INFORMATION TECHNOLOGY

Paper 9626/11 **Theory**

Key messages

Candidates must not use trade names in the examination. Where trade names are used, these will be ignored, and the answer read as if the trade name was not present. Where the trade name has been given for a piece of software, for example, and the software type has not also been given in conjunction with the trade name, this removal of the trade name usually renders the given answer meaningless. In many cases, where candidates have given trade names, the points made by the candidate would have earned marks had a software type, rather than a trade name, been used.

Candidates are reminded that answers need to be legible. Whilst the number of illegible answers remains very small, and every effort is made to read them, where answers can not be read, examiners are unable to give marks.

Candidates are also reminded that this examination is intended to assess their knowledge of Information Technology to a high level of understanding. Therefore, it is a reasonable expectation that candidates will be able to use technical terms from across the syllabus accurately and employ suitably technical terms in their answers. Terms such as 'sketchy websites', for example, in an attempt to identify possible sources of viruses, are not acceptable at this level.

General comments

Relatively few candidates sat the exam, and so it is worth remembering that the following comments are based on a small sample of answers.

In general, candidates seemed poorly prepared for the examination and unable to deal with some of the questions that focused on more technical areas of the syllabus. Very few candidates were able to use the CASE ENDCASE structure for the algorithm question and there was little understanding of the concept of indexed sequential access.

As is usually the case, a number of candidates decided to not attempt questions. This is understandable, especially when the concept is a difficult one, but individual questions tend to be structured so that they have a variety of levels of demand within them. In effect, questions tend to have a range of answers, some of which may be considered more accessible than others. This is especially true of questions that carry more marks. Therefore, candidates should be advised to attempt to answer all questions. Whilst they may not know the whole answer, they may still pick up some of the more easily accessed marks that are available within a question.

The use and understanding of key words remain incredibly important for this examination. Many candidates failed to differentiate between, for example, questions where they were asked to describe and questions where they were asked to explain. Similarly, some candidates seemed not to understand the importance of 'evaluate' as a command word, and so gave a one-sided answer.

Finally, candidates should be reminded to focus on the context of a question. If the question is set within a particular context, candidates need to consider the opportunities and restrictions that this context provides and structure their answers accordingly.

Comments on specific questions

Question 1

This question focussed on data and information. Candidates were asked to both describe and give a piece of data for question 1a and to describe and give a piece of information for **Question 1(b)**.

Both questions were answered quite well, with the majority of candidates achieving full marks across both questions. However, worryingly, a small, but significant number of candidates achieved no marks for either question.

Question 2

This question asked candidates to identify four factors which can affect the quality of information,

In effect, this question was a test of memory recall, as whilst the answer did not require precise wording, it was looking for four one-word answers

The majority of candidates achieved at least two marks for this question, with a sizeable minority achieving four marks.

Question 3

This question required candidates to focus on the role played by computer processing in an automatic stock control system. Automatic stock control systems are listed as one of the potential areas of focus in section 1.5 of the syllabus, with specific focus on the steps involved in such a system.

Despite this, candidates showed little understanding of the process, with some simply focussing on stock control as a concept, and totally ignoring the role of computers in that process. Other candidates described systems where a product's weight was measured, and so when that weight was taken off a shelf, this triggered a process of reordering. Despite this initial stage being invalid, such candidates were able to be awarded some marks for other aspects of the process.

In general, where marks were awarded, it was for the concept of minimum stock levels being reached and thereby triggering a reorder. However, typically, this was awarded for the concept, rather than a step-by-step description of a process.

Question 4

This question required a technical description of the term 'indexed sequential access'.

This question proved to be extremely challenging to virtually all candidates, with a significant minority failing to attempt an answer. Typically, marks were awarded for stating that each record is given an index and that the system allows for quick searching, but very little other understanding was shown.

Question 5

The focus of this question was on the use of an expert system within a bank. Candidates were told that this system helped customers with financial planning.

The first question focussed on describing the use of four components of an expert system within the scenario of financial planning. Therefore, this question had two separate strands of demand. Firstly, candidates had to know four components of an expert system. As these are generic, this was not expected to present a major challenge to candidates, and this was the case, with most candidates able to identify four components. Where candidates could not, they tended to not know any, which suggested that they had not studied this important part of the syllabus.

Having identified a suitable component, candidates had to apply it to the scenario. This proved a slight increase in demand and did mean that some candidates did not achieve marks for components they had previously identified. In some cases, this was because in attempting to explain the role of a component, candidates showed that they did not really understand the role of that component. Typically, this was the case for the knowledge base and the inference engine. In other cases, candidates failed to apply the use of

the component to the scenario. The ability to answer questions in context is very much a required skill for this course.

