BCS THE CHARTERED INSTITUTE FOR IT

BCS HIGHER EDUCATION QUALIFICATIONS

BCS Level 4 Certificate in IT

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EXAMINERS' REPORT

Information Systems

General Comments

The standard has dropped this session, despite the content being similar to previous examinations. One of the reasons being that questions were based around more practical examples rather than straight forward questions. However, answers were accepted which were not always directed to the question, for example in Question 2c, the phases of normalisation were acceptable, similarly the stating of the elements of dataflow diagrams and entity relationship models were credited as well as the diagrams.

There are still some very poor centres. Candidates should use previous examination papers and answer pointers. It is very evident that this does not happen.

Section A

A1

Answer Pointers

a) External entities – tutors, students/trainees (separate accepted).
Processes – register apprentices and students, allocate them to classes, allocate class to rooms, register attendance, deal with payments from students, pay tutors.
Data stores – apprentice/student details (possibly separate), class, class and tutor allocation, attendance, fees, tutor, payments.

b) Entities – Trainee/Student – trainee number/student number (PK), trainee/student name, class no (FK).
Class – class no (PK), classroom no, class name.
Tutor – tutor no (PK), tutor name. Tutor/Class intersection entity, Tutor no (FK) +Class no (FK).

The assumption made is a student only attends one class, if this is not the case then a many to many relationship occurs resulting in an intersection entity student/class.

c) There are several prototyping methods which are acceptable. Prototyping is a user centred approach enabling the analyst to interact with the users; e.g. evolution, spiral, dummy (throwaway) etc. Pilot or staged prototyping are not applicable. The most likely method is evolutionary, which involves discussion of requirements, an initial design (usually screens and reports) which is presented and evaluated as an incremental process until the user is satisfied with the prototype. The final system then needs to be developed to include more stringent validation, security, etc.

Examiner's Comment
This was a popular question with a reasonable pass mark but with a relatively low average mark. As indicated above the identification of the various elements of dataflow diagrams and entity relationships were acceptable even without an attempt of a diagram. It is important that candidates recognise these and can show understanding of what they are – the deliverables of systems analysis. Only a few candidates described prototyping and could describe the process, which is unusual as the subject often appears. Candidates seemed to concentrate on the words 'fact finding' and described other methods.

A2

Answer Pointers

a) Information flows from the lowest level of detail to the highly sophisticated presentations at the top level of an organisation. These are typically – operational information, which is timely and part of the day to day supervisory function of a business, usually provided by a TPS (Transaction Processing System); e.g. daily output of orders. Tactical information provides accrued information, such as periodic or monthly aggregated data for use by middle managers using MIS (Management Information Systems); e.g. monthly actual and budget spend. Strategic information is typically long term and unstructured and may include external factors, and used by executives to help manage the company or business; e.g. profit and loss, market share, future predictions etc. EIS (Executive or Enterprise Information Systems) or DSS (Decision Support Systems) are more likely to be used at this level.

b) A data warehouse is a relational database which contains historical data. Data mining techniques use OLAP (On-line Analytical Processing) systems to extract, transport and present the information in many formats identifying hidden patterns and predictive analysis. It supports management decision making by storing historical data from all systems both internally and externally. Web design software provides simple instructions and is used by small businesses to set up their own website, without the necessity to be able to code such as scripting languages. Examples such as Adobe Dreamweaver™ etc. are acceptable. They allow the use of logos, images, videos etc., to provide a professional look to the web site. A CASE tool is a tool supporting a particular system methodology. They provide documentation, verification and definition of the results of analysis and design. CASE tools can be upper or lower level or a mixture of both supporting differing levels of the life cycle.

c) Tutor – tutor no, tutor name, dept number
Subject – subject no, subject name, room number
Dept – dept no, dept name
Tutor-Subject – Tutor number + subject number

Normalisation is the production of simple stable relationships as a basis for relational analysis. The various stages reduce the duplication, redundancy of data and update anomalies. First normal form (1NF) – remove repeating items. Second normal form (2NF) – remove partial dependencies. Third normal form (3NF) – remove transitive dependencies.

Repeating items – Tutor, Subject resulting in Tutor-Subject.
Dependencies – dept number - Tutor and room number - Subject

Examiner's Comment

This was the most popular question with a good pass mark. Most marks were obtained from part a) and b). The flow of information within an organisation needs to be understood by analysts and designers. There was some confusion over the definition of a data warehouse; many candidates described database management software. Most could describe web design software well, but CASE less well. Descriptions of the stages of normalisation was acceptable, but candidates could not put the theory into practice. However, marks were given for identification of relations, primary keys and attributes. Very few candidates identified dependencies such as dept number in the tutor relation, room number in the subject relation and tutor-subject relation.

