

INFORMATION TECHNOLOGY

Paper 9626/11
Theory

Key messages

A number of candidates showed a good, general, level of understanding though there were particular areas of the syllabus where many candidates demonstrated a lack of detailed knowledge.

On much of the paper some expansion and detail is required. It is not sufficient to give brief answers.

Evaluation requires candidates to make comparisons between different options, including discussing the importance of certain features, weighing up the advantages and disadvantages of different options, and judging their overall effectiveness. It is not sufficient to simply state features or uses.

Questions requiring simple and straightforward answers were done fairly well, while the answers to more demanding questions needed to contain more explanation and evaluation.

General comments

Many candidates were unable to demonstrate knowledge of several areas of the syllabus; in particular, proprietary and open-source file formats. Candidates also found the topics of sorting data in a spreadsheet, and user interfaces to be challenging.

For the tick box questions, some candidates did not put down the required number of ticks. Candidates should be encouraged to answer all of the questions as fully as they can.

Many candidates would benefit from being more familiar with using technical terms when answering questions and from giving more detail in their answers, which were sometimes too vague to gain full credit.

A significant number of candidates would benefit from listing their thoughts about a question in rough before choosing the most relevant points to include in their detailed response, and elaborating on them. Some candidates wrote lengthy answers which gained little credit as they did not contain sufficient points relevant to the question.

Comments on specific questions

Question 1

Candidates did fairly well on this question, with the majority gaining at least partial credit. A number of candidates mistakenly thought that all data could be coded. Occasionally candidates ticked fewer than the four answers requested and were therefore unable to gain full credit.

Question 2

Candidates again did fairly well on this question, although some candidates found it slightly more difficult than **Question 1**. Most of the incorrect answers chosen appeared to be because of a lack of understanding of dot matrix printers.

Question 3

This question was quite well answered, with many candidates gaining at least partial credit. Those candidates who answered the question well had a clear idea of the relationship between data and

information and were able to use the examples given on the Question Paper to clarify their argument. A number of candidates did not refer to the examples on the Question Paper, or only referred to one of the examples.

Question 4

This question was fairly well answered, with many candidates making at least two good points. As the question asked candidates to comment specifically on concerns with students revealing information about themselves, it was important that candidates gave sufficient detail about this. Some candidates gave insufficient detail, instead devoting the vast majority of their response to other problems associated with using the internet.

Question 5

A number of candidates demonstrated a lack of detailed understanding of LANs and WANs. The question required candidates to compare and contrast these types of network so candidates were required to describe the similarities and differences between the two. While many candidates were able to comment on the relative size of the types of network, few candidates made many additional valid points. Many candidates did not take account of the information given in the question that the LAN was part of the WAN of one company.

Question 6

A significant number of candidates did not demonstrate knowledge of proprietary and open-source file formats, and a large proportion of candidates omitted this question. Many candidates just re-worded the question stem. Several candidates thought the answer concerned hardware compatibility so that a file created on a school computer would not open on a home PC.

Question 7

A number of candidates seemed to be unfamiliar with the specific tasks an operating system carries out and were unable to gain credit on this question. Again, a substantial number of candidates omitted the question. The majority of candidates were able to gain partial credit at best. While the vast majority of candidates demonstrated a general overview of operating systems, many candidates did not write about the individual tasks an operating system performs, such as allocating memory to software, sending instructions to printers, responding to input devices, and opening and closing files on storage devices.

Question 8

This question was reasonably well answered with many candidates gaining at least partial credit. Candidates found **part (b)** more straightforward than **part (a)**.

- (a) The stronger candidates were able to describe phishing quite well but the majority of candidates, despite gaining credit for stating that it resulted from a phone call, gave little further information.
- (b) Many candidates did well on this part of the question. The vast majority of candidates identified that smishing arose from using text messages. Several candidates were able to expand upon the message containing a link.

Question 9

Only the strongest candidates gained significant credit on this question. As has been reported in previous years, a high proportion of candidates did well on the practical papers but performed less well on the theory papers. Candidates found **part (a)** to be fairly straightforward but the other parts much more difficult, particularly **parts (c) and (e)**. A large proportion of the candidature omitted **parts (c) and (e)**.

- (a) Most candidates did very well on this question, with many gaining full credit. A number of candidates, however, used circular referencing.
- (b) Many candidates were unable to gain any credit for this question, with weaker candidates repeating their answer to **part (a)**, attempting to use the LOCATE function again.

- (c) Candidates found this question challenging, with the majority not gaining any credit. The stronger candidates were able to realise the need for the RIGHT function to be used but some found it difficult to complete the formula. Very few candidates used the space available for their working.
- (d) Candidates found this part more straightforward but only the stronger candidates were able to fully describe their solution. Those candidates who were successful listed the individual steps required to perform the formatting, as they saw them. Other candidates just described the overall effect of the formatting which gained little credit.
- (e) Those candidates who attempted this part of the question found it quite difficult. A number of candidates did not appreciate the need to highlight the data before carrying out the sort. The vast majority of candidates did as well on **part (ii)** as they did on **part (i)**. There was a very small minority who either repeated their answers and so could not get marks for **(ii)** or, having attempted **part (i)** and gained marks, did not attempt **part (ii)**.

Question 10

Most candidates were unable to describe how microprocessor-controlled systems work. Many candidates only gained partial credit for identifying a sensor and explaining about data being received by the microprocessor.

Question 11

Many candidates did not gain full credit on this question. Candidates tended to do better on **part (a)** than **part (b)**. Again, a large number of candidates did not attempt the question and a fair proportion attempted **part (a)** but did not go on to attempt **(b)**.

- (a) Most candidates gained partial credit, though many did not copy the field names accurately. Indication of primary keys was also a frequent omission. The majority of candidates drew the link and a large number also identified it as a one-many relationship but often in the wrong direction.
- (b) Candidates found this part of the question more challenging. The descriptions seen often gave information about what a relational database consists of but did not describe how to create one. Many of the correct terms were used by candidates but with little understanding being shown.

Question 12

This question was quite well answered by candidates, with many gaining at least partial credit. Most candidates identified length check and format check but some did not go on to give appropriate examples of invalid data. A number of candidates suggested lookup check and range check.

Question 13

Few candidates gained full credit on this question. Many candidates seemed to understand the three types of interface but did not describe the advantages and disadvantages of each. Although many candidates could describe what each one interface consisted of, they were unable to evaluate them.

Question 14

Few candidates gained full credit for this question. However, it was pleasing to see very few candidates using bullet points to answer the question. Many candidates did not take account of the statement 'Apart from e-safety' and elaborated on the risks involved with using the internet. Few candidates concentrated on the help, or otherwise, that the internet provides to candidates for their classwork. Aspects such as the internet tending to be up to date, the internet having vast amounts of information, the potential for students to access biased or inaccurate websites, and it being difficult to decide on the best of many answers provided by the internet, were rarely seen.

INFORMATION TECHNOLOGY

Paper 9626/12
Theory

Key messages

Candidates showed a higher level of understanding than in previous years but many candidates appeared to lack detailed knowledge of some areas of the syllabus.

On much of the paper some expansion and detail is required. It is not sufficient to give brief answers.

Evaluation requires candidates to make comparisons between different options, including discussing the importance of certain features, weighing up the advantages and disadvantages of different options, and judging their overall effectiveness. It is not sufficient to simply state features or uses.

Questions which required a recall response were handled well by most candidates, particularly questions which required one-word answers, though there were few on this paper. Questions that required candidates to apply knowledge and to give accurate and detailed responses proved to be more challenging for candidates.

This paper involves a lot of writing. In order that the Examiner can clearly see and understand what the candidate has written, it is very important that handwriting is not rushed and can be easily read. Rushed scripts and poor handwriting can lead to candidates not being awarded marks as what they have written down cannot be understood.