However, overall, where candidates had studied expert systems, they did fairly well on this question, but the evidence would suggest that few candidates had studied this topic area.

The second question asked candidates to describe the advantages to the bank of using an expert system. The advantages of any expert system are fairly fixed and so this question was, again, intended to be an exercise in applying knowledge to a scenario. Candidates who answered well, tended to focus on reduced staff costs, reduction of errors and expert systems not needing breaks.

However, some candidates missed the point of the question and assumed that the expert system was used by the bank to then pass on advice. Had this been the focus of the question, more would have been made of this in the scenario.

Other candidates suggested that an expert system can work 24/7. This was not accepted, as a human based system can also work 24/7. The full availability answer differs from the lack of breaks answer, as a lack of breaks means that no cover is required, whereas full availability means the system is fully available.

In general, whilst some candidates did fairly well, most candidates gave answers that were lacking in both focus and detail.

The final question asked candidates to focus on the disadvantages, to a bank, of using an expert system. This question was slightly more nuanced, in that candidates could not simply state that if the system was not working, wrong answers would be given, but needed to realise, for example, that the use of an expert system could lead to bad reviews, or a loss of customers.

As with **Question 5(b)**, there were some very fairly good answers to this question, but many answers were, again, lacking in focus and detail.

Question 6

This question asked candidates to discuss the advantages and disadvantages of using flight simulators.

Candidates showed a fairly good understanding of this topic and, as a minimum, scored at least two marks from the question. Candidates dealt with the need to discuss both advantages and disadvantages well and answers were, in the main, well balanced.

Question 7

This question required candidates to be able to describe the role of both compilers and linkers.

(a)   Candidates either knew this topic, or they did not. Where candidates did know the topic, candidates from across the ability range achieved well on this first question. Whilst some candidates only achieved one mark – typically either for stating that the whole programme is translated at once, or that the program is translated into machine code – most candidates gave full answers that frequently scored at least two marks. However, overall, the majority of candidates failed to score on this question, with many not giving answers.

(b)   In the main, candidates were even less able to deal with this question than for **7(a)**. Where marks were awarded, most understood that a linker joins object files together, and occasionally stated that this then became an executable file, but this tended to be the limit of their understanding. Overall, again, little understanding of the role of the linker was shown.

Question 8

For this algorithm question, candidates were asked to use the CASE ENDCASE structure to write an otherwise relatively straightforward algorithm.

The question highlighted that very few candidates indeed appeared to have any understanding of this structure. Most candidates tried to combine the structure with IF statements, thereby highlighting this lack of understanding.

Where marks were awarded, these tended to be for structural awareness, such as correct use of indentation, or for inputting a number at the start of the process.

Question 9

Candidates were asked to evaluate the use of static and dynamic parameters in a query to search a database. This question therefore asked for an evaluation of both types of parameter.

This question proved fairly demanding for all candidates. Candidates tended to know the difference between static and dynamic data but failed to be able to evaluate the use of such data. Where candidates were successful, they focussed, for example, on the flexibility that a dynamic data search allows, so the database could be searched for values that may change away from what may be expected. In a scenario such as the one used here, where a database holds details about customers, the ability to search for a range of areas, or street names, for example, would indeed be a benefit. Due to the way in which the question was asked, candidates were then able to give a converse argument for static parameters and score further marks. Some candidates did this to great effect, but candidates who looked at the issue from both sides were relatively few.

Question 10

This question focussed on methods by which data could be kept safe from unauthorised use. This is a subtly different question from asking 'what is meant by the term encryption' and required candidates to understand how the stated aim of each method is achieved.

(a)   The first question was about the use of encryption. A relatively easy first mark was given for any answer that stated that the data is scrambled. Many candidates achieved this mark. Two further marks were then dependant on this answer. The second of which was for the implication of data being scrambled, which is that scrambled data is useless. This statement was, effectively, the answer to the question, with the previous marks being the part of the answer that allowed this explanation to be given. This is itself is straightforward. However, the first of the two dependant answers was more demanding. Previous instances of this and related reports have stated that encryption does not make data unreadable. The data is encoded, but is still, fundamentally, readable. Rather than making data unreadable, encryption puts data into a state whereby it can not be understood.

Many candidates made the point that encrypted data can not be understood, but an approximately equal number stated that encrypted data could not be read, and were not awarded marks.

(b)   The second question focussed on the use of a firewall. The vast majority of candidates had little technical understanding of how a Firewall works. Some gave descriptive answers about what a Firewall does, whilst others attempted technical answers, but tended to be too vague, and described files being looked at to see if they allowed, or other, similar and equally vague answers.

