THE BCS PROFESSIONAL EXAMINATIONS
Certificate in IT

October 2006

Examiners' Report

Information Systems

General Comments

The pass rate for Section A was disappointing, being lower than previously. One reason for this still lies with the candidates' poor examination technique. They should be encouraged to read the question carefully and make a note of the number of marks allocated to each. This indicates the amount of detail required. There were also a larger number of very weak students, which invariably lowers the pass rate.

Question 1

1. A sports clothing business specialising in gymnastics and fitness clothing is developing an on-line web site to sell and promote their products. The following functions are required: displaying the product, allowing customers to check availability of size and colour, producing a shopping basket, dealing with credit card payments and arranging delivery.

a) You are the project manager for a small software house employed to manage the above development and have been asked to give a presentation to the directors of the above company detailing your development methods. Write a short report describing the following development methods and techniques used in each, indicating which you would choose and why you chose it:

i) Prototyping
ii) Object oriented analysis
iii) Hard system methodologies **(15 marks)**

b) Sketch a series of screens enabling the customer to pick the product he/she requires, build up a shopping basket and enter payment and credit details. **(15 marks)**

Examiner's Comments

Part a): Candidates were able to discuss prototyping, but many failed to be able to describe object-oriented techniques. As this area is now as common as the traditional hard system methodologies, this is surprising. There are many published textbooks and information is available on the internet. Candidates should be encouraged to carry out research into modern techniques.
Part b): There was an improvement in the screen design. Many candidates indicated the differing techniques that were used, which gained more marks as it helped describe functionality.

Answer Pointers

Part a): Prototyping is a user-oriented process used to build the system with the co-operation of the user. It concentrates on the business needs and flexibility within development. There are several prototyping techniques that can be used such as evolutionary, spiral, dummy, staged, phased. Examples of commercial products are DSDM, Agile products etc.

OOA concentrates on the objects, which exist in the 'real' world, their roles and responsibilities (attributes and operations), the way they work together (interaction). Objects are classified within classes containing attributes and methods. Techniques include class diagrams, use-case diagrams, the theories of inheritance and persistence. Examples include UML.

Hard systems methodologies such as SSADM deal with the detailed and methodical approach to analysis and design. Techniques include data flow diagramming, logical data modelling, entity life histories, normalisation etc.
The choice of method and reasons are up to the individual.

Part b): The screens need to show good functionality, basic screen design and consistency. The nature of the system allowed the use of many differing techniques, such as images, video clips, radio buttons, help, drop down lists etc. Showing how users can navigate through the screens should indicate the usability of them. Exit strategies and help are expected.

Question 2

2. *a)* The production of a large project requires good project management skills and techniques. Describe the mechanisms and stages you would produce in order to manage and control such a project to ensure a good quality system, which is produced on time. **(13 marks)**

b) Using the system development life cycle as an example, draw a Gantt chart and a PERT chart for a project lasting twelve weeks, making reasonable assumptions as to the length of each stage. **(8 marks)**

c) Write brief notes on the following:
- *i)* Outsourcing **(3 marks)**
- *ii)* Facilities management **(3 marks)**
- *iii)* The role of a software house **(3 marks)**

Examiner's Comments

This question was the least popular and those who attempted it, found it very difficult. Many misread part a), and described the system development cycle rather that the management of the development process. This has been a common error in previous papers.

Part b): There are many examples of Gantt and PERT charts using the system development life cycle as an example and yet very few candidates attempted the question. Those who did obtained high marks.

Part c): The majority of candidates ignored this question; those who did attempt it were not familiar with the facilities, which are often used by large companies.

Answer Pointers

Part a): Project management is crucial to system development. Teams need to be organised, the project needs to be broken down into stages and tasks, time and cost budgets decided, tasks and resources allocated, recovery mechanisms devised etc. Techniques include the use of good methodologies, regular progress meetings, structured walkthroughs etc

Part b): A good example of a Gantt chart should indicate the stages and length of time each should take using a histogram. The PERT chart should indicate start and finish times with a critical path.

Part c): Outsourcing is a mechanism of using external sources for example to develop a system, run a system such as payroll, provide input to a system It saves time and resources and can reduce costs by taking responsibility for employing specialist staff for example. It can also be used as a security measure (egg payroll).

Facilities management is a mechanism whereby a company carries out the entire running and processing of systems. That company, thus releasing the necessity to employ any specialised

technical or development staff, absorbs all the responsibility. An excellent example would be overseas call centres and support centres.

A software house/company develops systems and provides the software to a company. Support and maintenance would normally be provided by use of a contract. There are many examples of companies, e.g. Microsoft providing operating systems and packages such as word processing, as well companies who provide turnkey solutions, accountancy systems, payroll system etc.

