Answers

1. Smith and Sons is an accountancy firm that has around 500 employees, each with their own networked computer.

Each employee needs to send and receive email. They also make use of cloud accounting software to view and update their client’s business accounts.

Telephone calls are made via the Internet using handsets.

(a) The company makes use of the HTTPS protocol for the cloud accounting software and SMTP for sending email. Explain **two** other network protocols that the company
will be using. [4]

POP3 / Post Office Protocol 3 (1) for receiving email (1)

IMAP / Internet Message Access Protocol (1) for receiving email / having synchronised mail on many devices (1)

VoIP / Voice over Internet Protocol (1) for making telephone calls (1)

HTTP / Hypertext Transfer Protocol (1) for viewing web pages that don’t contain private/personal/confidential information (1). Note: the use of HTTP must be for a use that isn’t confidential. It is not appropriate if it is for use of the cloud accounting software

(b) The company has found that their current connection to the Internet is slow. They have been told that they should get a better connection that improves both their bandwidth and latency.

Explain **two** ways that improving the bandwidth and latency could affect the
companies use of their cloud accounting software. [4]

**Bandwidth improvement:**

This allows more data to be transferred per second / Mbps (1) which will mean that there is less data queued / congestion (1) so webpages or the cloud software will work faster (1)

**Latency improvement:**

The time it takes to send/receive data will be reduced (1) so the cloud application will be more responsive (to data entered / buttons selected) (1)

(c) The company has to deal with highly confidential business and personal information when it makes use of the cloud accounting software.

Explain **one** way that the company makes sure the data it transmits is secure. [2]

By using HTTPS / TLS / SSL encryption (1) the company makes sure the data it sends cannot be read by an eavesdropper / man-in-the middle attack / hacker (1)

2. A software engineering company has offices in London, New York and Beijing. Large program files need to be downloaded for the programmers to use.

(a) The files are often compressed before sending.

Explain why these programs must **not** be compressed using a lossy compression. [2]

A lossy compression method would lose some of the information (1) which would cause the program to incorrectly function / crash (1)

(b) The company has commissioned a photographer to create some digital photos of key employees which will be used on their website.

They are happy for these photos to be given in a lossy compressed format.

Explain why the photographer has been allowed to use a lossy format. [2]

The image will lose some information (1) but the changes will be so small that they won’t be detectable by the human eye (1)

(c) The company will also be putting a marketing video on their website.

Discuss a suitable codec that could be used for the video. [6]

Factors that may affect the codec chosen for the video.

**Compatibility**

The video needs to be in a format which can be easily read/decoded by people who will watch the video

Suitable video formats would be MP4/H.264 which is read by many modern players and web browsers

A number of different formats may need to be produced with different codecs so that a wide variety of players can play the video

**Compression**

The video needs to be compressed by an amount that will make it possible to transfer quickly, but not so much that the quality looks unprofessional
A lossy compression method would most likely give a better compression rate without using important information

**Encryption**

The codec is unlikely to need encryption as the video is likely to not need security measures. If it did need encryption, it may be possible to use place the video in a ZIP file with a password. Alternatively, a format with DRM (digital rights management) could be used.

**Speed of the encoder**

The time taken to encode the video may need to be taken into account, especially when many videos need to be produced.

| **Level** | **Mark** | **Descriptor** |
| --- | --- | --- |
| Level 0  | 0 | No rewardable material.  |
| Level 1  | 1-2 | Technical vocabulary is used but it is not used appropriately to support arguments, in relation to the issues of the question.Issues are identified but chains of reasoning are not made, leading to a superficial understanding.  |
| Level 2  | 3-4 | Accurate technical vocabulary is used to support arguments but not all arguments are relevant to the issues of the question. There is consideration of relevant issues using logical chains of reasoning. Considers the various elements of the question. |
| Level 3  | 5-6 | Fluent and accurate technical vocabulary is used to support arguments that are relevant to the issues of the question. There is a balanced and wide-ranging consideration of relevant issues, using coherent and logical chains of reasoning that shows a full awareness. Carefully considers the various elements of the question.  |

 [Total 20 marks]