INFORMATION TECHNOLOGY

> **Paper 9626/12**
> **Theory**

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General comments

As is usually the case, a number of candidates decided to not attempt questions. This is understandable, especially when the concept is a difficult one, but individual questions tend to be structured so that they have a variety of levels of demand within them. In effect, questions tend to have a range of answers, some of which may be considered more accessible than others. This is especially true of questions that carry more marks. Therefore, candidates should be advised to attempt to answer all questions. Whilst they may not know the whole answer, they may still pick up some of the more easily accessed marks that are available within a question.

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Finally, candidates should be reminded to focus on the context of a question. If the question is set within a particular context, candidates need to consider the opportunities and restrictions that this context provides and structure their answers accordingly.

Comments on specific questions

Question 1

This first question focussed on the use of a relational database by a building company.

(a) The first question required candidates to describe what is meant by a foreign key. The question was worth two marks and therefore required two separate comments.

The majority of candidates scored at least one mark on the question, with approximately 30 per cent of candidates achieving both marks. However, just under 40 per cent of candidates did not

achieve a mark for the question. Of the candidates who failed to achieve full marks, the most frequent issue was a lack of clarity in their answer. Typically, this was due a lack of clarity about the existence of the foreign key in both tables. Answers such as 'it is a field that is linked to a primary key' were considered too vague as the concept of 'linking' was not clear enough.

(b) The second part of the question explored the concept of referential integrity.

  (i) Despite requiring a straight definition of a concept with which candidates should be familiar, many candidates either failed to answer this question, or gave answers that were incorrect. The extent to which some answers were incorrect suggests a lack of coverage of the term.

  (ii) This question then deepened the study of referential integrity by asking candidates to explain why referential integrity is important. As may be expected, a similar proportion of candidates did not answer this question as did not answer the previous question. However, overall, of those who attempted the question, candidates were marginally more successful.

  Typically, candidates tried to answer this second question by explaining what referential integrity does. In some cases, had the answer they gave for **Question 1(b)(ii)** been given for **Question 1(b)(i)**, they would have been awarded marks. To some extent, the issue with the answers to this question was one of a failure to understand what was required. When asked to explain the importance of a concept, candidates should focus on what positives arise as a result of the concept being enacted or used.

(c) The final part of the question assessed candidates' understanding of what a relational database is. This question was answered with far greater success than the previous two. Of all candidates, a little over 50 per cent of candidates achieved 3 or more from the question, with a significant number achieving full marks.

Question 2

This question assessed candidates' understanding of super computers, specifically in the role of weather forecasting.

Some candidates gave generic answers about supercomputers and failed to apply their understanding to the context of the question, therefore, these candidates failed to be awarded marks, as the question was clearly set within a context.

Of those candidates who did focus on weather forecasting, marks tended to be low, with very few candidates scoring 4 or more marks.

Typically, marks were awarded for descriptions of the use of sensors, and of data to make predictions.

Of the most common misconceptions for this answer, two stand out. Firstly, many candidates claimed that supercomputers were able to store a vast amount of data. This may well be the case, but the defining features of supercomputers is their ability to deal with vast amounts of data. The concepts of 'dealing with' and 'storing' differ. This brings on the second issue, which is that candidates are incorrectly stating capacity. Answers claiming that supercomputers dealt with a lot, or even a great deal of data were not awarded, as they did not capture the huge capacity of supercomputers to carry out calculations.

Question 3

This question focussed on the digital divide and how its effects may be reduced, specifically by the Government.

Alongside some very good answers were some claims about the abilities of government to facilitate direct change in markets that did stray too far into the fanciful, and so marks were not awarded. For example, candidates claimed that Governments could pass a law that restricted the price of technology for certain groups of the population, or that the Government set up their own business to manufacture and distribute computers. Whilst both solutions have a degree of merit, they were considered to be unlikely to be adopted and so were not accepted.

Despite these issues, candidates did well on the question, with three marks being the mode of marks given.

Question 4

Question 4 was another question that required a degree of technical understanding. Candidates were asked to describe the use of SSL/TLS to ensure data is kept secure.

Many candidates focussed on the use of encryption by the protocols to achieve this end. Whilst this section of the mark scheme only gave candidates a maximum of four marks, many candidates were given marks for identifying that encryption is used, with a further mark being given for a statement that this puts the data in an unusable state. This answer is acceptable, as the focus was on how the protocols kept the data safe. Putting the data in an unusable state is one method by which it may be protected. A further mark was then achieved for stating that both private and public keys were used.

However, other candidates chose to focus on the use of certificates and did so with a fair degree of success. Typically, these answers identified the role of the certificate in order to verify their identity and went on to explain that a handshake had taken place.

