples of life cycle methods, prototyping and hard and soft methodologies. Sample diagrams were acceptable in the few cases they were provided. This was the least popular question with a below average pass rate (38%).

A2

Answer Pointers
a) TPS – low level processing of the main data such as daily processes within an organisation, used to support the activities and managed at supervisory level. Data warehouse systems are consolidated organisational database systems, used for high level analysis through data mining and on-line analytical processes (OLAP), pattern recognising, historical/retro detail, forecasting etc.
KBS – are systems built on expert knowledge used for example in medical diagnosis, they are able to help predict trends, diagnostics etc.
DSS – support the decision making process within an organisation, usually by providing aggregated/consolidated information often in the form of reports and graphs for middle and top management.

.b) Functions of a database management system include robustness, security, access privileges, performance monitoring, concurrency control, stability, maintenance, query, report writing, control etc

c) A relational DBMS is based on mathematical principles of relational calculus using primary and foreign keys to access tables and attributes within a defined relationship. It is the most commonly used database method and is accessed by SQL (standard query language); e.g. Oracle

Examiner's Comments
A popular question, answered reasonably well, although there is evidence that the majority of candidates attempting this question related the management styles to each of the software descriptions in part a). Database functions are well known.

A3

Answer Pointers
a)
   i) Purchasing is the process of buying goods, raw materials and services from suppliers. It includes invoicing, payment and debt collection.

   ii) Marketing is the mechanism used to promote the goods or services of an organisation. It includes the production of advertising material in many forms; e.g. printing and publishing in many forms, the media, the internet etc

   iii) HRM manages the human resources; i.e. the staff. Dealing with problems and issues, unions, disputes, recruitment and dismissals related to the staff.

   iv) Stock control ensures the presence of the correct material being available at the right time within the budget. Records of the movement of stock are kept and the theory of stock control such as 'just in time' (JIT), FIFO and LIFO and re-ordering processes is important.

b) Operational information is the lowest level of data used within an organisation. It is of timely, often daily importance, and is produced as a result of transaction process systems and is used by the lowest managers such as supervisors to ensure smooth processing; e.g. a customer order.

Tactical information is the middle level. It consists of accrued information such as that produced weekly or monthly by management information systems and is used for such functions as financial reports indication the progress of the organisation; e.g. monthly sales.

Strategic information is at the top level often unstructured and is used by the executives to control the organisation. Information can be internal such as annual profit and loss or external such as the market forces and stocks and shares. It is produced by executive information systems and decision support systems; e.g. market share

c) Structured English or pseudocode are types of narrative techniques; e.g. 'If Stock < 0 then order-stock'. Examples of graphical techniques are decision tables, decision trees, dataflow diagrams, models, graphs, flow charts etc; e.g. Decision 'If Stock < 0', Action 'Order Stock'

d) A program specification document would contain the system overview, program/modules, detailed function specifications, screen shots, report layouts, database table descriptions, security procedures, help facilities etc

Examiner's Comments
The understanding of business functions is important to systems analysts, designers and developers. There is evidence that candidates had some difficulty with understanding these functions and very few knew the purpose of narrative and graphical specification techniques and a typical content of a program specification document. there was still an above average pass rate.

A4

Answer Pointers

a) Security plays a vital role when processing on the internet. Examples of breaches include hackers, viruses, worms, spyware, phishing etc. Many products exist to prevent these such as virus checkers, anti spyware programs, secure sites for processing payments by credit cards. Password protection, the use of roles and access privileges are provided by database management services. Also, practical solutions such as closing down applications, prevention of access to servers, use of intranets, back up control, cloud computing, disaster recovery procedures, fire prevention etc although not directly an internet problem is still required.

b) Testing – testing should take place throughout the system development cycle. There are several testing methods such as data validation, input/output testing, black and white test methods, module testing, top down testing, system testing, alpha/beta testing, stress testing, regression testing, acceptance testing, performance testing, etc.

