THE BCS PROFESSIONAL EXAMINATIONS
BCS Level 6 Professional Graduate Diploma in IT

April 2008

EXAMINERS' REPORT

Computer Services Management

General Comments

The answers for most questions were generally of a slightly lower standard than previous examinations and some candidates had clearly failed to study the recommended reading material or read past examiners' reports. A number of candidates just provided a commentary about the question, rather than provide an answer. A significant proportion provided business, rather than IT/IS answers and were unable to gain marks as a result. Many candidates also lost marks by not expanding upon points made and just provided lists. At this level the examiners expect the candidates to demonstrate a greater depth of understanding.

To maximise their marks, candidates are strongly advised to study the application of information technology within their own organisations. As well as helping to pass this examination, such study will provide benefits to their career and to their employers.

Despite the comments above, there were some excellent papers. The most successful candidates carefully considered the requirement of each question, planned the layout of their answer, provided diagrams where appropriate, avoided generalisations, justified points with examples and gave comprehensive and thoughtful answers. Such candidates clearly demonstrated they understood and could use the knowledge gained through study rather than simply trying to memorise study material.

An indication is given below of the expected answer points. However, marks were given for additional or alternative points where relevant to the question.

Question 1

The company you work for obtains most of its computing services from two external contractors. One contractor provides the physical IT infrastructure, including networks, servers and desktop systems. The other contractor delivers and maintains the software environment that supports the business.

Over the last few months several losses of service have occurred which has resulted in significant lost business. Meetings have been held with the contractors in an attempt to resolve the problems. However each has blamed the other for causing the disruption.

(a) Discuss a framework that can be introduced to the existing business relationship which could be used to prevent a recurrence of this situation.

(12 marks)

(b) Write a report to the senior management of your company describing how all future IT service arrangements should be negotiated. You should give a balanced view of the costs and benefits of the approach you discuss.

(13 marks)

Examiners' Comments

This was a popular question, and in a number of cases was well answered by candidates. A number of candidates lost some marks because they did not provide the answer in the format requested. Similarly, some candidates did not achieve their full potential mark because the response they gave did not cover all the elements which were requested in the question.

While there are strongly business-oriented elements to this question, the nature of the scenario – and the wider context – dictates that the core requirement is to demonstrate how the IT requirement of the organisation can be met. IT issues should be at the centre of the response, rather than peripheral to it.

Answer Pointers

- Sanity could be restored by making one of the contractors responsible for the delivery of both aspects of the service – with the other acting as sub-contractor.
- It could well be that the tension between the two contractors is fuelled by a basic imbalance between the provision they have made in their service delivery. They need to be encouraged to work together to ensure that the services they are providing are compatible.
- The use of a formal report format is important in section (b). Candidates need to be able to demonstrate that they can use the standard business formats for communication – this is a key part of the role in a business IS/IT environment.

Question 2

You have recently been recruited as a Technical Support Manager in the Computer Services Department of a large organisation that has a history of failed systems. The CEO has stated that the main reason for the failures is the high number of post-implementation system errors experienced during live operation. The CEO believes these errors are the result of inadequate testing, particularly user testing, and has asked for further information and advice.

Prepare a memorandum for the CEO to:

a)   Describe a sequence of testing stages necessary to identify system errors before the system is made available for testing by the end users.

(10 marks)

b)   Explain and justify the involvement of the Computer Services Department in the testing process.

(8 marks)

c)   Propose and describe a user testing service which should significantly reduce the number of post-implementation errors.

(7 marks)

Examiners' Comments

Part a) was a straightforward question and most candidates gained marks by describing at least some of the testing stages.

Part b) sought to uncover the candidate's knowledge of the role of Computer Services in testing. Whilst the better candidates were able to understand what was required, others just repeated the stages they had used in Part a) of the question. Worryingly, some candidates appeared to misunderstand the role of a Computer Services Department.