Question 5

This question focussed on the use of checksum verification and proved to be very challenging. When asked to describe why checksum verification is used, many candidates chose to describe verification itself, or a different type of verification. Very few candidates understood that checksum verification is used as part of the process of checking that a package has been transmitted properly. Even fewer candidates were able to describe how a checksum was calculated, with the vast majority of candidates failing to be awarded a mark for the question and many candidates failing to answer it at all.

Question 6

This question asked candidates about three types of malware. For each type of malware, candidates were asked to describe the named malware.

Across all three questions, marks were mixed, and while most candidates were able to pick up some marks in each section, only approximately 20 per cent of candidates achieved above 6 marks across all three questions.

For malicious bots, candidates either knew the term, and did well, or failed to score at all. Some candidates identified the range of different roles that bots can carry out or focussed on bots pretending to be human beings on chat sites, with the intention of stealing personal details from those to which they chat.

For rootkit, marks were more mixed. Candidates tended to know that rootkits hide their presence, and some also knew that they installed a series of tools. However, others made claims that were not supportable. Claims about rootkits stealing personal data were not awarded if presented on their own but were awarded if presented as part of an answer about rootkits allowing administrative access.

Finally, candidates were asked to describe a virus. Of the three questions asked, this was answered in by far the best way. Whilst a small minority of candidates did not score, approximately half of all those who attempted the question were awarded two or more marks.

Question 7

For this question, candidates were asked to discuss the advantages and disadvantages of using direct data compared to indirect data. In effect, the question was asking what was good and bad about using direct data, with indirect data presented as a reference against which direct data could be assessed. Candidates therefore did not need to give both sides of an argument for the marks to be awarded. Some candidates effectively wrote what was good about direct data compared to indirect data and then repeated the list, but in reverse structure, so the positive aspects of one became the negative points of the other. As such, this represents bad exam practice, as exam time was wasted.

Overall, few candidates failed to provide an answer for the question, and of those who attempted the question, only about 10% failed to achieve a mark. Typically, candidates scored 3 or 4 marks for the question and focussed on the issues of relevance of data and time to collect. Where candidates stated that collecting direct data was expensive, this was considered too vague, but if candidates identified an area on which money would have to be spent, which would not otherwise be spent, this was awarded.
It was also noticeable that some candidates repeated answers from previous papers for this question.

Question 8

This question focussed on sound editing software and why different tools may be used.

(a)   The first question asked candidates to state two reasons why an audio clip may be trimmed. For the vast majority of candidates, this question posed little difficulty.

(b)   For the second question, candidates were asked to state one reason why two clips may need to be spliced together. Again, this represented very little challenge to the majority of candidates.

(c)   The final question asked candidates what was meant by the term equalisation when applied to audio clips. This question proved to be a challenge for all but approximately ten percent of candidates, and of those ten percent, the majority achieved one mark.

Typically, candidates claimed that audio would all be of the same volume or style, neither of which is correct.

Question 9

The final question explored candidates' understanding of the use of dialogue interfaces. As with question 7, candidates were presented a concept against which this could be compared. In this case, it was gesture-based interfaces.

Overall, candidates did very well on this question. Many correctly identified that dialogue-based interfaces suited users who were paralysed, but was of no use to users who had a speech impediment. Others focussed on the advantage of dialogue-based interfaces being hands free, and so safer in certain circumstances, whilst others noted that the use of dialogue interfaces avoided making what may be socially unacceptable gestures in a public place.

One answer that did cause problems for candidates was that of accents. Candidates frequently claimed that accents were a barrier to the use of dialogue interfaces. This answer was not accepted, as it is incorrect. However, where candidates answered about different dialects or languages causing a barrier to use, this was accepted.

INFORMATION TECHNOLOGY

Paper 9626/13
Theory

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General comments

Some of the more technical questions proved to be a challenge to many candidates. **Question 4** was particularly challenging, whilst answers to **Question 5** and **6a** both suggest that candidates failed to read the question.

As is usually the case, a number of candidates decided to not attempt questions. This is understandable, especially when the concept is a difficult one, but individual questions tend to be structured so that they have a variety of levels of demand within them. In effect, questions tend to have a range of answers, some of which may be considered more accessible than others. This is especially true of questions that carry more marks. Therefore, candidates should be advised to attempt to answer all questions. Whilst they may not know the whole answer, they may still pick up some of the more easily accessed marks that are available within a question.

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Comments on specific questions

Question 1

This first question focused on the use of a relational database.

(a)   This question presented candidates with the entities and attributes of a relational database. Candidates were asked to identify the primary key in the CUSTOMER entity.

      This question proved to be a minimal challenge, as over 95 per cent of candidates gave the correct answer.