   Training – this will need to cover all users from the operational staff to top management. It should be formal as well as on-the-job. Timing is essential. They will need to be trained to use the system, recover from their errors, know how to back-up etc. Often done in parallel with data capture and file take-on.

c) The examples will vary depending on the candidates' experience. Typical examples would be the Data Protection Act enabling people to know what is being stored in their name. All companies holding information whether on paper or electronic media have to be registered and reveal the information stored if requested. The Computer Misuse Act covers the ethical use of computers enabling prosecutions for malicious damage, hacking, viruses, worms etc. The Freedom of Information Act is similar in a way to the DP Act, but is more relevant to information stored at institutional level such as government enabling access to the public. Intellectual Property Act deals with the 'ownership' of software amongst other aspects. The BCS code of conduct provides and ethical and professional approach to development. Other examples are the Health and Safety Act and Copyright.

Examiner's Comments
This was the most popular question with the highest pass rate. Parts a) and b) were well answered but examples of legal issues were poor.

B5

Answer Pointers
One or two marks for each reasonable area discussed:-

Novice users will need more help.
    Perhaps radio groups, drop down lists etc
    More guidance or more restricted in allowable values
    The use of yes/no confirmation to ensure that they are doing the actions correctly

Expert user will need less help
    Less guidance and more power to the user
    Limited or restricted use of yes / no
    An adaptable user interface that will enable the user to use a range of skills; e.g. drop downs, short cut keys etc

Intermediate
    Basically, a cross between the two

Examiner's Comments
This question was not just about the different types of users. The majority of answers did not address the phrase "design data capture screens" and therefore did not score highly.

B6

Answer Pointers
a) Up to three marks were awarded for discussion on each technique.

    ERM is a top down approach looking at entities and creating a pictorial representation of entities and ignoring the attributes. Focus is on the relationship between data (use of PK / FKs)

    Normalisation is a systematic bottom up approach, which essentially at first ignores the entities and seeks to find meaning from looking at the attributes. Once the attributes are in 3NF an ERD can be built

    This process typically uses three stages (3NF) but can use more.

b) One mark was awarded for any reasonable point with a maximum of three marks per technique

    Use of both techniques should highlight any issues.

    ERD is a visual technique which can be viewed and understood easily. Normalisation requires training and can be difficult to portray to the end user, When there are large amounts of attributes if can be difficult to represent in normalisation

Examiner's Comments
Marks were reasonable for this question with part a) answered well. Part b) was quite often missed/ignored.

B7

Answer Pointers
Marks were awarded for each reasonable role within a software development team.

The roles could be

    Project manager/ Team leader
    Programmer
    Systems Analyst / Business Analyst
    Technical manager / technical consultant
    Tester

Additional marks were awarded for a discussion as to why these roles are included in the team

Examiner's Comments
Many answers focused on what roles there were in the company CEO / MD etc, which were outside the realms of the question.

There were a number of good answers, but there is evidence that a lot suggested that software teams are just programmers and managers.

B8

Answer Pointers
a) A hard method is one that has a rigid structure and uses a pre-defined framework to engineer a solution.

   Examples such as SSADM, waterfall, RAD

   Tools such as CD, DFD, ERD, ELH etc

b) A soft method recognising politics and people are an influence on systems. There is not normally a pre-defined framework.

   SSM, Checkland etc

   Tools could be rich pictures, use case diagrams, storyboarding, prototyping,

   Any technique which enables greater user interaction in the technique etc.

Examiner's Comments
There is evidence that answers were very disjointed and not really addressing the question.
A number of answers confused hard and soft and so were awarded limited marks.
There needs to be a demonstration of better understanding of what the differences are between a method that has a clearly defined, engineered solution and one that

requires a method that deals with users, internal politics and where solutions are not so clearly defined.