A3

Answer Pointers

a) Screens - Simplicity, ease of use, conformity, consistency, clarity, use of images, colour, response, understandable error messages, help etc.
Techniques – radio buttons, list of values, icons, logos etc.
Screens are used for input, amendment and query. Reports should be well spaced out, uncluttered with usable headings, readable from left to right, contain page numbering and be in a recognisable company style etc. The use of tables, graphs, charts could be included. Colour is not necessarily required unless a logo was required.

b) A simple neat design was expected with headings, dates, help, navigational assistance etc.

c) An ELH depicts the life of an entity from its creation to its deletion.
Selection – depicts decision making as a result of the outcome of processes; e.g. in the ELH Student, the student could be either an apprentice who does not pay a fee, or a university student who does.
Sequence – procedural processes showing in what order the process happens; e.g. in the ELH of student, the processes registration, attendance and completion of course can be displayed.
Iteration – a process continues until an end of sequence is identified; e.g. In the ELH student, the process of recording attendance continues until the student completes the course.

Examiner's Comment

This question was poorly answered with only a third passing. With the development of websites, screen design issues and techniques are increasingly important and yet few could describe them. Few seem to understand what a printed report was. Not everything is displayed on the screen although the screen can of course be printed, however sometimes, reports need to be produced. There are design issues which are separate to screen design. Most could draft an input screen. Entity life histories are event/process driven diagrams and part of structured systems methodologies, describing the ‘life’ of an entity. Several candidates gave a bank account as a good example.

A4

Answer Pointers

a) Presentations need to be planned with an audience in mind. PowerPoint™ is a good example of conventional software which could be used. Management would need an overview of the system, its advantages, benefits, and cost saving issues. Administrators would need more detail to include the functions, it would also be useful to provide a short demonstration. Presentations should be structured with a beginning explaining its purpose, middle containing the appropriate detail and end providing a conclusion. Sessions should not be too long. Copies of the screen layouts should be provided allowing notes to be made. Short question and answer sessions should be provided. A professional approach and appearance would be expected.

b) Analytical ability, appropriate qualifications, confidence, problem solving, team and leadership ability, planning and management skills, good communicator, resourcefulness etc

c) Security aspects – username and password protection, access and role levels, use of payment protection software, prevention of unauthorised access by hackers, production of secure payslips, etc.
Recovery – use of physical backups, use of recovery mechanisms within the software (e.g. DBMS functionality), disaster recovery plans.

Examiner's Comment

Although this question was the least popular, the pass rate was the highest. The question asked for an approach to providing presentations to management and administrators describing the new system. The implication was that the system had been developed and was ready for use, but some answers included the system development life cycle which was not required. Those who realised this did show the difference in presentation content. Project manager skills were identified well. Security of systems is extremely important as emphasised in the question, with a company's payroll as an example. Candidates seemed to concentrate on the function of a payroll rather than security implications.

Section B

B5

Answer Pointers

One mark was awarded for any reasonable comment

a) testing used to ensure that the system can handle the load placed on it
may be used to test the number of concurrent users
may be used to test types and mode of failure
defines unsafe usage of a system
may be used to test denial of service attacks
may be used to test for deadlock

b) tests to ensure that changes between versions of software have not introduced bugs
tests to ensure that changes in modules have not introduced faults
can test performance by use of pre-defined scripts
part of software quality audit

c) tests the inputs and outputs of a system
tester does not see the internal working
can be seen to be based in the business specification rather than the coding spec.
primarily functional rather than non-functional tests

Examiner's Comment

Black box testing was well answered
Stress testing was confused with performance testing but marks were still awarded
Regression testing was poorly answered and very few scripts for this section were on topic.

B6

Answer Pointers

A simple "note dump" on surveys without relating it to the question was awarded a pass mark only. Examples given needed to be related to stock control.

a) Answers are not restricted and will be user centred
Answers are not limited to a pre-defined list
May have problems with scope, allows user free range of answers
Requires more processing than closed questions
Harder to convert into percentages, but can be done

b) Answers are restricted to options; e.g. multi-choice.
There may be more than one answer
There may be a scale (0 to 10, 1 to 100 etc.)
Data can easily be converted to percentages for analysis
May also be yes / no (true / false)

Examiner's Comment

Poorly attempted question. It was clear that the majority of scripts clearly did not understand the difference between open and closed questions which is a basic area when it comes to fact finding techniques.