Many candidates found questions which required higher order thinking skills, and the ability to analyse and evaluate, difficult. Teachers would be well advised to further develop the skills of their learners beyond recalling points of information to enable them to gain better results at this examination level.

General comments

For the tick box questions, some candidates did not put down the required number of ticks. Candidates should be encouraged to answer all of the questions as fully as they can.

Many candidates would benefit from being more familiar with using technical terms when answering questions and from giving more detail in their answers, which were sometimes too vague to gain full credit.

A significant number of candidates would benefit from listing their thoughts about a question in rough before choosing the most relevant points to include in their detailed responses, and elaborating on them. Some candidates wrote lengthy answers which gained little credit as they did not contain sufficient points relevant to the question.

A large number of candidates used brand names for software. Handwriting was sometimes almost illegible, making scripts very difficult to mark.

Candidates must read questions carefully before answering them. See more detail about this for **Question 9** (below)

Comments on specific questions

Question 1

Candidates did fairly well on this question but only the stronger candidates were able to gain full credit. The most common incorrect answers were that 'digital certificates are not used with asymmetric encryption' and 'the use of asymmetric key algorithms always ensures security of a message'. Occasionally candidates ticked fewer than the four answers requested and missed the opportunity to gain marks.

Question 2

Again, only the strongest candidates were able to gain full credit on this question. A significant number of candidates thought that viruses do not delete files and that ransomware continually deletes files. Again, a small minority of candidates ticked fewer than the four answers requested and missed the opportunity to gain marks.

Question 3

Candidates were often able to gain at least partial credit on this question. Many candidates were able to provide a correct type of sensor to be used and managed to include some statements about the use of ADC to convert data. However, many candidates did not explain that the sensors would need to be placed upstream and downstream from the factory. Some candidates thought that humidity and moisture sensors would be used, while a large number of candidates wrote about the computer trying to do something with an actuator.

Question 4

This proved to be the best answered question on the paper. Many candidates were able to define data and information, though candidates found it more difficult to define knowledge. Many candidates referred to the example in the question, explaining that it was either an IP address or a product code.

Question 5

Overall, candidates found this question difficult, with many gaining little credit. Both parts of the question produced a similar type of answer. Where candidates did not answer this question well it was usually because they tended to describe the purpose as being to hide an individual's IP address despite the question clearly asking about company networks.

- (a) Many candidates who read this as a question about networking ignored the security aspect. Many responses relating to the general use of LANs were seen. A large number of candidates described an intranet rather than a VPN.
- (b) Many candidates gained marks for mentioning tunnelling and encryption and some candidates went on to describe SSL and a firewall. Candidates rarely expanded on the use of encryption, and some candidates were not able to demonstrate a depth of understanding of a VPN.

Question 6

Very few candidates gained much credit on this question. Some candidates did not seem to understand what legislators were, apparently thinking they were judges in court cases. Others did not appreciate that the question was about the effects of video conferencing on target groups. Answers tended to be general, and not focused on the actual area, or did not focus on video conferencing, but on video transfer, especially where the focus was on news presenters. The most frequently seen correct answers related to saving on travel costs and travel time. Many candidates were not able to apply their knowledge to the different scenarios presented and appreciate what was specifically different about each of the 3 scenarios.

Question 7

Many candidates found this question difficult and gained little credit, although a reasonable number of candidates achieved credit in **part (a)**.

- (a) A lot of candidates demonstrated confusion about using the correct terminology in answering this question, where they needed to describe the meanings of terms. Many candidates were able to describe a primary key, but a lot fewer were able to describe a foreign key successfully. Very few candidates were able to correctly describe the compound key. Although candidates demonstrated awareness that it used more than one field, they did not clearly state that these were combined to form a unique value.
- (b) A substantial number of candidates omitted this part of the question. Where candidates gained credit, this was generally related to duplication of data. A number of candidates described referential integrity from a practical sense in setting up relationships in a database, rather than explaining the underlying theory and reasons for applying it. Many answers displayed confusion between tables, fields, records and keys.

Question 8

This question proved to be challenging for candidates and only the stronger candidates achieved much credit. Candidates did not seem familiar with the scenario and therefore their answers did not reflect that it was to do with scanning cheques. Most answers were vague, such as OCR being faster than MICR. Answers often did not demonstrate an appreciation of how this system works in the real world. There were very few correct answers for the advantages, though the most common correct answers seen related to accuracy and security.

Question 9

This question produced few fully articulated responses, and few candidates gained much credit. Several candidates wrote about expert systems in general and what they do, rather than basing their answers on the knowledge base and its interactions with other components. A number of answers seemed to reflect candidates attempting to answer based on having learned the answer to a past question, rather than on an understanding of knowledge bases and expert systems. Many candidates gave an overview of an expert system, or general descriptions, but did not produce sufficiently detailed answers explaining the roles of, and interplay between, the knowledge base and inference engine.

A significant number of candidates appeared to have read the question, noted the phrase 'expert systems' and then proceeded to write down as much as they could about expert systems. Careful reading of the question would have caused candidates to realise it was specifically about the knowledge base in such a system.

Question 10

This question was reasonably well answered with the majority of candidates gaining some credit. **Parts (b)** and **(c)** were answered better than **parts (a)** and **(d)**.

- (a) This was a difficult question but many candidates were able to gain some credit. Some candidates managed to gain the mark for /365.25 but others used the ÷ sign or thought that multiplying was correct. Careless syntax was commonly seen, for example leaving off closing brackets or placing the \$ sign after the letter instead of before it.
- (b)(i) Most candidates did well on this question.
- (ii) This was not as well answered as **(b)(i)**. Fewer candidates were able to gain full credit. The most common error was their answer to E17.
- (c) Candidates did a lot better on this part of the question than **parts (a)** and **(d)**, although not as well as on **part (b)**. A common error was using COUNTIF rather than COUNTIFS. There were quite a lot of errors around the correct use of syntax with the criteria. Some candidates transposed the ranges and the values.

- (d) Candidates found this part of the question difficult. Where candidates made errors in the formula, they tended to gain fewer marks than in **part (c)**.

Question 11

This question was quite well answered, with the majority of candidates gaining quite a lot of credit. Most parts of the question were well-answered, but candidates found **part (b)(ii)** difficult.

- (a) There was a mixture of answers to this question, with the full range of marks being seen and most candidates gaining some credit. Some candidates described copying the data into a spreadsheet and then filtering the data there, which demonstrated a confused understanding of the terminology used in the question. Common errors were not correctly stating they were selecting query design, and not selecting the correct table and then the correct fields. Some candidates changed the names of the fields in their answers. Although a lot of candidates were able to describe setting the criteria, others used incorrect terms, such as set validation or filter. A minority of candidates chose to filter rather than design a query so gained little credit.
- (b) (i) Again, there was a mixture of answers, with many candidates who were successful with **part (a)** being successful with this part also. A number of candidates did not appear to know the difference between $<$ and $>$. Some candidates included the Euro sign in the criteria selection.
- (ii) Approximately two fifths of the candidates omitted this question. Very few candidates demonstrated knowledge of a parameter query. There were some candidates who simply copied their answer from the previous question.
- (c) This was fairly well answered. The most common correct answers related to common fields, ISBN and ID being foreign Key in borrowers/books table. Where candidates had included adding a new field, this was not always completed with where the field would be added or how to link the tables.

Question 12

This question was answered quite well. Some candidates did not read the question carefully and gave general answers about validation rather than relating their answers to the scenario presented in the question. Quite a few candidates did not demonstrate understanding and appreciation of the difference between validation and field definitions in a database, with a number of answers confusing these two different elements. The question used the keyword Analyse, and only a few candidates appreciated that they had to both give examples of working validation checks and also to justify why some validation checks might prove to be inappropriate. Many candidates were able to gain only partial credit as they did not discuss why a particular validation check may be ineffective.