Question 3

3. *a)* There are several issues that need to be taken into account when investigating the feasibility of a project. Describe what should be contained in a typical feasibility report. **(10 marks)**

b) A system's data is stored in a database, which is supported by a database management system (DBMS). Describe what functions should be contained in a typical DBMS in order to be able to present good quality data when required. Use an example with which you are familiar. **(10 marks)**

c) Your manager has expressed an interest in buying help desk software to support the hardware and software within a company. Produce a report showing the main functions and data required to support a help desk database. **(10 marks)**

Examiner's Comments

Part a): This is a very common question and was answered reasonably well. However, candidates tended to spend too much time, for example describing feasibility techniques such and interviews, questionnaires etc, none of which was required.
Part b): Despite this being a common question, it was not answered well
Part c): Many candidates misunderstood the question and ignored it. They should be familiar with the functions of a help desk and were expected to describe what information is required to support these functions.

Answer Pointers

Part a): The main issues are: economical, technical, operational, social and legal. Descriptions of each are expected.

Part b): Security (including passwords and roles), referential integrity, privacy, locking mechanisms, recovery e.g. roll back, roll forward, back up, performance and response. Examples such as Access, Oracle etc

Part c): The database should hold details of all the hardware (type, manufacturer, serial no) and software including name, location and version, user names, passwords, roles etc. details of the queries/problems with user codes, dates, severity code, solution, FAQs (frequently asked questions) etc

Question 4

4. *a)* There are several types of testing strategies and stages when testing should occur. Prepare a brief report identifying THREE different types of testing and THREE stages, which should be included in testing. **(12 marks)**

b) Documentation is vital to provide good maintenance facilities. **Briefly** describe what should be contained in the following:

i) System specification
ii) User training and reference guide
iii) Technical documentation **(9 marks)**

c) Discuss what measures you would take to ensure that your company's data is secure and recoverable at all times. **(9 marks)**

Examiner's Comment

This was the most successful question and yet not the most popular.
Part a): This was answered well and high marks obtained.
Part b): Most candidates were able to show some understanding of the three different types of documentation, but often confused the system specification with the technical documentation. The former is logical/physical attributes of the system and the latter the physical attributes of the implementation.

Part c): This was answered reasonably well.

Answer Pointers

Part a): Functional testing showing the system contains the required functionality, i.e. it does what was expected. Usability testing ensuring it meets the user criteria in terms of look and feel, response etc. Performance testing ensuring it can cope with the required volume. Could also include black/white testing and Pareto analysis. Stages to be tested include module/screen/program testing, system testing, integration testing, alpha and beta testing, and user acceptance.

Part b): The system specification should contain the detail of the analysis and design including data flow diagrams, data models, normalisation, screen, database and output design, function/module specification (pseudo code, structured English etc). User training and reference guides should contain access and help guides, screen layouts, print layouts, terminology, support details etc documentation is vital. It should enable the users to understand how to use and navigate the system and how to recover from errors. Technical documentation should contain the technical information concerning the hardware and software, details of maintenance contracts, contact details etc.

Part c): Security of data is covered by the use of passwords, user roles, back-up procedures on and off site, use of fireproof safes, disaster recovery procedures, antivirus and spyware software, measures to prevent malicious access to servers/computer rooms etc.

Question 5

5. *a)* An Entity Relationship Diagram (ERD) consists of the Entity Relationship Model (ERM) and associated documentation. What information should be included in the additional documentation? **(5 marks)**

b) Outline what you consider to be good practice for drawing an ERD. **(4 marks)**

c) List THREE other techniques that could be used to support an ERD. **(3 marks)**

Answer Pointers

a) A range of documentation – one mark for each validate document, will reduce marks for duplication
Attribute list,
primary key,
foreign key,
domain constraints,
examples of business rules not support by standard constraints

b) Open ended, open for the students

None plurals,
all relationships named,
all entities have a relationship,
no cyclic relationships,
no circular relationships

One mark for each relevant point

Some candidates stated that training or knowledge was a key point, as was an understanding of the problem domain.

c) One mark for each relevant example

DFD, ECD, EAM etc.

Examiner's Comments

Well answered by candidates who had clearly read around the subject or understand the technique.

Question 6

6. Internet sites should be accessible to all users regardless of whether they do or do not have special needs. Comment on how you would structure test scripts and conditions to ascertain whether an internet site was accessible to all types of users. **(12 marks)**

Answer Pointers

Open ended style question but should cover a range of special needs users not just one group.

The test scripts should cover areas such as:

Alternative methods of delivery of material
- use of text instead of sound,
- sound instead of text etc.

Sites decided so that images have alt text tags
Uses of messages conveyed in imagery reduced.
Reduction in amount of frames

Consistency between existing web sites
Use of third party validation sites like the bobby standard
http://www.websynergi.com/accessibility_bobby_w3c.asp

Examiner's Comments
A poorly answered question.

It seemed clear that those answering this question did not really understand the question.

Providers might need to discuss this domain in greater detail, and discuss the needs of disabled users and other ethical considerations with the IS realm.