B9

Answer Pointers
Two were awarded marks for the discussion and two for the example

a) Mean or average, sum of the numbers divided by the count of the numbers

   so, for 4+3+2+1+5+3+2+5+2 / 9 or 27/9 or 3

b) Mode is the most frequently occurring number

   so, for 1,2,2,2,3,3,4,5,5

   the 2 needs to be highlighted in some way, or a frequency table drawn up

c) Median is the middle value in an ordered sequence. When there is an even number of numbers and the middle value lines between two numbers these two numbers need to be averaged.

   1,2,2,2,3,3,4,5,5,

   So, the 5th number needs to be highlighted

Examiner's Comments

There were a number of answers where the "correct answer" was entered for the wrong section, and therefore no marks awarded.

There were a number of correct answers with no explanation as to how the answer was derived. These were awarded one mark.

A number of answers simply defined what was meant, and these were awarded half marks.

B10

Answer Pointers
One mark was awarded for any reasonable remark on the topic

a) Raw data is data that has not been processed.

   Raw data is at the stage where decisions cannot be made.
   One mark for any reasonable example

   Information is data that has been processed
   It can be used for decision making

b) Big Data has various definitions so any discussions that covers definitions which reference either 3V / 4Vs or even one of the 5Vs

Social media data is as it suggests data that is derived from a social media source.

The answer should have referenced that it is either semi structured or unstructured data

It is data that is not easy imported directly into a relational database and would require processing or use of a document based querying front end.

Examiner's Comments
a) There are still a number of answers that simply state raw data is unprocessed data and that information is processed data. This is a limited answer.

It is the examples that let a number of answers down. "John is 27" is not processed data or information. The 27 is simply an attribute of John. Whereas "John's average grade is 27" implies that we have processed John's grades and can now state that his has failed. There were a number of answers that used DOB, Age, and Height as being information. Those are simply attributes and needed to be averaged, maximum values found, etc to be used to help someone make a decision.

b) Most answers covered Social Media Data but limited themselves what Social Media is and therefore did not fully address the question.

As most twitter / facebook data, for example, does not have a structure it is difficult to process. There can also be large volumes of data which can be generated over a short period of time.

Big data was poorly discussed.
The question asked about processing the data. Having an understanding about any of the 3V, 4V or 5V definitions would give an insight into this.

B11

Answer Pointers
a) Hyper text is a none sequential method of presenting information. It allows the end user to navigate or re-navigate the information structure. The user is able to decide what route they take rather than being presented data / information in a linear manner.

b) HTML is a language use to build basic web pages. It consists of a series of tags which indicate what the content does (each tag needs in theory to be closed). It can be used as a place holder for other languages to be embedded into (asp, PHP etc).

c) Hypermedia is an extension to hypertext that allows media to be embedded. It allows pictorial representation of data rather than straight text. Again, the user has the ability to learn material in a none linear manner.

d) Multimedia is the use of a range of media to convey a message. The media can be a combination of text, images, sounds and moving images.

Examiner's Comments

Parts b) and d) were reasonably well answered.

A common response for part c) was simply to state that hypermedia was the same as Multimedia. Candidates needed to mention the fact that it is linked to hypertext to be awarded full marks.

Answers for a) were poor. A number of answers noted that a hyperlink could be an embedded link, and these were awarded one or two marks.

B12

Answer Pointers

A **quality** review/audit needs to be discussed

The document needs to be put through a quality committee; i.e. the document is sent to a nominated list of relevant people so that each can proofread it and report back on any issues with the documentation.

This can be / is an iterative process until the document is signed off

There also needs to be a standards procedure or manual defining what is meant by quality. This outlines the agreed structure, a glossary as to what is and is not acceptable. Perhaps a reference to the publish Prince2 templates for documentation

It could be argued that an independent person needs to look at the document to ensure quality, so an internal person from the organisation that does not work for the department that the document references might be needed.

Any reasonable argument that ensures that the quality can be improved will be given credit.

Examiner's Comments

A lot of answers simply listed facts on a project / systems lifestyle and missed what was being asked. Another variation was simply listing the different types of documents.

This question was very much about ensuring the "quality" of documentation. Very few answers addressed the points about obtaining and maintaining quality in documents.