Question 13

This question proved difficult for some candidates but many were able to articulate good answers. Most candidates identified the safety aspect and wrote about not damaging real cars. Stronger candidates discussed issues around the fact that different weather conditions could be simulated without having to wait for them to occur in real life. Some candidates also mentioned that there could be overconfidence in drivers due to the ease of driving in a simulation, and that this could cause issues on the road later. Others were able to describe that it is a model and it is impossible to create simulations that accurately reflect human behaviour on the road. Some were able to provide answers based on a lack of data to produce the model.

INFORMATION TECHNOLOGY

Paper 9626/13
Theory

Key messages

Candidates showed a reasonably good level of understanding though there were areas of the syllabus of which many candidates appeared to lack detailed knowledge.

On much of the paper some expansion and detail is required. It is not sufficient to give brief answers.

Evaluation requires candidates to make comparisons between different options, including discussing the importance of certain features, weighing up the advantages and disadvantages of different options, and judging their overall effectiveness. It is not sufficient to simply state features or uses.

Questions requiring simple and straightforward answers were done fairly well, while the answers to more demanding questions needed to contain more explanation or evaluation.

A significant number of candidates are still using brand names for software. There appeared to be a lack of knowledge of technical terms for candidates taking an examination at this level. Some scripts were very difficult to mark because of poor handwriting. This can lead to candidates not being awarded marks as what they have written down cannot be understood.

Many candidates found questions which required higher order thinking skills, and the ability to analyse and evaluate, difficult. Teachers would be well advised to further develop the skills of their learners beyond recalling points of information to enable them to gain better results at this examination level.

General comments

Many candidates would benefit from listing their thoughts about a question in rough before choosing the most relevant points to include in their detailed responses, and elaborating on them. Some candidates wrote lengthy answers which gained little credit as they did not contain sufficient points relevant to the question.

Candidates must read questions carefully before answering. A number of questions required detailed descriptions but candidates often listed the basics or gave a very brief outline rather than including sufficient detail.

Some candidates seemed to have only a superficial knowledge of topics such as financial modelling, the use of codecs static and dynamic parameter queries. While this enabled candidates to gain some marks for a general understanding, they were unable to gain full credit as their responses lacked detail.

Comments on specific questions

Question 1

Candidates did fairly well on this question, with the majority of candidates gaining at least partial credit and many candidates getting full credit. Where candidates did not gain full credit, it was often because they incorrectly thought that SSDs store more data than magnetic tapes. A number of candidates did not attempt this question, so were unable to gain any credit.

Question 2

Candidates did well on this question with most gaining at least partial credit. Options 4, 5 and 6 were usually answered correctly but there was no clear pattern to the incorrect answers. All candidates attempted this question.

Question 3

Candidates did quite well on this question, with many gaining some credit. The vast majority of candidates were able to explain that static data would not change. Many also had the idea that it would not go out of date. Some candidates mentioned that static data would generally be accurate or reliable but did not explain why this was the case.

Question 4

Candidates did not do quite so well on this question, with the majority gaining little credit. Few candidates demonstrated sufficient knowledge of what sampling resolution was. Many candidates confused it with sample rate. Where marks were awarded it was usually because candidates had written that the higher the sampling resolution was, the larger the file size or the better the quality of the sound. Some candidates gave both answers.

Question 5

Overall, candidates tended to do fairly well on this question. **Part (a)** was answered quite well but candidates tended to do less well on **parts (b), (c) and (d)**.

- (a) There was a lack of accurate definitions for software. Few candidates were able to describe system and applications software, sometimes confusing the two terms. They were often, however, able to provide examples. Many candidates did not gain marks as they used brand names instead of general terms for types of software.
- (b) Candidates did not do as well on this part of the question. The benefits of off-the-shelf software were not fully understood. Many candidates made correct observations but did not expand a brief statement in order to gain the mark. It was often noted that the software was generally cheap, or bug-free, but an explanation of why this is the case was not included. Some candidates mistook off-the-shelf software with freeware.
- (c) Again, this part proved to be challenging for candidates. Many were unable to describe the drawbacks of off-the-shelf software, with the majority of responses demonstrating only a superficial knowledge of the topic.
- (d) Candidates did slightly better on this part of the question. Verification, as a concept, was generally understood, though a number of candidates were unable to gain marks by describing the process by which it is carried out. Proofreading was often incorrectly used as an example of verification. A few candidates confused verification with validation.

Question 6

Candidates found this question difficult, with very few candidates gaining significant credit. A lot was written about the basics of spreadsheets such as them containing rows, columns and cells. Some candidates wrote about spreadsheets performing calculations such as adding up. Very few candidates provided reasons why specific characteristics of spreadsheets would be suitable for financial modelling. Candidates did not mention absolute and relative cell referencing, cell protection, macros or and automatic recalculation so were also unable to relate these functions to financial modelling.

Question 7

This question was also not well answered, with few candidates gaining more than minimal credit. Very few candidates appeared to have studied or understood the concept of codecs. Candidates tended to confuse codecs with cryptography and thus wrote answers which were irrelevant. Others thought that using codes to represent data was what was being asked for. A few talked about compression and data transmission.

Question 8

This question was reasonably well answered overall, but there were differences in how well each part was answered. **Part (b)** was answered much better than **parts (a)** and **(c)**.

- (a) Most candidates displayed a general understanding of the concepts required to answer this question but were not careful enough with their use of technical language. The question asked how candidates would create a relational database, so specific instructions were expected. Many candidates gained credit on this question. However, a few candidates did not gain credit due to using field names inaccurately.
- (b) Candidates did very well on this part, with the majority of candidates gaining at least half marks. The most common errors were due to them not knowing the difference between < and > and using speech marks inappropriately in the Engine criteria.
- (c) Although many candidates gained at least partial credit, the topic proved difficult for some. Candidates often did not produce a well-structured answer to this question. A number of candidates were very uncertain about the definitions of the validation checks they put forward, confusing, for instance, range check with length check and type check with format check.

Question 9

This question was quite well answered with many candidates gaining at least partial credit. Most candidates achieved good marks for **parts (a)** and **(b)** but **part (c)** proved to be difficult for candidates.

- (a) Many candidates gained the mark. Many candidates made the answer more complicated than it needed to be by not using the range C4:E4. A number of candidates did not notice the word 'function' in the question and were unable to gain full credit as they did not use a function.
- (b) Candidates did very well on this part of the question. Some candidates gained fewer marks than they could have because they omitted speech marks and/or did not place enough closing brackets.
- (c) Very few candidates were able to give the AVERAGEIFS() formula correctly. Various alternative formulae were provided, some of which were able to gain partial credit but rarely gained full marks. However those candidates who understood AVERAGEIFS() often gained full credit.

Question 10

Candidates found this question challenging. It was pleasing to see very few candidates using bullet points to answer the question. A few candidates understood the distinction between peer-to-peer and client-server networks. These responses, however, often did not gain full credit as the discussion was based on putting an argument for one and then the opposite for the other. Many candidates displayed confusion as to which had the higher security, and whether the failure of a workstation would affect the entire network.

Question 11

This question proved to be the most challenging on the paper, and a large number of candidates omitted this question. Candidates who did answer often confused this question with **Question 3** about static data. Very few correctly identified the difference between dynamic and static parameter queries. They did not go on to describe sensible uses of them. Many candidates thought that it was the data in the database that was static or dynamic rather than the query.