(b)   This question asked candidates to identify the primary key in the ORDER entity. Again, this question proved to be little challenge, and over 90 per cent of candidates gave the correct answer.

(c)   The third question followed the pattern of the two previous but asked candidates to identify a foreign key in the ORDER entity. Again, this proved to be a very accessible question, with approximately 90 per cent of candidates giving the correct answer.

(d)   The final question of this group asked candidates to identify the relationship between the CUSTOMER and the ORDER entities.

      This proved more of a challenge to candidates, but still resulted in slightly over 60 per cent of candidates being awarded a mark.

      Overall, these four questions represented a good strong start by the vast majority of candidates.

Question 2

This question assessed candidates' understanding of how people can gain unauthorised access to personal data. The focus of the two questions were firstly pharming and secondly smishing.

Over the question take as a whole, the majority of candidates achieved 3 or 4 marks from a total of 8 available, with some candidates achieving full marks. Within the question itself, candidates were stronger on their descriptions of smishing than pharming.

The difference in performance across the two answers may be explained by the fact that the description of pharming is slightly more technical than that for smishing. Few candidates, for example, stated that pharming uses a piece of software or code that is inserted onto the user's computer, or started that the hosts file is corrupted, whereas, for smishing, many candidates were aware that this occurred through the use of an SMS message and the process that is involved with encouraging the target to give out personal information.

Both questions included a mark based on candidates stating that the user believes themselves to be on a genuine website. Very few candidates gave this key point.

Question 3

This question focused on the use of backward and forward chaining by an inference engine, with candidates asked to explain the differences between backward and forward chaining. When asked to explain differences, candidates are expected to do more than describe the differences, but to also give reasons for why the differences exist.

The majority of answers were restricted to fairly basic descriptions of what forward and backward chaining were and lacked depth. Typically, candidates stated that forward chaining starts with the data, whilst backward chaining starts with an hypothesis, with some going on to state that forward chaining is data driven and backward chaining is goal driven. Very few other answers were seen and answers to the question displayed an apparent lack of in-depth knowledge of the concepts.

Question 4

Question 4 was a further question that required a degree of technical understanding. The question focused on the differences between absolute and relative cell referencing.

Quite a large minority of candidates failed to answer this question and of those who did attempt it, very few achieved any marks. Whilst one may expect that those who fail to answer a question would score poorly overall, what is interesting about this question was that candidates from across the ability range failed to answer it.

Across the answer, answers were generally poor. In a few cases, it seemed that the candidate had some understanding of the concept, but expressed themselves poorly and so were not awarded the mark. However, the majority of candidates simply did not have sufficient understanding of the concept to answer the question in sufficient depth.

Question 5

Candidates were given a range of information about a database used by a college. Candidates were asked to describe three validation rules that may be applied to the database, and for each validation rule, state why the validation rule may still allow inaccurate data to be entered.

While candidates generally understood the concept of validation rules, many struggled to apply the concept to specific examples like candidate numbers and examination scores. Simply stating the validation rule without providing concrete examples was insufficient.

Secondly, some candidates gave rules, but then did not apply these correctly. Specifically, many candidates who identified a range check as a validation rule that could be applied, then described a limit check and so could not be awarded a mark.

When asked to provide a reason why inaccurate data may still be entered, a significant number of candidates failed to read the question properly, and instead chose to state why the validation check would stop invalid data from being entered.

Overall, just under 25 per cent of candidates failed to give a valid answer for the question, whilst the majority of candidates who gave a valid answer, were awarded 2 or 3 marks.

Question 6

This question focused on the use of data logging and computer systems to monitor pollution.

(a)   Approximately half of all candidates failed to give an answer worthy of any marks for this question. Candidates across the ability range seemed ill-prepared for a question on this topic. Where marks were awarded, this was usually for candidates identifying that a sensor was used within the process. However, few candidates described the use of sensors, or of data logging, in any great depth.

(b)   This question was, to some extent, a variation on a theme that had been explored in previous iterations of this exam. Some candidates continued to misread the question, and focused on conditions within the factory, describing how, for example, the heat could be monitored within the factory, whilst others interpreted the question correctly and gave some fairly strong answers, albeit resulting in a mode mark of three being given.

In questions such these, that focus on advantages and disadvantages, candidates are expected to take generic answers and apply them to the context. The failure of candidates to do so was one of the features of this question.

Question 7

Candidates were asked to draw a flowchart to describe a program.

The improvement in the ability of candidates to answer such questions over the past few series is one of the foundations on which the sustained increase in candidates' marks is based. Candidates from across the ability range showed a good deal of analysis, clarity of thought and understanding of the topic to produce some very accurate flowcharts.

While questions about flowcharts and pseudocode often test a range of skills, easier marks are generally accessible, making it disappointing to see some candidates choose not to attempt this question.