For Part c), a proportion of candidates either just repeated the question or commented on the need for testing. Only the best candidates gained marks for this part.

Answer Pointers

This question sought the candidate's understanding of Computer Services role in the testing and implementation of a new system. Answers may vary according to the type of organisational structures assumed by the candidates and therefore some discretion by the examiners was applied.

a) Testing Stages

Although the terminology may differ, candidates should have broadly described the following stages:

Unit testing tests the minimal software unit, typically a module or program. Each unit (basic component) of the software is tested to verify that the detailed design for the unit has been correctly implemented.

Integration testing exposes defects in the interfaces and interaction between integrated components (modules or programs). Progressively larger groups of tested software components, corresponding to elements of the architectural design, are integrated and tested until the software works as a system.

Functional testing tests at any level (class, module, interface, or system) for proper functionality as defined in the specification.

- System testing tests a completely integrated system to verify that it meets its requirements.
- System integration testing verifies that a system is integrated to any external or third party systems defined in the system requirements.

Acceptance testing can be conducted by the end-user, customer or client to validate whether or not to accept the product. Acceptance testing may be performed as part of the hand-off process between any two phases of development. Operational testing will occur at this point.

Alpha testing is simulated or actual operational testing by potential users/customers or by an independent test team.

Beta testing comes after alpha testing. Versions of the software, known as beta versions, are released to further users within the company. The software is released to groups of people so that further testing can ensure the product has few faults or bugs.

Although both Alpha and Beta are referred to as testing, the rigours that are applied are often unsystematic and many basic tenets of the testing process are not used. The Alpha and Beta period provides an insight into environmental and utilisation conditions that can impact on the software.

Regression testing. After modifying the software, either for a change in functionality or to fix defects, a regression test re-runs previously passed tests on the modified software to ensure that the modifications have not unintentionally caused a regression of previous functionality. Regression testing can be performed at any or all of the above test levels.

b) Computer Services involvement in testing

The format of answers varied but the key points are that Computer Services are involved both as a "user" and (usually) as a provider of testing environments.

CS as a user:

- **Explanation:** CS will be responsible for the live operation and possibly maintenance of the system and so will need to conduct their own usability tests.

- **Justification:** This will be necessary to test operational procedures, documentation, security copying, recovery, performance, operational resilience, compatibility with other systems, periodic procedures, use of computing resources, impact on other systems, etc. For system maintenance, CS will need the development documentation possibly some training/handover of knowledge. They will have to agree a cross-over period with the developers

CS as a provider:

- **Explanataion:** CS usually provide the various testing environments and therefore have to be involved.

- **Justification:** CS have to ensure that sufficient computer resources exist for each of the services. This may involve purchasing additional hardware, changing operation schedules, providing additional PCs configured for the new system. Budgets, staffing, communication and schedules may all be affected.

c) User testing environment

There are three parts to this question – **propose** a user testing environment, **describe** the environment and explain how it would **reduce errors.**

Propose: It could be that the user testing service used for previous developments was inadequate. Either it was non-representative of the live environment or it failed to use realistic data. Propose that a user testing environment be provided that is as close as possible to the live situation.

Describe: A large scale copy of the databases used (or full scale) will ensure that data relationships etc. are truly representative of the live situation. PCs used should not be the users' existing PCs but devices configured as per the situation when the new system is made operational. Users should be able to repeat tests carried out previously, so a restoration/new copy of the underlying data should be agreed with the developers and the users.

Reducing errors. There should be mechanisms for formally recording errors identified during user testing and their resolution should also be recorded. Version control should be rigorous. A disciplined and rigorous approach, using repeated data and documented tests and acceptance, will reduce errors.

Question 3

Your role is the IT Operations Manager for an organisation which employs several thousand people, all of whom are located on a single site within a major city. In association with colleagues from other parts of the business you have developed a significant business continuity plan for the organisation. You have now proposed a full scale test of the plan under realistic conditions. The test would take place on a non-working day and would however simulate a normal working day.