INFORMATION TECHNOLOGY

Paper 9626/02
Practical

Key messages

Candidates would benefit from:

- more practice in converting video and audio files from one common file type to another.
- being more precise with the timing of objects within their video clips.
- more familiarity with applying their theoretical knowledge to practical tasks.
- examining the given data files in greater detail when instructed to do so.
- a better understanding of database normalisation to 3NF.
- more practice and experience in ensuring there is no unnecessary duplication of data within their normalised database.
- a better understanding of good practice in the design and construction of a database table.

General comments

A significant number of candidates did not submit all the required files in the specified file types. Some candidates omitted one or more of the required files to be submitted for assessment, or submitted the containers for their working files but not the finished product (for example: files were submitted in .wlmf format, which is a container holding pointers to individual component files stored on a local (or networked) drive). When these files are uploaded the contents cannot be viewed. Similarly, a number of candidates did not apply the principles of normalisation to their databases, often including duplicate tables, relationships built from queries rather than tables and not removing duplicate or redundant data from within their tables.

Comments on specific questions

Question 1

Almost all candidates created a new video with the required image ratio. A few candidates did not set the image ratio of the software to 16:9. Some candidates did not produce videos of a professional standard as they did not set the video (or background size) to fill the entire window. A significant number of candidates removed the start of the video clip, but this was not removed to start at the specified time. Most candidates set the length of the first video clip to 10 seconds.

Question 2

Most candidates successfully took a snapshot of the first frame of their video to provide the background for the start of the video, although a significant number did not edit this image to include a transparent version of the coat of arms as shown in the question. A number of candidates placed the coat of arms so that it touched the outside edge/top of the image. The coat of arms did not always appear on this title background, but was seen in many different places.

Question 3

The title background was not always displayed for the required 10 seconds with a significant number of candidates leaving this to their editing package's default 7 seconds.

Question 4

The text was frequently added as shown, although a number of case errors were seen. On some occasions the text did not appear as shown in the question in terms of; font size, font-style (sans-serif) and/or text position. Some candidates did not follow the instruction to add appropriate animation to this text. Some candidates chose an inappropriate animation from the brief given, such as scrolling from the bottom to the top of the screen as the instructions asked for it to be in the top left hand corner of the screen.

Question 5

The snapshot of the final frame was frequently correct but not always placed for the required time. Only the stronger candidates produced correct caption text and many candidates did not recognise the purpose of the presentation (which was given before step 1), often citing the date of the future event as 2018 rather than 2019, or the location as their location rather than Ellmau in Austria. Some candidates omitted the instruction to add a different effect to place the caption. A number of candidates did not place their caption clear of the background firework images which meant the text lost its readability. Many candidates used an effect that scrolled from the bottom to the top which overlapped the background image at the top and therefore lost its readability.

Question 6

The second video clip was usually inserted in the correct place with a transition in place, although few candidates set the transition to be 2 seconds in length.

Question 7

Almost all candidates selected an appropriate background image, either selecting a still image from the clips or a dark background that blended with the sky. The majority of candidates displayed this for the required 7 seconds but some candidates included a transition into these frames. Scrolling text often passed over white areas of the background image, decreasing its readability.

Question 8

The video was exported as specified by most candidates with the correct filename into mp4 format. A number of candidates exported their video which was not in the order identified by the steps in the question paper. Some candidates incorrectly saved their video in their package's default format (often as a .WLMP file).

Question 9

Most candidates removed the end of the clip as specified.

Question 10

Many candidates included fade-in and fade-out although a number of candidates did not include fade-in, or a fade-out of appropriate length. Some candidates selected a fade-in at a different point in the audio file, i.e. not at the beginning of the audio.

Question 11

The audio clip was frequently saved as specified. A few candidates did not save the audio file in the correct mp3 format.

Question 12

Most candidates added the soundtrack to the video. Some candidates added the soundtrack at such a low volume that it was barely audible.

Question 13

Many candidates exported the video in .wmv format with the sound track attached.

Question 14

Few candidates exported the video into .avi format. A number incorrectly saved it in another format (like .mp4 or .avi) and changed the file extension to make it appear as a .avi file. These files would not run due to the file formats.

Question 15

Many candidates did not examine the data files thoroughly before starting the task. The forename and surname data were reversed in the two data files but many candidates did not change this prior to merging the data. The age and date of birth columns were not compatible. The evaluation of the suitability of the two data files was often very limited, perhaps indicating that many candidates did not study the data in any depth before creating their evaluations. Candidates tended to concentrate on the differences between a csv and text file, rather than reviewing the data itself and many answers were not in context for the files that were given. A number of candidates omitted the evaluation.

Question 16

Most candidates merged the two files examined in step 15. Not all candidates manipulated the files prior to merging the files. A number of candidates omitted the creation of a venue type code table using the information given in the question. A significant number of candidates created the Employees file, but fewer saved this in comma separated value format. Not all these candidates had aligned the forename and surname data (which should have been identified in step 15) or removed both the age and date of birth data.

Question 17

This question was challenging for many candidates. The concept of normalisation with no duplicated data and the minimal number of tables to attain this, was not applied by most candidates. The most frequent solutions included a Jobs and an Employees table, with a one-to-many relationship between them. Selection of key fields was frequently left to the database package, or ignored completely. The responses to this question frequently showed the lack of application of the theoretical knowledge to a practical situation. At this level understanding normalisation is not enough and candidates should be able to create a database to 3NF. Most candidates successfully saved their database as specified.

Question 18

Of the candidates who attempted this question, many selected the data for the chefs and trainee chefs. Fewer candidates set the row headings as specified or made the database fit-for-purpose by displaying the titles “chef” and “trainee chef” in full as column headings rather than the codes for these occupations. Some candidates correctly identified the count function for their underlying crosstab query, but few displayed the resulting data with gridlines in the specified format.

Question 19

A significant number of candidates incorrectly used product names to answer this question, but many did identify a spreadsheet as an alternative. The more detailed explanation of why a relational database was advantageous to the alternative was not always given, and when it was the answers did not always relate to this original data. Many candidates gave very general answers rather than relating their response to the data they were using.

INFORMATION TECHNOLOGY

Paper 9626/31
Advanced Theory

Key messages

It is imperative that candidates read the information given in the short scenarios so that they can apply their knowledge when answering the subsequent questions. As in previous series, many candidates did not apply their knowledge to the given scenarios or to the context set in the questions so answers were generic or vague. The consequence of this was that, while candidates appeared to know the syllabus content quite well, they did not score the higher marks because their knowledge was not appropriately applied, the questions not answered in sufficient detail, or, in a number of cases, candidates did not answer the question as set.

While many candidates appeared to have good subject knowledge and some good technical descriptions were seen, there were also many candidates who displayed insufficient in-depth knowledge of syllabus topics when answering the questions.

There also appeared to be a number of candidates who looked for, or 'spotted', 'key words' in the question and then proceeded to write answers based on those keywords. Centres are reminded to encourage candidates to read the questions carefully and to apply their knowledge to the scenario in the question. Answering questions without doing so, or writing about a topic with little reference to the question as set, may gain partial credit but will not give access to the full credit available.

General comments

As in previous series, there were a number of candidates who created numbered bullet points or dashed lists for questions that required free responses. Such answers rarely gain much credit. Where candidates are asked to 'explain', 'describe', 'discuss', analyse or 'evaluate' a topic, the use of bullet points rarely produces explanations or descriptions. Candidates who write in sentences and paragraphs tend to gain more credit as their responses are more coherent and contain more evaluation.

The syllabus shows a list of 'command words' that appear in the questions and it explains what each word requires from candidates. It is very important that, when answering questions, candidates read the rubric and answer the question in the appropriate manner.

