COMPUTER SCIENCE

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Paper 3175/12
Paper 12 Theory

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Key messages

This standard of candidates' work continues to improve. There is a continued move to provide questions where candidates have to apply their knowledge, rather than just show their ability to simply remember facts. There is strong evidence that this is producing candidates who are now exhibiting an improved understanding of many of the topics.

General comments

Candidates and centres are reminded that written papers are now scanned in and marked on computer screens by examiners. Consequently, if a candidate writes the answer to a question on an additional page, they must indicate very clearly to the examiner where their revised answer is to be found. Also, if answers have been crossed out, the new answer must be written very clearly, so that examiners can easily read the text and award candidates the appropriate mark.

Comments on specific questions

Question 1

Many candidates were able to provide three suitable sensors. Some candidates gave the same sensor for the first two applications. Candidates are reminded to read the question thoroughly to make sure that they have met the criteria for all parts. The most common correct answers were pressure sensor for application 1, infrared sensor for application 2 and moisture sensor for application 3.

Question 2

Most candidates were able to match the data transmission method to its correct description. The most common incorrect answer was a mismatch of half-duplex and duplex.

Question 3

(a) Most candidates were able to correctly expand the acronym IP to internet protocol. The most common incorrect answer was internet provider.

(b) Many candidates were able to demonstrate the knowledge that an IP address is a unique identifier. Many candidates provided knowledge of the features of an IP address, such as its ability to be static or dynamic, rather than what the question required, which was its role. It would be beneficial for candidates to understand that when they are asked to provide an understanding of the role, they need to provide knowledge about what it is used for and how it is used, rather than the features.

Question 4

Some candidates were able to demonstrate a full understanding of storage media. The most common incorrect answer was removable hard disk drive identified as solid state.

Question 5

Many candidates were able to provide a good understanding of RAM. The most common correct answers were stores data temporarily, directly accessible by the CPU and stores data currently in use.

Question 6

(a) Many candidates were able to provide the correct logic for the truth table. This continues to be a strong point of knowledge for many candidates.

(b) Some candidates were able to provide a fully correct statement. Many candidates were able to provide a partially correct statement. The most commonly missed or incorrect element was the required brackets in the correct places.

Question 7

(a) This question proved challenging to many candidates. It would be beneficial for candidates to have an accurate and technical understanding of the role of registers in the fetch-execute cycle. Many candidates lacked accuracy in their responses. Common inaccuracies were candidates stating that the program counter stores the next instruction, rather than the address of the next instruction. Vague answers stated that data is stored in the program counter, it is then passed to the memory address register and then passed to the memory data register. It would be beneficial for candidates to understand the need for accuracy and technical language when describing the operation of computer architecture.

(b) Most candidates were able to provide all three correct buses.

Question 8

(a) Most candidates were able to provide a correct stage of working, the most common correct stage given being 1024*100. Few candidates were able to provide the correct answer. This was not due to difficulty with the accuracy of the calculation, but due to not understanding the process. It would be beneficial for candidates to have a greater understanding of how to calculate the size of a file in various different contexts and with a range of different units.

(b) Many candidates described how lossy compression would compress the file and not lossless compression. It would be beneficial for candidates to understand how both compression methods accurately reduce the size of the file. Common incorrect answers described removing the colours that cannot be distinguished by the human eye.

Question 9

(a) Many candidates were able to provide accurate descriptions of viruses and hacking. Few candidates were able to provide an accurate description of denial-of-service attack. It would be beneficial for candidates to have a greater understanding of the process involved in a denial-of-service attack. It would be beneficial for candidates to understand that the large number of requests are sent all at the same time. A large number of requests are likely sent to any web server on a daily basis, so it is important, for the level of accuracy for candidates to state that this occurs all at the same time.

(b) Many candidates were able to gain at least half marks for this question. The most common responses were that it made data meaningless if stolen and that data is converted from plain text to cypher text. It would be beneficial for candidates to demonstrate an important aspect of symmetric encryption and that is that it is performed using the same key to encrypt and decrypt.

(c) Many candidates were able to provide a range of benefits for the use of serial data transmission.

Question 10

(a) Many candidates were able to provide the correct binary conversion.

(b) Most candidates were awarded one mark for a correct 9-digit binary value. Some candidates read the question thoroughly and recognised that the binary value required needed to be 10-digit and added the leading zero to create this.

(c) Some candidates were able to provide the correct hexadecimal conversion.

Question 11

Few candidates were able to provide a fully correct response. Many correctly identified the correct descriptions for shareware. Few candidates correctly identified that free software is also subject to copyright. It would be beneficial for candidates to have a greater understanding of the restrictions of free software.

Question 12

(a) Most candidates were able to provide the correct parity bits.

(b) Many candidates were able to state a transposition error or provide it by description.

(c) Many candidates were able to provide the correct bit and byte number.

Question 13

Candidates found this question challenging. Many did not answer the question, instead, describing how a sensor and a microprocessor would be used in the system. Candidates who did gain marks commonly stated that it had a limited number of tasks and no requirement for multitasking or other operating-system functions.

Question 14

Many candidates provided understanding that a proxy server could be used to provide the services to act as a firewall. Some candidates also provided an understanding of further uses of a proxy server. The most common was to cache data and to keep an IP address anonymous.

Question 15

(a) Many candidates were able to provide a suitable use for a 3D printer.

(b) Many candidates could provide knowledge about how a 3D printer operates. The most common correct answers were the creation of the object layer by layer and reference to a type of material that may be used. The most common incorrect responses came from candidates that described the operation of a 3D cutter.