Question 8

This question focused on video editing software and why different tools may be used.

(a)   The first question asked candidates to explain why credits may be used with a video. Judging by the answers seen, one of the biggest challenges for this question proved to be answering the question without repeating the word 'credit'. That having been said, most candidates understood that the reason why credits were given was so that those involved could be identified. However, as candidates were expected to explain the reason, candidates could only achieve full marks if they also stated why those involved needed to be identified. Where candidates realised this, they stated that this allowed those involved to be praised. However, relatively few candidates gave this extension.

(b)   For the second question, candidates were asked to explain why a still image would be extracted from a video. Most candidates who were awarded marks identified that a still image would be used as a thumbnail or as part of the advertising for the film. From that initial point, extra marks could be achieved for an explanation of why such an image may be used. Typically, candidates stated that an iconic still image from the video may attract more people to watch the video. This answer was a suitable explanation of why a still image may be captured.

(c)   The final question asked candidates why a video clip may be exported in a different format. Answering this question required a higher degree of technical understanding of the topic and this was reflected in the candidates' answers. In some cases, candidates were able to identify that different software allowed different tools to be used, or was supported by different platforms, but other candidates focused on speed of transfer, or other irrelevant features.

Question 9

This question focused on the role of a microprocessor in controlling the operation of a car park barrier.

Candidates were told that the barrier opens automatically when a vehicle approaches and closes when the vehicle is clear.

Answers involving sensors often highlight a degree of misunderstanding by candidates. Candidates will often state that a sensor detects the presence of, for example, a car, and send a signal to the microprocessor to take an action. As has been stated in previous iterations of this report, this is not the case. Whilst it is true that sensors gather data, the microprocessor is the device that makes any decisions about what the data represents. A microprocessor, for example, may take signals from a sound sensor and only take action when the signal exceeds a fixed value. The sound sensor, or any other sensor, acts solely as a data gathering device.

Answers to this question were mixed. A small but significantly large group of candidates seemed to be answering a previously asked question on a related topic, and so achieved few, if any, marks. Typically, these candidates answered a question about identifying how much space was available in a car park, or about how sensors in a car may ease the process of parking.

Where candidates did focus on the required area for their answer, most were able to describe how a sensor could detect the presence of a car. In most cases, candidates then described how this presence would be read by the microprocessor and action taken by the microprocessor as a consequence. As stated above, some candidates incorrectly argued that the sensor took action.

Overall, this topic is one that suffers from a degree of misconception that has a significant, negative, impact on candidates' scores.

Question 10

This final question asked candidates to describe the benefits and drawbacks of using the csv format to save data.

It was clear from the candidates' answers that most were aware of the format and were able to describe both what it was and, also, what may be considered the negative impacts of using the csv format. Typically, this focused on the lack of formulae and formatting.

However, fewer candidates were able to describe positive aspects. Where positive aspects were identified, these tended to be the cross-platform compatibility of the csv format.

INFORMATION TECHNOLOGY

Paper 9626/02
Practical

Key messages

For this examination, the main issues to note are as follows:
- Candidates need to understand the requirements of a conceptual entity relationship diagram.
- Candidates need to understand the components and requirements of a data dictionary and apply this knowledge to the data provided in the source files for the scenario presented.
- Candidates need to make sure the database table they create precisely matches the details documented in their data dictionary.
- Candidates need a better understanding of the conventions for naming tables and fields within a relational database.
- Candidates need a better understanding of applying appropriate data types to fields in a database.
- Candidates need to examine the supplied data files carefully and take greater care to make sure data is not duplicated in order to normalise the database to third normal form (3NF).
- Candidates need to understand that a simple data entry form should be created based on a table rather than on a query.
- Candidates need to annotate their data entry form with clear instructions to help the user complete the form correctly.
- Candidates need to use appropriate labels, field sizes, layout and white space in their data entry form to improve the presentation and make it user-friendly.

General comments

Some candidates performed well when setting up their database, but they did not always use their data dictionary to create the specified table.

Most candidates performed well on the audio editing task.

Comments on specific questions

Question 1

Many candidates did not appear to understand that a conceptual ERD has no data types, field lengths or primary keys identified. Most candidates used appropriately drawn rounded rectangles for their ERDs. Most candidates correctly identified three tables for the database although some included a link table which was not required for this data. Most entity names were correctly placed inside the rectangles at the top with the attributes listed below although many candidates used attribute and entity names with spaces in them.