Candidates should also answer the questions in some detail. Many answers seen were vague or displayed only superficial knowledge, and did not gain much credit. At A Level, candidates are expected to be able to formulate answers that properly convey their knowledge and understanding.

Fewer candidates omitted questions than in previous series. Candidates should always be encouraged to attempt all of the questions.

Comments on specific questions

Question 1

The emphasis of this question was on the saving of bitmap images in different file formats. Good answers focused on why the different formats are used or required rather than just describing the differences, e.g. some graphics software may not support all file types so having different export options allows images to be shared; use of JPEG/GIF is almost universal; bitmap images can be saved as compressed files to save storage space and allow their use in different situations; where transparency or animation is required then a specific file type may have to be used; cross platform use of the images may require the use of particular file

formats. Most candidates could describe the features of different file types but many did not explain why they are available.

Question 2

- (a) Many candidates answered this question well, explaining why the list in Fig. 2.2 was not sorted as expected. A common error was to omit, or more commonly incorrectly give, an example based on ascending or descending letters or numbers. Good answers referred to the Function sort () treating values as strings not numbers and that strings are sorted alphabetically not numerically.
- (b) This question required candidates to write a line of JavaScript code. While there are various ways of sorting a list in JavaScript, and all valid methods were given credit, many candidates did not produce a workable line of code. The most common error was to write out the sorted list in descending order without any code for sorting it. Good answers could have used a suitable variable name along with the reverse() function e.g. insects.reverse().

Question 3

- (a) This question asked candidates to explain what the parts of a line of JavaScript code did. To aid the candidates, the result of the code was also given. Some good answers were seen but many candidates did not give sufficient detail to gain full credit. Each of the three main parts of the line of code had to be explained to score the full marks.

In **parts (b) and (c)**, it was recognised that it is extremely difficult to create completely error-free code under examination conditions.

- (b) This question was quite well answered by some candidates, but many candidates produced unsuitable code. Good answers included the choice of input type, a suitable name, and a line break.
- (c) As for **part (b)**, this question was quite well answered by some candidates, but many candidates produced unsuitable code. Good answers included the choice of input types, correct syntax, and assigned values.

Question 4

- (a) This question was well answered, with most candidates producing good descriptions of the drawbacks of storing company data in the 'cloud'.
- (b) This question was well answered, with most candidates producing good descriptions of the benefits of storing company data in the 'cloud'. Some, however, did not give much more than statements without descriptions so did not gain credit.

Question 5

This question required candidates to describe how data is transmitted using fibre optic technology. However, many candidates incorrectly interpreted this to mean that they should describe the advantages and disadvantages of fibre optics. Good answers included references to how data is modulated onto light waves/pulses and transferred along the fibres.

Question 6

Many candidates did not answer this question well because their answers described photo-editing and what it could do with images but did not relate this to any impacts in politics. Good answers referred to how photo-editing of images can alter images to dissuade or reinforce a belief of the viewer, retouching images of politicians can make them appear more attractive than in real life so more likely to appeal to a voter and how viewers can be unaware that an image has been manipulated so may make decisions based on false information. The question required 'impacts' and not simply descriptions of photo-editing.

Question 7

This question was well answered, with most candidates producing good reasoning based on the information given.

Question 8

- (a) This question required candidates to describe the components of an automated online assistant and how these components provide help to customers. However, many candidates gave answers that focused on the artificial intelligence aspect and did not refer to the other components. Good answers described the dialog system that provides an interface translating human input into digital format, the avatar that appears and represents a 'realistic' assistant that appears when humans ask for help or assistance, and the help or advice that is generated by the system.
- (b) Most candidates could explain the benefits of using an 'automated online assistant' with references to it being available to customers all of the time, the decrease in the number of human assistants required and the customised help it can provide.

Question 9

This question required candidates to evaluate the use of physical security in combatting IT crime.

In this question, 'evaluate' required candidates to discuss the importance of, and weigh up, the advantages and disadvantages and then to judge the overall effectiveness of the use of physical security in combatting IT crime.

While a few candidates described logical measures such as anti-virus software and did not gain credit, many candidates could describe physical security and how it would be used. However, few candidates discussed its effectiveness. Good answers referred to the use of security guards, locks and tethers etc., how these could be effective in combatting crime, and how methods to circumvent these reduce their effectiveness.

Question 10

- (a) Good answers to this question included references to the reduction in the number of frames that need to be drawn which takes less time when producing an animation, and the more fluid movement shown by drawing on 'twos' instead of on 'ones'.
- (b) This question was well answered by most candidates.
- (c) This question was well answered by most candidates, although some stated, inaccurately, that the movement shown in the animation would appear to be slower.

Question 11

Candidates were required to discuss the impact of wearable computers in manufacturing but a few referred to the use of wearable computers in other fields such as medicine. Candidates must read the question carefully. Good answers referred to enhanced monitoring of the manufacturing process, tracking of manufacturing activities, improvement of employee safety, the positioning of devices on the body leading to inaccuracies in the performance of actions, and staff not wishing to be monitored.

Question 12

Most candidates described how virtual reality is used in healthcare but only a few commented on how effective this is or can be. An analysis requires candidates to explain the main points of effectiveness in detail. Good answers made references to, for example, using virtual reality instead of drugs to treat depression, patients role playing in a fantasy world to help manage depression, using VR to train healthcare professionals using simulations because simulations provide a safe and repeatable set of activities, and VR allowing patients to experience an operation before they actually have the procedure thereby being less worried.

INFORMATION TECHNOLOGY

Paper 9626/32
Advanced Theory

Key messages

Many candidates appeared to have good subject knowledge and some good technical descriptions were seen, but there were also many candidates who displayed insufficient knowledge of syllabus topics when answering questions. Many candidates did not apply their subject knowledge to the given scenarios or to the context set in the questions, making answers generic or vague. The consequence of this was that, while candidates appeared to know the syllabus content quite well, they did not gain the higher marks because their knowledge was not appropriately applied, the questions not answered in sufficient detail, or, in a number of cases, candidates did not answer the question as set.

It is imperative that candidates read the short scenarios and the information given in these scenarios very carefully so that they can apply their knowledge when answering the subsequent questions.

There were also a number of candidates who appeared to look for, or 'spot', 'key words' in the question and write answers based on those keywords. Centres are reminded to encourage candidates to read the questions carefully and apply their knowledge to the scenario in the question. Answering questions without doing so, or writing about a topic with little reference to the question as set, may gain partial credit but will not give access to the full credit available.

General comments

There were a number of candidates who created numbered bullet points or dashed lists for questions that required free responses. Where candidates are asked to 'explain', 'describe', 'discuss', analyse or 'evaluate' a topic, the use of bullet points rarely produces explanations or descriptions, and so little credit is gained. Candidates who write in sentences and paragraphs produce responses that gain more credit.

The syllabus shows a list of 'command words' that appear in the questions and it explains what each word requires from candidates. It is very important that, when answering questions, candidates read the rubric and answer the question in the appropriate manner.

Candidates should also answer the questions in some detail. Many answers seen were vague or displayed only superficial knowledge, and did not gain much credit. At A Level, candidates are expected to be able to formulate answers that properly convey their knowledge and understanding.

Fewer candidates omitted questions than in previous series. Candidates should always be encouraged to attempt all of the questions.

Comments on specific questions

Question 1

- (a) Candidates could offer some technical detail about the features but many answers were vague referring to 'faster' or 'bigger' bandwidth or references to 'HD video' without actually answering the question. The question was 'how the features of 4G improve the smartphone's ability to download a video file from the internet'. Good answers described the higher download speeds, higher bandwidths, and reduced latency available over 4G and how these allow smartphones to download video files faster or to improve the user experience when streaming video.

