

**BCS THE CHARTERED INSTITUTE FOR IT
BCS HIGHER EDUCATION QUALIFICATIONS
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EXAMINERS' REPORT

Information Systems

General comments on candidates' performance

There is a continuing improvement in the candidates' submissions for Section A, although there is a large disparity between excellent and poor answers. Candidates need to be reminded to take time to read the questions thoroughly, particularly when the question asks for examples. Those parts of questions asking for a little more thought were not answered well; e.g. project management, testing strategies and documentation.

Section B was not answered as well as usual. There were a lot of superficial answers which gained few marks. Many candidates picked up on certain words or phrases (e.g. testing) and gave a "memory dump" on the topic without reading the question fully and setting their answer in the context requested.

Section A

A1

Indicative Answer Points

- (a) Typical project control and planning use PERT, CPA, GANTT charts, identifying goals, requirements and objectives, task analysis (through the life cycle), resource allocation, regular team briefings, monitoring and reviewing, feedback mechanisms, walkthroughs, good documentation etc. Examples include PRINCE, Microsoft Project or Agile methods.
- (b) Structured systems analysis – typical waterfall hard system method consisting of stages requirements analysis, logical, physical design (business and technical options), implementation and testing.

Techniques – data flow diagrams, logical models, normalisation, physical design etc. Examples include SSADM which is a proven and sound methodology but is only really useful for large projects.

An OO method is based on object classes and method giving a more reliable and stable model, the standard being UML. Various techniques include inheritance, aggregation, persistence and graphical modelling such as usecase, collaboration and sequence diagrams etc. OOM goes through various stages such as business planning, architecture definition, technical design, incremental delivery, design and build and deployment.

Prototyping is a different approach in that it produces models, interacting with users using an iterative approach to help develop the final system. Types include evolutionary, staged, phased and dummy prototypes. Users are consulted throughout the process but problems can occur as some facilities may not be provided and users seem to be satisfied with an incomplete system.

Examiners' comments

Although almost half the candidates attempted this question, the pass rate was disappointingly low. This was mainly because the candidates did not understand the difference between managing a project and merely describing the project life cycle. The question asked for control and management techniques. Descriptions of differing methodologies varied considerably, prototyping being the most consistent.

A2

Indicative Answer Points

- (a) Questionnaires – useful for large number of users, geographically split users or simple data collection. They are difficult to design and often ignored especially if sent electronically. If designed well, they can be analysed easily.

Interviews are useful for communication and gaining ideas. They are time consuming and need to be structured and organised with a specific time limit.

Observation is another time consuming method but useful to gain experience and identify problems and bottlenecks. They can be disruptive, cause resentment and possibly fear of loss of jobs.

Sampling of records, files and documents is useful for collecting low level data, but can be potentially dangerous if important detail is not discovered. Data collected may be out of date.

Each of these methods requires good training and experience. Other techniques include prototyping, JAD/JRP sessions, brain storming, workshops, seminars etc.

- (b) An open question which allows the user to give his/her own answer to a question, whether it is in an interview or on a questionnaire; e.g. 'What is your opinion of the current appointment system?' However these are difficult to analyse and it would be advisable to restrict the number of words or simplify the question. A closed question is a simple question with a single or range of simple answers, which can be analysed easily; e.g. 'How many appointments are available each day?' The answer here would be a simple number.
- (c) An entity is described as a person, place or thing about which an organisation requires information; e.g. an appointment. A relationship is the link between an entity and another entity or itself. It can be in the form of one-one (1:1) or one-to-many (1:M) and is bi-directional; e.g. the relationship between a Patient and an Appointment (1:M). An attribute is a component of an entity; that is, it describes an entity – for example Patient Name. A primary key is the identifier of an entity; e.g. Patient Number. A foreign key is embedded in an entity which links or relates the entity to another within a relationship; e.g. Patient Number is a foreign key in Appointment. A concatenated key is a composite key which is used to identify a single existence of an entity in a 1:M relationship; e.g. Appointment Date and Patient Number would need to be combined to make that Appointment unique, assuming each Appointment does not have a unique number or time. An entity life history depicts the 'life' of an entity from its creation to its deletion; e.g. the entity Appointment will only have a certain time scale of existence from its existence, through consultation or cancellation to deletion or archiving.

Examiners' comments

This was the most popular question and was well answered. The most common mistake was that examples of modelling terms were not provided from a patient appointment system. Also examples of open and closed questions were not related to an information system. Disadvantages of fact finding methods should not include time wasting as an example.

A3

Indicative Answer Points

- (a) A data warehouse is used to store historical data, extracted from current systems. This definition of the data warehouse focuses on data storage. The main source of the data is cleaned, transformed, catalogued and made available for use by managers and other business professionals for data mining and drilling, OLAP (online analytical processing), market research and decision support. However, the means to retrieve and analyze data, to extract, transform and load data, and to manage the data dictionary are also considered essential components of a data warehousing system.

