

**THE BCS PROFESSIONAL EXAMINATIONS  
Diploma**

**April 2006**

**EXAMINERS' REPORT**

**Professional Issues in Information Systems Practice**

**General**

The pass rate was disappointing. Furthermore, over 30% of candidates gained marks of less than 30%. While a few of the candidates scoring this badly may not be intellectually equipped for work at this level, it seems in most cases that candidates with marks as low as this are simply not prepared for the examination and lack the basic knowledge. As usual, some candidates performed extremely well and showed a real and profound understanding of the material; as a result, they gained very high marks.

The examiners and the moderator are well aware that the material in this module is different in nature from the other material that candidates study and that they may therefore find it difficult or they may have motivational problems. It should be emphasised, however, that an awareness and an understanding of the issues addressed in the module is an important factor in distinguishing the professional engineer from the technician.

**Question 1**

1. a) Identify FIVE responsibilities of the Engineering Council within the UK engineering profession. **(5 marks)**
- b) i) Explain why the development of information systems is regarded as an engineering activity. **(6 marks)**  
ii) In contrast, give two reasons why aspects of the information systems development process might be seen as outside of the engineering field. **(4 marks)**
- c) Explain the legal status of software engineers in the UK and how this compares to other professions and other countries. **(10 marks)**

**Examiner's Comments/Answer Pointers [syllabus section 1]**

Part a)

Candidates were quite able to identify the duties of the Engineering Council (e.g. list below), but not always very clearly. The main error was the confusion between the roles and duties of the Engineering Council roles and those of the British Computer Society. Areas for improvement: ensure the answer is precise enough (e.g. advising the government is too vague – adding in relation to engineering issues clarifies the role); avoid confusing it with the roles of the BCS (e.g. accreditation of university courses).

**Five of the following six points were required:**

- functions as the umbrella organisation for the 40+ engineering institutions, representing the profession as a whole;
- acts as the UK member on international bodies
- regulates the profession;
- set educational standards for the various grades of engineer;
- maintain registers of engineers in the various grades;
- encourage multi-disciplinary work.

Part b)

Some candidates tried to answer a different question, i.e. the position of the professional body within the Engineering Council, but most were able to show a fair understanding of why IS is regarded as engineering, that is:

Traditional engineers design and build a wide variety of objects but there are two constraints that apply to all such activities and which can be regarded as characteristic of engineering:

- engineering involves designing and building things that must work properly, that is, must meet a set of pre-determined requirements concerning their functionality, their performance, and their reliability
- the process of designing and building the object must be completed within specified constraints of time and budget.

These characteristics are not shared by activities such as accounting, consultancy, marketing, or medicine. On the other hand, most software development does share these characteristics.

An engineering perspective has enhanced the standard and quality of the development activities through developing a body of knowledge and measuring the activities.

Candidates found this a little bit more difficult, thinking it implied a question about the status of the IT profession. Credit was given for any two suitable reasons, such as:

- application of IT tools in the creative technologies field might be seen as artistic;
- much of the IS research / practice draws from a wide variety of reference disciplines, such as psychology, natural science, business & management, social science;
- there is little mathematical underpinning for much of the IS work in comparison with the rest of engineering.

Candidates provided a good account of this, showing that they understood the main differences, but some needed to be more specific, others needed to take care in the use of terms such as statutory, and others needed to give more details of the UK position (often showing greater clarity about the US). A suitable answer made the following points:

The legal status of engineers varies between countries. In the UK the profession has a formal structure that allows for the registration of engineers, under the auspice of the Engineering Council.

However, despite the recommendations to government of the Finiston Committee in 1977, registration is not legally required nor is the title of engineer reserved in any way. Some professions in the UK (e.g. law, medicine) are regulated through statutory professional bodies

In the USA the engineering profession is strictly controlled as both the title and function are reserved. The position in software is patchy with some states enforcing the rules on 'software engineer' more strictly than others.

**Question 2. [syllabus sections 3 & 4]**

2. a) Explain the meaning of the following terms, using examples as appropriate:
- i) Fixed Costs
  - ii) Variable Costs
  - iii) Depreciation
  - iv) Equity Capital

(12 marks)

- b) Green Computing is a company that acquires second hand computers and renovates them. The cost of acquisition of the PCs is low as they provide a service to companies who wish to dispose of such machines. It requires a van for collecting these machines. They sell the machines to home users and schools. They have two levels of renovation: a simple check and clean up, and a more advanced upgrade to key components. Eight technicians are employed full-time to undertake this work for 1500 productive hours annually, and one part-time technician is employed for 500 hours per year, at an average cost of £20 per hour. The following table shows the resources required for each type of renovation and the likely sales figures.

| Type of Renovation | Cost of Components (£) | Technician Time (hours) | Expected number of Sales |
|--------------------|------------------------|-------------------------|--------------------------|
| Simple             | 0                      | 5                       | 500                      |
| Upgrade            | 200                    | 15                      | 700                      |

Company overheads are expected to be £100,000 per annum.