A few candidates had attribute names that were far too long, although most candidates used short and meaningful names for both entities and attributes. The relationships between the entities were rarely correct, many candidates showed relationships between specified attributes rather than just between the entities and fewer candidates used the correct notation on the relationship lines (especially the use of the trident for the many symbol) to indicate the one-to-many relationships. Candidates who did correctly indicate the relationship types, often transposed these with one from the Order entity and many to the Stock and Customer entities.

Question 2

Many candidates successfully created a data dictionary for the stock data. Most added field names that were suitable although some candidates included either very long field names and/or spaces in their field names which were not suitable for this purpose. A significant number of candidates did not identify the table name. Few candidates included all the data dictionary requirements such as field names, data types, field sizes, input masks, validation rules and key fields.

Of those candidates who set field lengths some attempted to set them on numeric fields which was not appropriate. Few candidates were accurate in the maximum number of characters for each alphanumeric field, which should have been determined by the data supplied. Where candidates identified input masks, again the number of characters in the input mask was not always identified correctly.

Very few candidates were successful in identifying all the appropriate validation rules for the appropriate fields.

Question 3

Not all candidates identified the three tables required to create the database to 3NF. Some erroneously included link tables, in an attempt to create many-to-many relationships, or duplicated one or more of the tables. A small number of candidates attempted to place the order details into more than one table, and others split the customer details into several separate tables The most significant errors and omissions were in using the data dictionary from step 2 to create the stock table.

Very few candidates used the same components that they had specified in their data dictionary such as table name, field names, data types, field lengths and primary key fields. Even fewer candidates did so with their validation rules and input masks. These methods of restricting data entry were often partially attempted but it appeared that the supplied data files were not examined in sufficient detail to elicit appropriate candidate responses. An example of this was that few candidates identified that there were only three metals, five item types and six different stones used in the jewellery, or that the validation for the stones data had to allow a null string as some jewellery items contained no stone.

Table names were usually appropriate, although some candidates used the j24 prefix, had field names of excessive length or included spaces which were not appropriate for database development.

Where candidates had created the correct three tables, one-to-many relationship types were usually created between the correct fields although not all candidates applied referential integrity to **only** the relationship between the customer and order tables. This again would appear to be due to lack of careful examination of the data files provided as some items of data in the stock table had not yet been ordered by customers but would need to be retained within the database.

Question 4

This proved challenging to many candidates with a significant number making no attempt to create a data entry form. Among those who did attempt it, not all used appropriate form names or titles. A crucial oversight was the lack of user instructions, which are essential for any data entry form to ensure users understand what to enter and where. Field labels with shortened names are insufficient for this purpose.

While most candidates correctly based their forms on the stock table, some forms were incorrectly based on a query or included unbound controls. Additionally, many candidates failed to consider the layout and presentation of their forms, resulting in inappropriate field sizes and excessive or inconsistent white space.

Question 5

This step was performed well by the majority of candidates who attempted it. Most candidates removed the silence at the start of the clip, many also set the speed of the clip as specified. The majority of candidates mixed the stereo tracks down into a mono track. Most candidates exported the file with the correct file name in .mp3 format but very few set the track title to **left** during the export process.

For the second export into .ogg format few candidates had reduced the volume of the track so that the waveform showed a quarter of the original volume although most candidates exported this in the correct file format or used audio conversion software to change their exported file into .ogg format.

Question 6

The majority of candidates successfully added reverb to the voice track and most of these candidates also added a 'silent' 10 seconds to the start of the clip. Most candidates exported the clip in the correct format but occasionally case errors were seen in the file name.

Question 7

Candidates who successfully completed steps 5 and 6 generally performed well on this question. Fade-in and fade-out effects were typically applied as specified. However, some candidates submitted a mono track instead of the required stereo output, preventing the awarding of marks for left-channel effects or the correct right-channel file. Many candidates used the 2-second fade-out at 25 seconds and trimmed the clip to end at 27 seconds, as instructed. While the export step was often completed correctly, a few errors occurred in the file names.

INFORMATION TECHNOLOGY

Paper 9626/31
Advanced Theory

Key messages

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General comments

Centres must ensure that candidates target their answers to the questions as they are written and not at 'key' words in the questions. For example, **Question 8** asked candidates to justify the use of the client-server model in the scenario which was about the requests of services by web browsers from web servers. The question was not about the server per se but about why the client-server model is used to access the server's services and web pages. Candidates need to carefully read the whole question before attempting to write their answer.

Adequate descriptions or explanations cannot be made in short, brief, bulleted statements so candidates should be encouraged to write answers in proper sentences. Analyses, discussions and evaluations should be in free response with full sentences so as to properly answer the question. Further, if these answers are shown in a sketched table, they do not properly answer the question as there is, for example, no discussion.