Members of the Board of the company are concerned that the cost of the test will be substantial, and may have some knock on effect with normal business operations. They have therefore refused to approve the test event.

(a) Suggest a disaster scenario which you believe is likely to occur and write a report to the Board highlighting why you think the test should go ahead. You should base your argument on the business needs of the organisation.
(15 marks)
(b) Having read your report, the Board members have asked for more information regarding how the success of the test will be measured. Write a supplementary report describing how you intend to capture good quality information regarding the success, or otherwise, of the test event.

(10 marks)

Examiners' Comments

This question was answered by the majority of candidates, although it worth noting that it was much less popular with candidates from some exam centres.

The standard of answer was generally satisfactory – and there were some extremely good contributions from candidates. It would appear that these candidates had direct exposure to this type of operation through their workplace.

The type of scenario chosen was quite varied – although the most common themes were the standard concerns of power loss, flooding, fire and major hardware failure. Provided that the candidate appropriately justified their choice of scenario in the context of the question they were all given equal treatment in the marking.

A number of candidates provided scenarios which appeared to reflect their own experience but failed to place the response in the context of the scale of organisation described in the question. These candidates, inevitably, did not score well.

Once again, high marks cannot be expected by candidates when the answer is not provided in the format requested. Candidates should note, simply restating the information given in the question – however appropriate the format – will not provide a pass mark.

Answer Pointers

- A plan is often of very limited value unless you test it, and the more realistic the test, the more likely it is to expose problems within the plan.
- Suggest that the Board consider the costs, in lost business and damaged reputation, which might be incurred should an untested DR plan fail…
- Unless the company has a 24*7 operation that cannot be handed over to another body – or indeed suspended for a day – then it is difficult to justify such a test being "impossible". If it is "possible", then it just a question of negotiation…
- Some organisations use a public holiday to carry out the test. By choosing a day not habitually used for business, many problems can be avoided – provided that the staff members who take part are suitably rewarded!

- DR plans are often made out of date by the rapid development of new technologies and changes in business practice. The test will expose these problems and allow them to be addressed.
- The report should give a reasoned business case in a standard business format. It should stress that finding – and removing – problems if just as good an outcome as demonstrating that no problems exist.

Question 4

The cost of a university's computing facilities is apportioned between the various departments according to the number of students in each department. This method has worked satisfactorily in the past but has the drawback of benefiting high users of computing resources at the expense of low users. The issue has been put in sharp focus by a proposal to close the Music Department to all new students, as it is perceived to be too costly. The head of the Music Department argues that the current system of computer charging is grossly unfair, as the Music Department uses few computing resources compared to the Engineering Department, even though the number of students is similar.

The Vice-Chancellor has asked you, the Computer Services Manager, to propose a charging method that fairly reflects the resources used by each department. Write a report to the Vice-Chancellor to:

a)   List all the elements of a computing service.

(7 marks)

b)   Describe and justify ONE approach by which the elements could be charged fairly to each department according to their usage.

(10 marks)

c)   Discuss how the implementation of revised charges could impact on the demand for computer services, both in the short term and the long term.

(8 marks)

Examiners' Comments

This was the least popular question suggesting candidates are not aware that the provision of computing facilities are a cost to the business and this cost has to be justified by those who use the service. .

Part a) was straightforward, with all but the weakest candidates providing a list of elements.

There were some very simplistic answers for Part b) indicating that this part of the syllabus had not been studied with appropriate rigour and suggesting that the examiners need to return to this subject in future sittings.

Part c) sought to understand the candidate's appreciation of the effect that various charging mechanisms may have upon demand. Whilst some produced carefully constructed explanations, others gave short and ill-considered answers.

Answer Pointers

This question tests the candidate's understanding of computer charges in a typical business situation where cost centres argue over the apportionment of costs.

a) Charging components:

Central computers:

- CPU usage
- Disk accesses
- Disk storage
- Printing/paper
- Security requirements

- Operating system software licence charges
- Application software licence charges
- Hardware maintenance
- Software maintenance
- Staff costs
- Cost of capital/replacement costs
- Etc.