An expert system is a form of artificial intelligence or knowledge based system. It emulates the decision making ability of an expert by solving complex problems using logic and an inference engine. Typical examples are used in the financial world (investments, risks etc), medical science (research) or the oil industry (oil exploration).

Spreadsheets have evolved from the simple tabular version used for calculations. They provide a large variety of functionality in terms of formulae, formatting, graphs, charts, pictures, symbols, shapes, analysis etc.

- (b)
- If value < £10 then pay cash
Else if value ≥ £10 and ≤ £50 then raise cheque
Else use credit card.

Value < £10	√		
Value ≥£10 and ≤£50		√	
Value > £50			√
Pay cash	X		
Pay cheque		X	
Pay credit card			X

- (c) Testing should be meticulously planned, with timescales and resources allocated. Forms of testing are carried out throughout the system development, ranging from walkthroughs throughout the requirements analysis stage, black (data driven) and white testing (logic), stress testing, performance testing, system testing, user acceptance, regression testing, clerical procedures etc

Examiners' comments

This was the least popular question with a poor pass rate. Very few candidates knew what a data warehouse was used for and, surprisingly, could not describe a spreadsheet. Information systems include many different types of functional software. Examples of pseudocode, structured English and decision tables were poor. Candidates could describe unit testing such as black and white testing, but need to understand other techniques.

Indicative Answer Points

- (a) The three most common forms are parallel running, direct changeover and phased implementation.

Parallel method is the safest method of running the two systems side by side for a period of time and comparing the results. It is a costly method, but is of lower risk. It is the most common method and would be used in updating outdated business applications.

Direct changeovers are dangerous in that there is no backup, but are less costly and risky. It depends on thorough testing. The old system is abandoned and the new system used immediately. It may be the only method available, as the existing system is no longer relevant.

Phased systems are used by large companies particularly when the system is being used in many places e.g. branches. It can also be a part of the system that is implemented first; e.g. a small section of the stock within a stock control. Other techniques include pilot, staged and retrospective implementation.

- (b) Documentation should be developed in a top down way, particularly if a structured method is used. It is used to describe the current system for use and future maintenance. It is essential that version control and change control are supported. Standard forms and documents should be used. Documentation should be simple and clear. A good filing system is required for manual/physical documents and a good back-up system for automated documents. Feasibility report, requirements specification, system models, interfaces, user manuals, coding manuals, technical specification, test plans and results are examples of some of the documentation required.
- (c) Recovery plans should be documented in the same way as system documentation. Data should always be backed up including copies of the software. Copies must be held on and off site. A recovery procedure would be required to reload and reboot the system. Although commercial databases can do this by roll back, save points etc., a procedure may be required depending on the seriousness of the problem. Large companies need to provide disaster recovery procedures and a business continuity plan. The use of usernames, strong passwords, roles, access privileges, audit trails, virus checkers, firewalls etc helps prevent unauthorised access. There should be good staff training, computers should never be left logged on etc.

Examiners' comments

This question was attempted by almost half of the candidates with a high pass rate. Most could describe three implementation techniques, though some confused implementation with development, even though the question specifically indicated '*after development*'. The importance of documentation needs to be emphasised to the weaker candidates, many ignored this part.

Section B

B5

Indicative Answer Points

This was an open ended question with any reasonable discussion awarded marks. For a pass the question was looking for backups onto disc, and especially onto a different disc to the one which the DBMS resides on. For higher marks, there would need to be a discussion on how the various different backup files are managed. Traditionally an operator would take the tape out and store it, whilst putting a second tape in.

The answer would have to discuss how the backup structure would mirror this (renaming of files, creation of a directory structure so that each backup is clearly identified etc.)

An answer which states that moving the data into a data warehouse is incorrect. A data warehouse is not a backup.

Examiners' comments

A large number of answers still referenced Grandfather – Father – Son style of backups. These answers are not really suitable in the modern computing domain so were awarded few marks.

Many answers were “memory dumps” of material learnt/coached about backing up a database and did not refer to the question. The marks for these answers were limited to a basic pass mark

It was good to see a range of answers from some students including reference to Cloud computing.

B6

Indicative Answer Points

- a) Mean is the commonly used average. That is, all the numbers are added together and then divided by the number of numbers
- b) Mode is the value that occurs most often. If no number is repeated, then there is no mode for the list.
- c) Standard deviation shows how much variation exists from the mean (average).

A low standard deviation indicates that the numbers tend to be very close to the mean; high standard deviation indicates that the numbers are spread out over a large range of values.