Calculate how to distribute this overhead and the resultant cost of the computers sold based on:

- i) units sold
- ii) labour
- iii) total cost of units

(13 marks)

**Examiner’s Comments/Answer Pointers**

**Part a) [syllabus sections 3 & 4]**

Generally, this part was answered very well – especially for the first three topics. For full marks candidates were expected to give a clear definition, often using an example or some detail to show full understanding, such as:

**Fixed Costs:** a periodic charge that does not vary with business volume (as insurance or rent or mortgage payments etc.).

**Variable Costs :** a cost that fluctuates directly with output changes (e.g. overtime payments, electricity).

**Depreciation** is calculated annually on fixed assets to reflect the lifetime of the asset; the new value is used in the balance sheet. Depreciation can be calculated by straight line or reducing balance techniques.

**Equity Capital:** the money invested in the company by the shareholders (owners) initially and possibly also later.

**Part b) [syllabus section 4]**

This part was poorly answered, indicating many were not prepared for this type of calculation (it can be found in Bott, p.77). In fact very few candidates were able to achieve a correct or near correct solution to this question. Those that did know it got nearly full marks.

- i) 1200 units sold, so overhead is £83 per unit. The cost of units will therefore be:  
 Simple (£)= $0 + 5 \times 20 + 83 = 183$   
 Upgrade (£) =  $200 + 15 \times 20 + 83 = 583$   
 (4 marks)
- ii) Total number of hours of labour available per year =  $8 \times 1500 + 500 = 12500$  hours  
 [or as some candidates did it  $5 \times 500 + 15 \times 700 = 13000$  hours – this was allowed as a known alternative]  
 Overhead Cost per hour =  $\pounds 100,000 / 12500$  hours = £8 per hour  
 Cost of units will therefore be:  
 Simple (£)= $0 + 5 \times 28 = 140$   
 Upgrade (£) =  $200 + 15 \times 28 = 620$   
 (4 marks)
- iii) Total cost of units is  
 Simple (£)=  $500 (0 + 5 \times 20) = 50000$   
 Upgrade (£) =  $700 (200 + 15 \times 20) = 350000$   
 Overhead rate =  $100000 / (50000 + 350000) = 25\%$   
 Simple =  $100 \times 1.25 = 125$   
 Upgrade =  $500 \times 1.25 = 625$   
 (5 marks)

### Question 3

3. Suppose that you are the manager of a computer services department in a UK college that is responsible for both management information services and computing facilities for students.
- a) Describe the features that you would expect to provide in order to make the computer facilities accessible to students with disabilities. (13 marks)
- b) Discuss how you would ensure that the college complied with the UK Data Protection Act 1998. (12 marks)

### Examiner's Comments/Answer Pointers

Both parts of this question were answered quite well with students displaying a reasonable knowledge of the adjustments that might be required for disabled computer users, and the UK Data Protection Act 1998. However, there were many poor answers from students who seemed to have little knowledge or understanding of the topics.

#### Part a) [syllabus section 5]

There should be appropriate access to relevant computing facilities for students in wheelchairs. This might involve the installation of ramps or allowing sufficient space for wheelchairs between the desks in computer laboratories. (4 marks)

There should be provision of appropriate assistive technologies, for example screen reader software for blind / partially sighted students, and hearing loops for students with hearing difficulties. (4 marks)

Web based information provided for students should use large sans serif fonts with good contrast between background and foreground text. Navigation of web pages should be clear and straightforward. Images used should have alternative text labels. (5 marks)

**Part b) [syllabus section 5]**

There must be mechanisms to ensure that both students and staff are aware of the provisions of the Act so far as it affects them. (3 marks)

The university should be registered as a data user under the Act and the registration should be up to date. (3 marks)

Appropriate organisational and technical mechanisms should be in place within the university in order to provide an adequate level of security for personal data held. (3 marks)

Requests to view personal data held by the university by data subjects should be dealt with within an appropriate time scale, and any codes used in the data should be translated into plain English. (3 marks)

**Question 4**

4. a) Explain what is meant by a registered trade mark and describe how it can be used to protect against software piracy. (12 marks)
- b) Describe how the scope of Internet domain names differs from that of trade marks and explain how this can lead to conflicts. (8 marks)
- c) What mechanism exists for resolving these conflicts? (5 marks)

**Examiner's Comments/Answer Pointers**

**Part a) [syllabus section 6]**

This part of the question was generally answered well with students showing an understanding of trademarks and software piracy.

A trade mark is a name or other sign that distinguishes the goods or services offered by one company from those offered by other companies. A trade mark is registered by submitting it to the appropriate authority (in Britain, the Patent Office), which maintains a database of registered trade marks and will check that it cannot be confused with existing trade marks. (6 marks)

It is a criminal offence to produce, sell or offer to sell, import or export goods with an unauthorised trade mark. By registering a trade mark and displaying it prominently both on any packaging in which the software is delivered and on the screen when the software is loaded, a company ensures that any convincing copy of the software will infringe its trade mark and thus anyone trading in the pirated copies will be guilty of a criminal offence. (6 marks)

Students generally answered this part and the following part badly, apparently because they knew little about domain names.