Network Computers:

- PC/workstation hardware costs
- PC/workstation software costs
- Printers
- Toner
- Paper
- Cost of network
- Switches/routers etc
- Servers
- Security requirements
- Staff costs
- Hardware maintenance
- Software maintenance
- Cost of capital/replacement costs
- Etc.

b) Charging method

No set answer, but the candidate should demonstrate understanding by suggesting a method to charge out all of the elements. One possible approach could be to differentiate between fixed costs and usage costs. Fixed costs could be charged directly to departments and usage costs according to actual usage.

Fixed Costs:

The desktop costs could be charged according to how many PC/workstations are in each department and the costs of each PC. The server costs could be apportioned according to the numbers of PC/workstations. This is fair, as the cost of a high usage PC is similar to that of a low-usage PC. Any powerful PCs/workstations would be charged a higher amount to reflect the initial higher purchase cost. Apportioning the server costs according to the number of PCs/workstations is also fair, as usage has minimal effect on the costs.

Variable costs:

One possibility: For central computing, the whole of the costs could be totalled and split between users according to their actual usage, rather than simply dividing the total cost by the number of users. One way of doing this is total the costs of each element and charge these as "computer units". So a certain amount of CPU usage might constitute a computer unit, as would a given number of disk accesses, a certain number of lines of print, etc. The charge for each unit would be varied as technology changes/develops or usage changes.

c) Impact

Again, no set answer, but the examiners were seeking the candidate's degree of reasoning and understanding.

As the purpose of the charging method is for users to pay the fair costs of their usage, it is likely that usage may change. The past high usage departments may try to restrain their usage, as their costs are likely to rise. The low usage departments may not change their use at all. In the short term, it is possible that demand for computer resources will fall, rather than rise. However, in the longer term, department budgets and funding may change so the previous pattern of usage may return.

The computer services department will have to develop/purchase a system to charge the resources and may have to train/present the new charging methods to groups of users.

Question 5

You are the Head of IT Services for a public sector organisation which employs five hundred people. Most of these employees are heavy users of IT services and in most cases cannot do carry out their work tasks without their networked desktop computer system being available.

Despite having a well qualified and professional support staff in place and a good service record you are aware that the service provided is not highly regarded by its customers.

a) Describe THREE activities you would undertake in order to determine the fundamental problems behind this dissatisfaction.

(15 marks)

b) For ONE of these activities, provide a report to your manager which clearly identifies how the evidence you have collected will be used to develop the service further.

(10 marks)

Examiners' Comments

This question was answered by a large proportion of candidates. The range of activities presented was very wide and perhaps reflected the wide range of organisational cultures experienced by candidates.

It would seem obvious - but we feel the need to restate the case anyway – that when THREE activities are requested then THREE should be answered if the candidate hopes to gain the maximum number of marks available to them. Similarly, the balance of marks associated with each part of the question should be regarded as a strong guide to the degree of effort each section requires. In this case, merely listing three activities – as opposed to describing them in adequate detail – will not gain good marks.

The majority of candidates came up with good, sound techniques for managing the problems described in the question – but a few chose to take a strongly confrontational stance, which was judged to be unlikely to show significant benefit in most business cultures.

Answer Pointers

- You appear to be doing the job, but people are still not happy. This suggests that your communication structures and/or your influencing skills are not as good as your technical ones.
- Effective communication paths through coffee room meetings, clinics, special topic debates, training/information sessions and "walk-abouts" by staff can all help develop trust – as long as the "system" is seen to respond quickly to the issues raised.
- The staff simply cannot do their work if the IT system fails. It is important to show them the support that has been put in place to prevent failure. If the support is really not adequate, discuss with staff how they can influence the development/investment cycle to get improvements made.
- Show them you are both trying to get the same good result.