

**THE BCS PROFESSIONAL EXAMINATION  
Diploma**

**April 2002**

**EXAMINERS' REPORT**

**Multimedia**

This paper required the candidates to attempt four questions from a choice of six. Most candidates gave reasonable answers but some struggled to communicate in a concise and coherent manner. One general thread that ran through many candidates' answers was a lack of knowledge of multimedia from a practical viewpoint - candidates could explain theoretical concepts but failed to identify applications or account for the practical steps involved in their use.

**Question 1**

1. (a) **What do you understand by the terms e-publishing and e-book?** (5 marks)
- (b) **You have been asked by the managing director of a small traditional publishing company to give an introductory talk to the Board of Directors on the importance of multimedia in the modern world. They are particularly keen to know what multimedia is, the areas where it might be applied both now and in the future and the hardware requirements for producing and viewing multimedia materials. Explain the main elements you would include in your talk and produce some example slides.** (20 marks)

**Answer Pointer**

- (a) The student would be expected to define e-publishing as publishing in electronic format of material typically or traditionally published in paper form (newspapers, journals, articles, books etc.) and e-books as electronic books either on a computer or, more recently, on a PDA-type device. (5 marks)
- (b) This can be tackled in a number of ways. Most sensibly the student would give an outline of a presentation with a general overview of multimedia and hardware needs and a more specific section dealing with multimedia publishing. The likely breakdown of marks would be:
- General definition of multimedia and general application areas  
5 marks
  - Existing and future application areas relevant to publishing (5 marks)
  - Hardware requirements (MPC, plus web-based server systems) (5 marks)
  - Example slides (e.g. outlines or storyboards) (5 marks)

**Examiners' Guidance Notes**

Although the answers to this question were generally good, some candidates assumed this to mean publishing only via the Internet and therefore missed the broader definition.

## Question 2

2. (a) Briefly define each of the following terms and acronyms:

- **Bitmap and vector graphics**
- **Image compression and storage**
- **SVGA and XGA**
- **AGP and TFT**

(8 marks)

(b) There is a very large range of available formats for still graphics representation and storage. Which are the main formats? Which formats are you most likely to use for a multimedia application which is to be delivered on the Internet? What software and hardware tools can you use to capture, create, and edit your images? Justify your choices.

(17 marks)

### Answer Pointer

(a) Bitmap and vector graphics

- *graphic representation using a pixel map*
- *representations and coordinate drawing based systems*

Image compression

- *algorithms to reduce bitmap image data size and access time*
- *loss-less and lossy compression techniques*

SVGA and XGA

- *Super and Extended VGA (Video Graphics Array)*
- *Resolutions of 800 X 600 (256 colours) to 1024 X 768 (16/24-bit colour)*

AGP and TFT

- *Advanced Graphics Processor (or a specialist graphics processor)*
- *Thin Film Transistor (or active flatscreen technology typically found on notebooks)*

(8 marks)

(b) This question is fairly open. A wide range of formats, platforms and tools could be mentioned. A likely breakdown of marks would be:

Main formats: BMP, PIC, TIFF, GIF, JPEG, PNG, etc. (5 marks)

Internet Formats: probably GIF, JPEG or maybe FLASH (small image size and fast download times PLUS HTML/browser support)

(4 marks)

Hardware/software: scanners, digital cameras, graphics tablets, scanning software, paint packages, drawing packages, photo editing/enhancement (e.g. TWAIN scanning software, MS Paint, Adobe PhotoShop, Macromedia Flash) (8 marks)

### Examiners' Guidance Notes

This was a popular question and was answered well by nearly all candidates.

### Question 3

3. As a multimedia programmer you are provided with a digital video camera, some original video footage in VHS tape format, a CD-ROM of music and sound effects and a PC with on-board analogue and digital video capture hardware and software. You are then asked to put together a CD-ROM-based half-hour training video to explain to beginners the principles of video capture and editing. The video will include fresh footage of a lecturer explaining the process, together with short sections of VHS video footage showing the end product.
- (i) Which is the preferred source and format of video for both quality and ease of inclusion? Explain your reasoning. (8 marks)
- (ii) What are the stages you would go through to produce the video? (9 marks)
- (iii) What are the key points you would expect the lecturer to explain in the video? (8 marks)