- (b) Some candidates gave good answers to this question. Many, however, repeated their answers to 1(b) without describing the improvements that 5G is supposed to bring to smartphone use e.g. increased reliability and coverage, enhanced user experience due to, for example, almost negligible perceived latency, the use of live, multi-user gaming apps, reliable video calls or conferencing while 'on the move'.

Question 2

- (a) Confusion was seen between the use of lasers and the use of infra-red for transmitting data and some candidates did not demonstrate awareness of the dangers of using lasers. Poor answers stated 'by the military' or 'across spaces' without any descriptions. Good answers included the use between spacecraft in orbit around the Earth, connecting sites across roads or other barriers, or in providing temporary network connections where cabling is not possible.
- (b) Most candidates answered this correctly by referring to the need for 'line of sight' or lack of obstructions in order for a laser connection to work properly. Other acceptable answers included the restricted range due to light beam dispersion if used in open atmosphere or the difficulty in attaining an accurate aim for the beams, especially if sender, receiver or both are moving relative to each other.

Question 3

Most candidates answered this correctly and scored most of the marks available. Common errors were to refer to aspects of the scripts that were not errors or to lack detail in the answers e.g. 'script not opened or closed'. At A Level, it is expected that candidates provide detailed answers e.g. at line 8 the script is not opened so web browser cannot interpret it so add `<script>` to open the script. A closing `</script>` is also required at the end of the script.

Question 4

This question required candidates to analyse the use of focus groups for gathering feedback. When analysing, candidates are expected to explain the main points of effectiveness in relation to the topic in the question. Most candidates could describe what a focus group was and how it operates but few analysed how effective these groups are. Some candidates gave some advantages and/or disadvantages but did not properly apply these or lacked detail to gain full credit. Comments on the effectiveness could have included the validity of outcomes being questionable because the participants may not be independent of the stake holders, or a lack of confidentiality as the participants may be from external sources.

Question 5

- (a) (i) This question was well answered, with most candidates able to draw a fully correct activity diagram using the information given. Credit was given for linking the milestones correctly, showing the task correctly and showing the correct timings for the tasks. Common errors were those of omission e.g. not showing all of the timings.
- (ii) This question was well answered, with most candidates able to correctly work out the critical path and calculate its duration.

Question 6

- (a) This question was well answered, with most candidates able to draw a fully correct diagram of the routers and their interconnections from the information given. The most common error was not showing that all the interconnections between the routers were two-way.
- (b) (i) Most candidates answered this question correctly.
- (ii) Most candidates could calculate the shortest route and the time taken along this route but many did not realise that the acknowledgement message had to return to router A and so did not double the time.
- (c) (i) Most candidates could correctly calculate the longest time that could be taken to H but did not realise that the acknowledgement message had to return to router A and so did not double the time.

- (ii) Most candidates answered this question correctly.
- (d)(i) Most candidates answered this question correctly.
- (ii) Most candidates could correctly calculate the new minimum time that could be taken to H but many failed to realise that the acknowledgement message had to return to router A and so did not double the time.

Question 7

Part (a) asked candidates to describe the role of a network interface card while part (b) asked candidates to describe how a network interface card carries out its role. Many candidates muddled their answers to these two questions. The syllabus requires that candidates be able to describe both the role and operations of a number of network components including 'network interface cards'.

- (a) Good answers referred to the provision of access to a transmission medium to allow communications between LANs/WANs. Some candidates referred to the low level addressing at MAC level. Common errors were lack of detail or a description of how a NIC works rather than what it is for.
- (b) Most candidates could vaguely describe how a NIC receives and transmits data but few could provide much detail of the operation. Good answers included the NIC accepting data from the CPU via internal buses, converting a parallel data stream to a serial data stream and vice versa for transmission or/after reception to or from transmission medium and that the data is sent and received in frames.

Question 8

Most candidates answered this question with reference to cropping and rotating or 'straightening' but did not score the full marks available because their answers lacked details of what was cropped or straightened. Few described the transforming of the perspective by the 'stretching' of the image across the top to align the sides of the buildings despite this being the most important aspect of the image correction. Even fewer candidates described the cloning of the curtains in one window for insertion into another. At A level, it is expected candidates are not only able to use the tools in graphic packages but also to describe their use in detail.

Question 9

- (a) This question proved to be difficult for candidates. Good answers referred to opacity with a range from completely opaque to totally transparent and fading a colour from one colour into another colour across the colour palette.
- (b) Again, candidates found this question challenging. Good answers referred to the many colour gradients available in image editing packages e.g. a linear gradient that fills evenly across the image, a radial gradient that fills from the centre outwards along all radii or fills evenly along all radii or an elliptical gradient filling outwards from the centre along two directions away from the centre. There are other gradients that could have been described by candidates. Again, details of the gradients were required to score the full marks.

Question 10

This question required candidates to choose, with reasons, between the use of Bluetooth and the use of cables to connect headphones to a TV to hear the audio when watching a movie. To gain credit, candidates were required to apply their descriptions of the benefits and drawbacks of each method of connection to the use stated in the question. While most candidates could describe the benefits and drawbacks of Bluetooth or cable connections or both, few adequately applied these to the stated use. Some candidates did not actually state their preferred choice which made awarding marks quite difficult. Good answers referred to the trip hazard of cables, the better audio performance of cabled connections, the convenience of Bluetooth, the need to pair Bluetooth devices, and the latency issues with Bluetooth connections and how these affect the choice of connection of the headphones for use when watching movies.

Question 11

This question was poorly answered by most candidates because, while many candidates could describe the use of anti-virus and anti-spyware software, few could evaluate their use for combatting IT crime. An evaluation required candidates not only to give the advantages and disadvantages of the software but to assess the importance of these when combatting IT crime.

Good answers referred to advantages such as the removal of malicious software that could destroy data so this is important to businesses, the protection against spyware that might steal confidential information being important to banks for protecting customer accounts, the protection against redirection of automatic payments to help prevent 'click fraud' that targets vulnerable persons. Disadvantages that were referred to included the need for antivirus software to be kept up to date in order to combat the most recent viruses/malicious software and the need for antivirus software to run all the time which places a performance 'overhead' on a computer system that may make the system unresponsive. Both of these are important considerations for businesses which rely on IT services.

Question 12

Few detailed responses to this question were seen. Some candidates did not appear to know that perpetrators are the attackers and include any person or organisation who carry out the crimes. Many candidates correctly referred to risk analysis but most did not explain the importance of perpetrator analysis and how identifying the perpetrator allows resources to be allocated and deployed.

Question 13

This question required candidates to analyse the need for data protection laws. Candidates were not required to detail the principles of any data protection laws but to explain why these laws are necessary. Good answers described the principles of a set of data protection laws and then explained why these were required and the consequences of not having them enshrined in law and enforced. For example, the fact that data about individuals could be stored without their knowledge so infringing their privacy. Data protection laws are required to regulate this and to provide penalties if the regulations are not adhered to.

INFORMATION TECHNOLOGY

Paper 9626/33
Advanced Theory

Key messages

It is imperative that candidates read the information given in the short scenarios so that they can apply their knowledge when answering the subsequent questions. As in previous series, many candidates did not apply their knowledge to the given scenarios or to the context set in the questions so answers were generic or vague. The consequence of this was that, while candidates appeared to know the syllabus content quite well, they did not score the higher marks because their knowledge was not appropriately applied, the questions not answered in sufficient detail, or, in a number of cases, candidates did not answer the question as set.

While many candidates appeared to have good subject knowledge and some good technical descriptions were seen, there were also many candidates who displayed insufficient in-depth knowledge of syllabus topics when answering the questions.