Examiners' comments

Candidates showed some confusion over mean and mode; sometimes the answers were in the wrong section.

Standard Deviation was a concern as there was a great deal of confusion about what it is.

The question asked for examples but there were a number of answers without examples. These were limited to half marks.

B7

Indicative Answer Points

- a) A hard method is one which has a clearly define structure to solving a problem. It has a true engineered approached, which requires the appropriate steps to be taken in order to accomplish the task at hand.

It could be argued to be labour intensive, paper intensive and not flexible enough. Certain hard methods seem to ignore the human angle or at least pay it minimum attention. One example is SSADM

- b) Basically adding in more human orientated features. It could include
Co-opting work force members on the development team
Some elements of RAD (JAD session / JRP sessions /Road shows) but RAD is NOT a soft methodology

It is more engaged with the end users and involves more interviews, questionnaires etc.

Marks were awarded for discussion that includes more users throughout the processes.

Examiners' comments

Part A was answered reasonable well.

Part B was poorly answered. RAD is not a soft method. Neither are OO methods. Soft methods at not converted into hard methods during their life span.

There were good answers that covered the human / political / social aspects of soft methods.

B8

This was an open ended question. The main focus is to remove of the content on the web site that takes the most bandwidth.

- General reduction of content on web site
- Reduction of size of images
- Increase the use of text
- Reduction or removal of video and avis
- Perhaps splits of pages into smaller pages (less to load)
- Removal of frames and more of a paged application
- Increase contact us pages
- Reduction on the amount the end user has to learn or remember
- Testing using the lower bandwidth speeds

Examiners' comments

Generally where the student understood the question the answer was reasonable.

But a number of the answers focused

- a) on updating the server, which would have no effect on the client side of the problem
- b) updating the network within the organisation, which again would have no effect
- c) updating the ISP / network near the client, which the company would have no control over

The answers were very variable with some good answers but a lot focusing on the wrong areas.

B9

Indicative Answer Points

- a) A legacy system is a computer application which the company no longer wishes to maintain. It is still used, but there is no support or upgrades.
- b) Any decommissioned system needs all the data from the system to be transferred to any new system. Therefore a back record conversion strategy needs to be discussed. Decisions need to be made about how to migrate to any new system. Are the two systems to be run in parallel, if so how is the double entry of data to be achieved? If it is a big bang approach, how is the switch off and switch on handled between the two applications.

Marks were given for any reasonable discussion on how a system is wound down and a new system replaces it.

Examiners' comments

Part A was very poorly answered. A high percentage of answers discussed having a legal system rather than a legacy system.

Part B tended to focus on a limited area; most focusing on hand over styles (big bang, pilot, parallel etc).

There were some very good complete answers but in general most answers were too narrow in focus.

B10

Indicative Answer Points

The question was about turning data into information. The *three different types of statistical analysis/reports* therefore needed to produce results that showed processed information; for example,

Averages,
Totals,
Maximum/Minimum
Date ranges, monthly/annual reports
Exception reports
etc

Examiners' comments

This question was poorly answered. Rather than *statistical analysis/reports*, the majority of answers purely focused on defining what Bar Charts, Pie Charts, Scatter charts etc. were. While marks were given for these answers, they did not score high marks.

B11

Indicative Answer Points

This question was looking for a discussion on testing techniques that focus on the screen, screen design and performance as well as whether it did what it was supposed to do.

Stress and loading testing – how fast the page loads.

Regression testing – does this site still perform once a software upgrade has been done.

Version control – ensuring that a full site rollout has been performed

Browser testing – ensuring that the site works in all browsers

Traditional software testing in a web context

Examiners' comments

Many answers were a simple note dump on black and white box testing without any relevance to a web site. Marks awarded in these cases were limited.

There were some very good answers, but again there seems to be a great deal of coaching and focusing on just note dumping. This is becoming a problem with certain centres.

B12

Indicative Answer Points

This was a straight forward recall question. A useful (but none academic) starting point for this question is http://en.wikipedia.org/wiki/Unified_Modeling_Language

The quotes below are taken from above site

“Structure diagrams emphasize the things that must be present in the system being modelled. Since structure diagrams represent the structure, they are used extensively in documenting the software architecture of software systems.”

“Behaviour diagrams emphasize what must happen in the system being modelled. Since behaviour diagrams illustrate the behaviour of a system, they are used extensively to describe the functionality of software systems.”

“Interaction diagrams, a subset of behaviour diagrams, emphasize the flow of control and data among the things in the system being modelled”

Examiners' comments

As this is the Information Systems paper (as opposed to the Software Development paper), the diagrams required needed to relate to systems development rather than just software development. Those answers that focused on the diagrams used to develop software rather than diagrams used to develop systems did not gain full marks.