B7

Answer Pointers

One mark was awarded for each reasonable comment
Max of 4 marks per section

a) Project management technique
Schedule is divided into a number of distinct sections
Each part will have its own deliverables and perhaps budget
Deadline is fixed
Scope may vary downwards

b) Joint requirements planning
Meeting is held to set the scope of the project and to gauge initial ideas for system and to identify core and non-core functional
Method of getting IT and users together to form initial team and requirements list

c) Joint application development
May involve the use of a prototyping tool
Will involve the end users
The purpose is to establish functional and non-functional requirements
It is alternative to the traditional interview fact finding technique
It should speed up requirements capture
May use a CASE tool

Examiner's Comment

JAD and JRP were confused and a lot of scripts had JAD and JRP as the same process / meeting.
Time boxing was very weakly attempted

B8

Answer Pointers

An entity relationship diagram (ERD) is simply the diagram.
The entity relationship model (ERM) is the documentation than may clarify parts of the diagram

Documentation should include

List of primary and foreign keys
Degree of relationships between entities not shown by diagram; for example, each customer cannot rent more than 10 DVDs
List of attributes per entity or table, including sizes and type
Any domain constraints in attributes; e.g. gender can only be male or female
Any other supporting documents; perhaps peaks of data transference
Sample data sets to be used for testing
Any issues when converting logical into physical
May be a series of ERD Logical, Physical, Required etc
May indicate loading or that the ERD is distributed across a number of machines DBs

Examiner's Comment

Extremely poorly answered question and was attempted by the lowest number of candidates.

It was clear that very few actually understood the relationship between ERD's and ERMs.

Agile methods tend to be documentation light but it is important to understand that sometimes it is essential to create a data dictionary to ensure that, for example, the terms client and customer are clearly defined and understood.

B9

Answer Pointers

a) Up to 6 marks with respect to the following

Computer ethics is how computing professionals should make decisions regarding professional and social conduct. It should cover the individuals own personal code. Any code that is formally applied in the workplace (for example, BCS code of conduct) should be adhered to as well as any informal/company code. Examples from the BCS code of conduct could be given.

b) Apart from ensuring that all projects followed the organisations code of conduct, it might be stressed that they follow a professional bodies code of conduct; (i.e. BCS)

When gathering data, testing, gathering research those areas should be run ethically (obtaining consent, making finding anonymous, allowing private individual to have their data removed etc.)

Checking that all software / hardware is properly licensed.

Ensuring all aspects comply to the laws of the country where the software is built and deployed

Ensuring that all software is inclusive and not exclusive

Summed up by honest and professional

etc

(see http://www.bcs.org/upload/pdf/conduct.pdf)

Examiner's Comment

Part a) was better answers than part b), but it is clear from the average mark that this domain, which is essential within modern computing, is not well understood.

It was nice to see that a number of candidates referenced the BCS code of conduct but they perhaps did not understand the code.

From this question, it is clear that ethics and ethical behaviour is not clearly understand by the vast majority of the candidates.

Some answers did discuss disabilities but mainly with respect to HCI.

B10

Answer Pointers

a) Different vendors have different definitions which complicates the definition

The answers needed to reference distributed computing, perhaps outsourcing, public and private clouds, various models of service, perhaps on demand.
Candidates needed to demonstrate the change from traditional in-house database

b) Use of shared resource
   Economy of scale
   Economy of outsourcing
   Avoid having to employee highly paid individuals
   Ability to turn off and on as required

c) Lack of control
   What happens if the cloud provider folds
   Where is your data stored, who has access to it.
   Reliance on third party organisation
   Lack of standards

Examiner's Comment

The majority of answers were for internet enabled databases rather than cloud databases. Internet based databases is not cloud databases.

The importance of managed services, outsourcing and on demand services were missing from a lot of the answers.

B11

Answer Pointers

a) This was an open question and allowed the student to select the media of their choice.
   Media needed to be text, image, movie, etc.
   Answers relating to news, TV and radio were not relevant

   One mark was awarded for identification of the media and five marks for the discussion

b) The answer had to be mapped back to the answer given in a)

   Marks were only awarded for disadvantages. For example, text language may not be the first language of the person reading the web site so may not be understood. An image may be large and take time to load in a region with low internet speeds. A movie may need subtitles to help users to understand what is being said, etc

Examiner's Comment

Poorly answered question.

A number of candidates ignored the request for one media and did a note dump across a range of media. These did not received the credit for this note dump as the question asked for one media to be discussed. It is important to read the question carefully and answer what is being asked.

Candidates need to read and answer the question. A number made a range of valid points but did not answer the question correctly.

B12

Answer Pointers

a) One mark was awarded for the definition (that is, information is data that has been processed) and one mark for an example.

b) One mark for the definition (that is, data is still in its raw unprocessed state) and one mark for an example

c) Two marks for stating that the medium is the middle value when a list of numbers is sorted from the lowest to highest value. Two marks were awarded for an example.

d) Two marks for discussing mean sometimes referred to as the average and is the summation of the values divided by the number of values. Two marks were awarded for an example

Examiner's Comment

Another question were candidates did not read the question. A number of scripts had either an example or discussion but not both.

A reasonable percentage also confused medium and mean.