There also appeared to be a number of candidates who looked for, or 'spotted', 'key words' in the question and then proceeded to write answers based on those keywords. Centres are reminded to encourage candidates to read the questions carefully and to apply their knowledge to the scenario in the question. Answering questions without doing so, or writing about a topic with little reference to the question as set, may gain partial credit but will not give access to the full credit available.

General comments

As in previous series, there were a number of candidates who created numbered bullet points or dashed lists for questions that required free responses. Such answers rarely gain much credit. Where candidates are asked to 'explain', 'describe', 'discuss', analyse or 'evaluate' a topic, the use of bullet points rarely produces explanations or descriptions. Candidates who write in sentences and paragraphs tend to gain more credit as their responses are more coherent and contain more evaluation.

The syllabus shows a list of 'command words' that appear in the questions and it explains what each word requires from candidates. It is very important that, when answering questions, candidates read the rubric and answer the question in the appropriate manner.

Candidates should also answer the questions in some detail. Many answers seen were vague or displayed only superficial knowledge, and did not gain much credit. At A Level, candidates are expected to be able to formulate answers that properly convey their knowledge and understanding.

Fewer candidates omitted questions than in previous series. Candidates should always be encouraged to attempt all of the questions.

Comments on specific questions

Question 1

The emphasis of this question was on the saving of bitmap images in different file formats. Good answers focused on why the different formats are used or required rather than just describing the differences, e.g. some graphics software may not support all file types so having different export options allows images to be shared; use of JPEG/GIF is almost universal; bitmap images can be saved as compressed files to save storage space and allow their use in different situations; where transparency or animation is required then a specific file type may have to be used; cross platform use of the images may require the use of particular file

formats. Most candidates could describe the features of different file types but many did not explain why they are available.

Question 2

- (a) Many candidates answered this question well, explaining why the list in Fig. 2.2 was not sorted as expected. A common error was to omit, or more commonly incorrectly give, an example based on ascending or descending letters or numbers. Good answers referred to the Function `sort()` treating values as strings not numbers and that strings are sorted alphabetically not numerically.
- (b) This question required candidates to write a line of JavaScript code. While there are various ways of sorting a list in JavaScript, and all valid methods were given credit, many candidates did not produce a workable line of code. The most common error was to write out the sorted list in descending order without any code for sorting it. Good answers could have used a suitable variable name along with the `reverse()` function e.g. `insects.reverse()`.

Question 3

- (a) This question asked candidates to explain what the parts of a line of JavaScript code did. To aid the candidates, the result of the code was also given. Some good answers were seen but many candidates did not give sufficient detail to gain full credit. Each of the three main parts of the line of code had to be explained to score the full marks.

In **parts (b) and (c)**, it was recognised that it is extremely difficult to create completely error-free code under examination conditions.

- (b) This question was quite well answered by some candidates, but many candidates produced unsuitable code. Good answers included the choice of input type, a suitable name, and a line break.
- (c) As for **part (b)**, this question was quite well answered by some candidates, but many candidates produced unsuitable code. Good answers included the choice of input types, correct syntax, and assigned values.

Question 4

- (a) This question was well answered, with most candidates producing good descriptions of the drawbacks of storing company data in the 'cloud'.
- (b) This question was well answered, with most candidates producing good descriptions of the benefits of storing company data in the 'cloud'. Some, however, did not give much more than statements without descriptions so did not gain credit.

Question 5

This question required candidates to describe how data is transmitted using fibre optic technology. However, many candidates incorrectly interpreted this to mean that they should describe the advantages and disadvantages of fibre optics. Good answers included references to how data is modulated onto light waves/pulses and transferred along the fibres.

Question 6

Many candidates did not answer this question well because their answers described photo-editing and what it could do with images but did not relate this to any impacts in politics. Good answers referred to how photo-editing of images can alter images to dissuade or reinforce a belief of the viewer, retouching images of politicians can make them appear more attractive than in real life so more likely to appeal to a voter and how viewers can be unaware that an image has been manipulated so may make decisions based on false information. The question required 'impacts' and not simply descriptions of photo-editing.

Question 7

This question was well answered, with most candidates producing good reasoning based on the information given.

Question 8

- (a) This question required candidates to describe the components of an automated online assistant and how these components provide help to customers. However, many candidates gave answers that focused on the artificial intelligence aspect and did not refer to the other components. Good answers described the dialog system that provides an interface translating human input into digital format, the avatar that appears and represents a 'realistic' assistant that appears when humans ask for help or assistance, and the help or advice that is generated by the system.
- (b) Most candidates could explain the benefits of using an 'automated online assistant' with references to it being available to customers all of the time, the decrease in the number of human assistants required and the customised help it can provide.

Question 9

This question required candidates to evaluate the use of physical security in combatting IT crime.

In this question, 'evaluate' required candidates to discuss the importance of, and weigh up, the advantages and disadvantages and then to judge the overall effectiveness of the use of physical security in combatting IT crime.

While a few candidates described logical measures such as anti-virus software and did not gain credit, many candidates could describe physical security and how it would be used. However, few candidates discussed its effectiveness. Good answers referred to the use of security guards, locks and tethers etc., how these could be effective in combatting crime, and how methods to circumvent these reduce their effectiveness.

Question 10

- (a) Good answers to this question included references to the reduction in the number of frames that need to be drawn which takes less time when producing an animation, and the more fluid movement shown by drawing on 'twos' instead of on 'ones'.
- (b) This question was well answered by most candidates.
- (c) This question was well answered by most candidates, although some stated, inaccurately, that the movement shown in the animation would appear to be slower.

Question 11

Candidates were required to discuss the impact of wearable computers in manufacturing but a few referred to the use of wearable computers in other fields such as medicine. Candidates must read the question carefully. Good answers referred to enhanced monitoring of the manufacturing process, tracking of manufacturing activities, improvement of employee safety, the positioning of devices on the body leading to inaccuracies in the performance of actions, and staff not wishing to be monitored.

Question 12

Most candidates described how virtual reality is used in healthcare but only a few commented on how effective this is or can be. An analysis requires candidates to explain the main points of effectiveness in detail. Good answers made references to, for example, using virtual reality instead of drugs to treat depression, patients role playing in a fantasy world to help manage depression, using VR to train healthcare professionals using simulations because simulations provide a safe and repeatable set of activities, and VR allowing patients to experience an operation before they actually have the procedure thereby being less worried.

APPLIED TECHNOLOGY

Paper 9626/04
Advanced Practical

General comments

Candidates seemed well prepared for elements of this paper but most found the problem-solving nature of some tasks challenging. There was evidence of good skill, knowledge and understanding applied to the JavaScript task.

Comments on specific questions

Task 1

Candidates were required to recreate an image of a medical monitor.

Candidates needed to match the dimensions and colours specified in the question and to save these in a scalable vector graphics format. The final image needed to be created from 3 separate images, the casing with the 3D buttons, the metal frame insert and the grid.

Good solutions showed that candidates had taken care to ensure:

- the size and proportions of each image matched the dimensions in the question
- there were consistent outlines for the individual elements and images
- the panels in the casing and the metal insert frame were transparent
- the buttons and the text were carefully positioned
- the fill in the metal insert frame had light to dark gradients, left to right and top to bottom
- the lines on the grid were regularly spaced
- the elements were carefully positioned to maintain the vertical symmetry.

Most candidates managed to create all the images but there were a few common issues such as:

- the position and spacing of the buttons
- the transparency of the panels in the casing and the metal insert frame
- the gradient fill of the metal insert frame.

The configuration and adjustment of gradient fills is a skill which candidates clearly found challenging and many only filled the frame in one direction. This is an area centres could prioritise in planning future coverage of this topic.

Task 2a

In this task candidates were asked to animate an image of a wave trace continually traversing the grid.

Good solutions showed the trace repeatedly travelling from left to right without any obvious restart.