**Part b) [syllabus sections 6 & 7]**

Domain names are unique. Any given domain name can only be used by one organisation in the world. In contrast, the owner of a trade mark only has rights over it in a particular country or region. Furthermore, these rights only apply to the class of products for which it is registered. Thus, if company A holds a trade mark for soft drinks, it is possible for company B to register a similar trade mark for lathes, because there is no danger of confusion. (4 marks)

Conflicts arise when a company that owns a trade mark finds that another company owns the domain name that corresponds to the trade mark. This may happen innocently, e.g. because the second company owns the rights to the trade mark in another region or for a different group of products, or it may be done deliberately ('cyber squatting') by a company that has registered the domain name in the hope of being able to sell it to the trade mark owner. (4 marks)

**Part c) [syllabus section 7]**

Following a report produced by the World Intellectual Property Organisation, ICANN, the body responsible for assigning domain names, has adopted a policy called the Uniform Domain Name Dispute Resolution Policy, which provides for arbitration when conflicts arise. It has specific provisions for dealing with cyber squatting.

**Question 5**

5. a) It is not enough for an organisation of any size to merely support anti-discrimination legislation. Three courses of action are required of an organisation to ensure effective compliance with anti-discrimination legislation in the workplace. Briefly describe EACH of the THREE courses of action. **(10 marks)**
- b) Identify THREE important features of the Sex Discrimination Act 1975. **(9 marks)**
- c) Through the use of examples, explain the meaning of the terms *direct discrimination* and *indirect discrimination*. **(6 marks)**

**Examiner's Comments/Answer Pointers**

**Part a) [syllabus section 5]**

This part of the question was poorly answered by the majority of candidates. Only 10% of respondents described the THREE courses of action required. A further 10% incorrectly answered the question by providing an explanation of the Sex Discrimination Act, Race Relations Act and Disability Discrimination Act.

- Publish a suitable written policy, publicise it and make it freely and easily available. (4 marks)
- Deliver a training programme for both new and existing staff, to ensure all are aware of the policy and its objectives. (3 marks)
- Develop procedures for the implementation and on-going running of the policy. (3 marks)

**Part b) [syllabus section 9]**

The majority of respondents identified ONE or TWO important features, only about 15% identified THREE.

The main five are as follows; marks were awarded for other appropriate answers.

1. It is unlawful for an employer to discriminate against a person on grounds of their sex or marital status in terms of the arrangements made for recruitment and selection, and the terms on which employment is offered.
2. It is unlawful for an employer to discriminate against an employee on grounds of their sex or marital status in regard to opportunities for promotion or other benefits.
3. It is unlawful for an employer to discriminate against an employee on grounds of their sex or marital status in regard to dismissal or redundancy.
4. It is unlawful for an employer to victimise an employee for bringing a complaint of sex discrimination or for giving evidence in support of another employee's complaint.
5. It is unlawful for a trade union, a professional body, a registration authority, an employment agency or a provider of vocational training to discriminate against a person on grounds of sex or marital status. (3 marks, each for three of the above five)

**Part c) [syllabus section 5]**

This part of the question was well answered by 60% of respondents. The remainder were clearly unfamiliar with the concepts and produced imaginative but wrong answers.

Direct discrimination occurs when one person is treated favourably over another because of their sex, race or other such attribute. Indirect discrimination occurs when an employer imposes the same conditions on everyone, but has a disproportionate effect on one group.

**Question 6**

6. a) Job specialisation is aimed at increasing work efficiency. However, it does not necessarily improve job performance. Explain why this is so. **(10 marks)**
- b) What are the main strengths of Management by Objectives (MBO), when used to measure the performance of employees? **(7 marks)**
- c) Management by objectives is not suitable for measuring the performance of ALL occupations. One such occupation is that of software engineer. Explain why the job of software engineer may not be suitably measured by applying the system of MBO. **(8 marks)**

**Examiner's Comments/Answer Pointers**

**Part a) [syllabus section 9]**

This part of the question was answered very well by the majority of candidates.

The problem is that job specialisation ignores the negative effects the content of the job has on the job holder. Job specialisation leads to narrow and tightly defined jobs which in turn leads to boredom, poor performance, unsatisfied employees and ultimately high staff turnover. All of these effects impact negatively on job performance.

**Part b) [syllabus section 9]**

This part of the question was answered very well by the majority of candidates. A small minority of respondents failed to gain marks because they gave only an explanation of appraisal systems, but did not state the main strengths of MBO.

MBO enables an employee's performance to be measured precisely, objectively and quantifiably. Consequently, there should be no surprises for superiors or subordinates at appraisals.

**Part c) [syllabus section 9]**

There were a wide variety of answers to this part of the question. Good arguments were put forward by about 70% of candidates, while approximately 30% of arguments were not that convincing (e.g. because software engineering is a profession, there is no need to set objectives for software engineers).

Not all objectives for a software engineer can be easily specified in precise, objective and quantifiable terms. E.g. setting specific targets based on lines of code produced could result in poor quality software, rather than good design leading to good quality software.