Question 7

7. What is meant by the following terms and outline the principles and techniques behind each term:

a) RAD
b) SSADM
c) PRINCE **(12 marks)**

Answer Pointers
i) Rapid Application Development

Based on James Martin approach,
Increased reliance and use of users and prototypes to develop systems
JAD and JRP sessions
Time boxes and parallel development
Use of swat teams

Marks are awarded for relevant points.

ii) Structured Systems Analysis and Design Methodology

UK Government standard
Currently at version 4*
Use of standard techniques (CD, DFD, ERD etc)
Data focused,
Traditionally limited user involvement

Marks are awarded for relevant points.

iii) Projects in a Commercial Environment

Project management method
UK government standard,
Structures stages,
Deliverables include lessons learnt log / risk log

The student discusses the terms and needs to provide a relevant explanation of the term, in terms of the tools and techniques that differentiate them.

One mark for each relevant point made.

Examiner's Comments
Reasonable well answered question for parts 1 and 2. Prince seemed to a weak award, which is of some concern when the latest methods utilise terms from Prince (for example SSADM, Prestwood)

Question 8

8. What features and functions does a CASE tool provide? **(12 marks)**

Answer Pointers
Up to 12 marks for valid points as to how CASE can assist in software engineering

Generation of part of the diagram
Provide generation of the next level of diagram
Generate supporting documentation
Providing conformance to the rules and regs of the diagram technique
Provide diagram cross checking
Generation of (part) code and application
Provide methodology support
Provide help

One or two marks for each relevant point made.

Examiner's Comments
Reasonable attempts at this question.

Question 9

9. Define the following terms and explain their use:

a) ASP
b) XML
c) ODBC
d) DBMS

(4 x 3 marks)

Answer Pointers
a) Active server pages

server side technology,
generates HTML code for the client browser
Microsoft product
Can connect to a number of databases

a) Extensible Mark up Langage

markup language used to describe the structure of data
XML
Meta language
Can be combined with XSL and HTML etc

c) Open Database Connectivity

Microsoft standard

Open source, part of Windows Open Standards Architecture
middleware for database connections
slow,

d) Database Management System

software that supports the database functions etc.
hide the database function from the users
examples, Oracle, Access

Up to 2 marks for each discussion, 1 mark for each relevant comment made in each area.

Examiner's Comments
Reasonable attempts by some candidates, but there were a number of answers that were in the pure guess variety. When you consider this are standard terms within IS, candidates should have been better prepared.

Question 10

10. Company X is recording 'defects' information about all its current products, including those under development and those in operation. Defects can be reported by: system designers (during formal inspections); testers (during systems and integration testing) or users. What information should be collected when defects are reported? Sketch a screen layout containing this information. **(12 marks)**

Answer Pointers/Examiner's Comments
a) The major problem is the lumping together of faults and failure into defects. Clearly system designers are reporting faults while users are reporting failures. Testers finding defects during system and integration testing may be finding faults or failures. The distinct groups cannot be expected to produce the same kind of information (e.g. 'cause' cannot be given by users). Users cannot be expected to provide information about faults. They can only report on incidents that they believe are failures. It is up to the software developers to determine if these really are (new) failures and if so it is up to them to find the fault that has caused it and then fix the fault. [4 marks]

Other weaknesses to note (1 mark each up to maximum of 4 total marks)

a. No name field
b. Date ambiguous; is date the date of incident or the date reported?
c. Description could mean anything: ideally need to separate out symptom, end result and mechanism.
d. Too much reliance on free-form entry (simple scale choices are much better).
e. Does not provide a simple scale of severity
f. Does not identify location/version number [4 marks]

Marks were award for a reasonable attempt at a screen layout.

Marks will be awarded on how relevant the point is.

Most answers showed a level of understanding for this question.

Question 11

11. *a)* A standard Microsoft Windows development environment has a number of features that would assist with the development of a data entry application. Discuss THREE such features and give examples of where they would be used to assist data entry and validation. **(3 x 2 marks)**

b) What are the relevant advantages and disadvantages of server side and client side validation? **(6 marks)**

Answer Pointers
a) 3 times 1 mark for feature, 1 for examples

Features could include, drop down lists, query based options, check boxes,
1 mark for a relevant Example

Poorly answered question. Lots of answers discussed applications rather than features.

b) up to 2 marks for a discussion on server side validation
up to 2 marks for client side validation

Server side validation ensures that all business rules are met, but does require all transactions have to be validated on the server.

Client side validation utilises resources on the client machine, but may have business rules that are out of date, due to the client machine being out of step with the current application.

2 marks for comments, I would hope / expect that both would be used. The client would be used to ensure that data is within acceptable domains and that the server then ensures that the data is accurate.

There were a number of reasonable answers this question.

Question 12

12. Measurements and Metrics play a key role in the management of a RAD approach to project development.

Outline the type of information that needs to be collected, so that subsequent projects can be better estimated and the overall quality improved. **(12 marks)**

Answer Pointers/Examiner's Comments
The answers to this question were the poorest on the paper.

Any reasonable statistics could be used to improve quality and estimates.

a) Number of days taken to
    a. development an application
    b. write reports
    c. test applications
    d. etc
b) Number of faults found
    a. before testing,
    b. after testing,
    c. found by customer
    d. etc.

Any metrics that shows how much effort or how well the application mapped to the requirements catalogue can be used.