A key element of the task was using a mask so the wave trace image only showed on the grid.

Many candidates managed to submit an animation where the trace looped continuously but very few managed to create a mask. Even fewer candidates created a mask with sufficient accuracy to ensure the wave trace showed exclusively on the grid.

The use of masks in an animation is another important skill that centres should consider prioritising in plans to cover this topic.

Task 2b

Candidates were asked to consider the use of IT in Medicine and Healthcare. Most candidates seemed to have good knowledge and understanding and listed relevant uses, advantages and disadvantages. However, many described what was essentially the same use in different categories. The use of databases, for example was often described in more than one category and with more than one advantage or disadvantage. Stronger candidates were aware that each use needed to be discrete, and addressed these as an advantage and disadvantage once.

Task 3

The first part of the task required candidates to insert a new worksheet into the workbook provided, import some data and develop a method to manipulate the data into a uniform format. This was essentially a problem-solving task and it seems that whilst most candidates had the necessary spreadsheet skills many may not have had enough experience of problem-solving scenarios. Candidates would benefit from more focus on this aspect.

A large number of candidates used a new workbook. This meant many attempted the required manipulation in the wrong worksheet. The instructions in the question were clear but it seems that many candidates did not appreciate the hierarchy of the workbook/worksheet terms.

In general, the manipulation of the data was only done efficiently by the strongest candidates. However, many more achieved the desired results and used a wide variety of methods and formulae.

An efficient solution was one that could be used to configure new data without manual manipulation. A few candidates realised that this would involve determining the position of the 2 character Supplier code within the old Stock Keeping Unit, (SKU) and extracting the elements using MID() and RIGHT() formulae. They could then use an IF() formula to concatenate the elements in the required order.

There were a number of solutions that could work in this way. Two examples are shown below.
 e.g. 1

	A	B	C	D	E
1	SKU	Description	Units per case	New SKU	
2	SKU#Av411560	Deluxe Gauze	8000 units per case	SKU#Av411560	
3	SKU#Av411561	Deluxe Gauze	20 units per case	SKU#Av411561	
4	SKU#Av411559	Deluxe Gauze Sponges- 1cm Non-Steri	8000 units per case	SKU#Av411559	
5	SKU#303807Du	Gauze Pad/ 1cmx1cm/ 12 ply/ Sterile	50 units per case	SKU#Du303807	
6	SKU#303806Du	Gauze Pad/ 1cmx1cm/ 12 ply/ Sterile	60 units per case	SKU#Du303806	
7	SKU#304016Du	Gauze Pad/ 1cmx1cm/ 12 ply/ Sterile/	24 units per case	SKU#Du304016	

e.g. 2

	A	B	C	D	E
1	SKU	Description	Units per case	New SKU	
2	SKU#Av411560	Deluxe Gauze	8000 units per case	SKU#Av411560	
3	SKU#Av411561	Deluxe Gauze	20 units per case	SKU#Av411561	
4	SKU#Av411559	Deluxe Gauze Sponges- 1cm Non-Steri	8000 units per case	SKU#Av411559	
5	SKU#303807Du	Gauze Pad/ 1cmx1cm/ 12 ply/ Sterile	50 units per case	SKU#Du303807	
6	SKU#303806Du	Gauze Pad/ 1cmx1cm/ 12 ply/ Sterile	60 units per case	SKU#Du303806	
7	SKU#304016Du	Gauze Pad/ 1cmx1cm/ 12 ply/ Sterile/	24 units per case	SKU#Du304016	

Other successful methods used by candidates to determine the position of the Supplier codes included the use of FIND(), SEARCH(), TYPE(VALUE()) and CODE() functions.

Where candidates were able to design a single formula that worked for both varieties of the SKU full credit could be given.

The second part of the task involved copying the data and New SKU to the Revised MediStock Data worksheet. Since many candidates carried out the manipulation in this worksheet to start with, credit could not be awarded for this operation.

The task then required candidates to use a formula to extract the Supplier code from the New SKU and lookup the Supplier Name from the Suppliers worksheet.

Extracting the Supplier code could be done using a single MID() formula if the SKUs were consistent.

Many candidates used a VLOOKUP() formula to display the Supplier Name. However, this was not an efficient solution since they had to change the order of the columns in the Suppliers worksheet. At this level, efficient solutions are required. In this case an efficient solution should make it possible to add new supplier data without manually manipulating the order of the fields. Few candidates recognised that use of the INDEX(), MATCH() combination was needed.

Task 4

In order to prepare the data source file, candidates had to examine the conditions required in the merge document. Again, a problem-solving approach was needed. The application that the source data was prepared in was not important, but candidates needed to realise that there was a need to parse the "Contact_Title Forename Surname" field. Candidates were asked to show screenshots of methods that were not obvious from their solutions in their evidence document. Many candidates could not gain credit for their method of parsing the field because they did not record their method. It was also clear that a number of candidates must have separated the title and names manually.

The merge document itself was fairly straightforward. However, many candidates did not pay enough attention to the required formatting of the date field and the contents and layout of the address block. Candidates should ensure they pay attention to details and specifications in questions.

The most elegant solution to setting the conditional field was a nested IF{ } statement with the new Forename field as the default option.

e.g.

```
Dear { IF { MERGEFIELD Contact_Title } = "Unknown" "Sir/Madam" "{ IF { MERGEFIELD Contact_Title } = "Dr." "{ MERGEFIELD Contact_Title } { MERGEFIELD Forename } { MERGEFIELD Surname }" "{ MERGEFIELD Forename }" }
```

However, in this case there was not really any efficiency issue, so a linear solution was equally acceptable.

e.g.

```
Dear { IF { MERGEFIELD Contact_Title } = "Unknown" "Sir/Madam" "" } { IF { MERGEFIELD Contact_Title } = "Dr." "Dr. " "" } { IF { MERGEFIELD Contact_Title } <> "Unknown" "{ MERGEFIELD Forename }" "" } { IF { MERGEFIELD Contact_Title } = "Dr." "{ MERGEFIELD Surname }," ", }
```

The required exclusion of three of the ten suppliers could be achieved by the use of SKIPIF conditions, but many candidates either filtered the recipients in the application or deleted the 3 letters after the merge.

As in the preparation of the data source, unless candidates used SKIPIFs or showed screenshots of filtering the recipients in their evidence document, credit could not be awarded. Candidates would benefit from further guidance in determining what elements of their solutions may need to be recorded in this way.

Few candidates proofread the merged letters. Candidates should be made aware that manually correcting errors in the merged letters is acceptable.

Task 5

The task required candidates to test the webpage provided and determine any errors in the <script> section. After correcting the code, they then had to explain any errors and describe their solution in their evidence documents.

The key to understanding the error was to realise that JavaScript was treating the numbers entered as text. Candidates then had to add some code that could use the entries as numeric and perform the sum.

The simplest solution was to multiply each value by 1 and sum the new values in a third variable.

Most candidates were well prepared for this task and produced a variety of acceptable corrections, with most also adding valid annotations to the script.

In conclusion

For this session, the main issues for centres to bear in mind seem to be:

- developing the problem-solving skills of candidates
- ensuring candidates are aware of the need carefully match the size, shape, position and proportions of images shown in the question paper
- making sure candidate are aware of the importance of paying close attention to any specifications detailed in tasks
- the need to provide more experience for candidates in using and adjusting gradient fills
- the need to provide more experience for candidates in using masks in an animation
- making sure candidates are aware of the need to use efficient solutions such as those that could be used to configure new data without manual manipulation
- that candidates may need guidance to determine what elements of their solutions may need to be recorded in an evidence document
- the need to extend spreadsheet LOOKUP methods to include the use of INDEX() and MATCH() functions.