#### Answer Pointer

- (i) Probably digital (from the digital video camera) because the video is already digitised; CD-ROM requires the video to be in a digital format such as AVI or MPEG. The process of converting from an analogue source (such as VHS) is both time consuming and likely to lead to loss of image quality. However if only quarter-screen low quality video is needed, if the VHS tape already has the appropriate footage or if the material cannot be conveniently re-shot in digital form then the VHS tape might be the only sensible source. (8 marks)
- (ii) Stages are likely to be: production planning, shooting video, video capture, video editing from the technical side; planning the content, storyboarding the scenes, creating the script, collecting the assets and content, assembling the content (authoring) from the pedagogical design side. These two sets of task need to be inter-linked at appropriate points. (9 marks)
- (iii) Nature of digital video and how it works, video playback and CODECs; examples of video capture using a video capture package (e.g. Adobe Premiere); example of video editing techniques using an editing package (e.g. Premiere); worked example. (8 marks)

#### Examiners' Guidance Notes

Few candidates attempted this question. Those that did displayed little understanding of the concepts and stages involved and therefore many did not achieve even half of the marks for the question. This would suggest that candidates have little practical exposure to multimedia.

#### Question 4

4. (a) **Highlight the main differences between the multimedia P.C. of today and the business P.C. of five years ago.** (10 marks)
- (b) **“New technology has made the multimedia P.C. redundant.”**
- (i) **Discuss the developments that have given rise to this statement.** (8 marks)
- (ii) **Evaluate the correctness of this statement.** (7 marks)

#### Answer Pointer

- (a) Students could include:
- Processing power
  - Disk space, CDROM and DVD
  - The range of input devices such as graphics tablets, touch screens, pens etc
  - Support for sound, enhanced graphics and video
  - Improved display technology including colour depth and resolution
  - Software support and standards (10 marks)
- (b) Students would be expected to focus on developments such as dedicated hardware including set-top boxes and games consoles. (15 marks)

#### Examiners' Guidance Notes

This was a popular question with the candidates. Most candidates produced good answers to part (a), covering most or all of the issues listed in the answer pointers above, but only the more able gave sensible answers to part (b) - whereas the use of multimedia in devices other than the P.C. eluded others.

#### Question 5

5. **The BCS Symphony Orchestra has commissioned you to produce a web site to promote their concert season. They are obviously confused about audio technology as their initial brief includes the requirement to be able to have fast downloads of high quality extracts from their concerts in midi format. Produce a response which:**
- (a) **outlines the problems with their brief** (8 marks)
- (b) **compares and contrasts the current issues about delivering sound from a web site** (8 marks)
- (c) **makes a clearly argued recommendation about what can be achieved with current technology.**

**(9 marks)**

Answer Pointer

(a) There are several problems with the brief. Live extracts cannot be captured in midi format, as the latter is a synthesised format. There is a tension between high quality and fast. Whilst the length of the extract is not stated, even a few minutes of high quality audio will result in large downloads.

**(8 marks)**

(b) Issues will include bandwidth, various digital formats (e.g. wave, mp3, etc) sampling rates, quality, downloading verses streaming.

**(8 marks)**

(c) Recommended solutions will vary but should address the tensions identified and be consistent with the promotional aspect of the site.

**(9 marks)**

**Examiners' Guidance Notes**

Several candidates failed to spot the problem about midi and lost the context of the orchestra. Some misinterpreted part (c) and discussed general concepts about e-commerce sites. Candidates need to remember to answer the question and not to simply reproduce notes about e-commerce sites.

**Question 6**

6. (a) Explain briefly what you understand by the term streaming multimedia. **(5 marks)**

(b) Outline the problem that streaming seeks to address. **(6 marks)**

(c) What are the principle limitations of current streaming technology? **(8 marks)**

(d) Describe TWO current applications of streaming. **(6 marks)**

### Answer Pointer

- (a) Streaming is a method of delivering multimedia content - often over the Internet. (5 marks)
- (b) Multimedia artefacts are large and therefore, with limited bandwidth, download times are long. Streaming allows the user to listen to or see the file as it is downloading. (6 marks)
- (c) Students could include bandwidth, network bottlenecks, congestion, lack of standards. (8 marks)
- (d) Current popular applications include broadcasts from radio stations, movies, concerts and conferences. (6 marks)

### Examiners' Guidance Notes

Surprisingly, this was not a particularly popular question. It was the last question on the paper so it is possible that not all candidates read through the paper before making their question choice. Given the widespread use of streaming, it was amazing that some candidates struggled to find appropriate current applications.