Candidates should apply their knowledge to the scenario in the question set because the full range of marks is only available to candidates for answers referring to the question scenario. For example, **Question 10** was about the benefits and drawbacks to individuals of using chat rooms and not about the benefits and drawbacks to businesses or governments.

Comments on specific questions

Question 1

Answers to this type of question have to be accurate and precise to gain the marks.

(a) Most candidates correctly described 'iteration' as 'repeating' but few could add anything further for the second mark. As a 'method', a good answer expanded on the concept of 'repeat' by describing that it goes through the elements of an array one at a time. A common mistake was to repeat the wording of the question e.g. it 'loops through code'. Answers that repeat the question are not given credit.

(b) Common mistakes on this question was to confuse the actions of the types of loops. Good answers correctly explained e.g. that in a `do…while` loop the condition is at the end of the code block so the code is always executed at least once. Answers that explained the converse were also accepted e.g. in a `while` loop the condition is at the start of the code block so the code block may never be executed.

(c) The most common mistake was, again, to confuse the actions of the types of loops. A good answer was accurate and precise e.g. a while loop is used when the number of iterations is not known beforehand or the converse: in a for loop the number of iterations is already determined.

Question 2

This question was about the use of stroke and fill settings in computer animation. To gain the full marks, answers should have contained specific, separate references to both stroke and fill as the settings affect different aspects of objects. Good answers referred to stroke settings affecting the outline and fill settings affecting the contents of text, the object given in the scenario of the question, and expanded to describe how each of these could be altered using the settings.

Question 3

Evolutionary prototyping develops a working prototype of e.g. the interface that has only the basic functionality and extra features are added as development proceeds. Throw-away prototyping creates a working version of the new interface. After testing and reviewing, the prototype interface is discarded and a new one created. Candidates were not asked to describe either type of prototyping but to describe the consequences of using them for creating a prototype of a new interface. While many candidates could distinguish between the two types of prototyping, a significant number confused the two with the result that their answers were inaccurate. When answering this type of question candidates are expected to be able to use their knowledge and understanding as well as recalling facts.

(a) Most candidates described the greater involvement of the user and that the user requirements are more likely to be met as advantages.

(b) Most candidates described extended development times or a reluctance to stop developing as a disadvantage.

(c) Most candidates mentioned that prototypes are created quickly and that the system requirements are clearly understood as advantages.

(d) Most candidates described the wastage of resources e.g. time or money when the prototypes are discarded as a disadvantage.

Question 4

Vision enhancement is designed to provide visually impaired persons with images of their surroundings in order to enable them to better navigate and enjoy their surroundings either for work or pleasure. While some candidates had an understanding of vision enhancement, many could not accurately describe the benefits of the technologies. Common errors included stating that 'it enables blind people to see' or 'it restores colour vision to colour-blind people' without the necessary accuracy to make these statements worthy of credit. The question placed the vision enhancement in the scenario of health care, so candidates were expected to target their answers to its use in or by e.g. hospitals, health centres, doctors and surgeons. Although some general answers were deemed acceptable as health care examples e.g. the use of smart glasses with augmented reality to overlay details of environmental features or to change the colours of signs so that a wearer is more safe or mobile. Vague answers that referred to vision enhancement outside health care were not usually given credit. There was also confusion between the use of vision enhancement and augmented reality technologies. It is accepted that there is considerable overlap but they are not the same technology.

The command word 'discuss' requires answers be in a structured format, so it is important that candidates write in free-response and avoid bulleted, short answers in lists. Answers should make a point in a statement and then expand with further information e.g. *vision enhancement is used by surgeons or doctors when carrying out surgery so that the surgery can be less invasive and more precise which improves the speed of the patient's recovery.*

Question 5

This question was about the limited range of Wi-Fi connections. Some candidates interpreted a wireless access point (WAP) as a 'router' and wrote about these so did not gain credit.

(a) Answers referring to the absorption of radio waves by solid materials, e.g. obstacles such as the materials in walls, were commonly seen as was the attenuation (in air) of radio waves over

distance. These were awarded credit. Few candidates, however, pointed out that local regulations usually restrict the power of the radio transmitters in WAPs, and in devices, to a low level which has a significant effect on the range of Wi-Fi connections.

(b) Despite not mentioning it in an answer to part **(a)**, some candidates correctly suggested increasing the power of the radio transmitters used for Wi-Fi connections. The most common answers, however, were to remove or avoid obstacles and install repeaters (boosters) or more WAPs. The introduction of more WAPs (or the use of repeaters) was given credit despite not being strictly accurate because this increases the *area of coverage* not the *range* of a particular connection. Also, it is an accepted means of extending Wi-Fi throughout buildings. A very common mistake was to suggest using a cabled connection instead of Wi-Fi. While this is also an accepted method of extending a *network*, it does not answer this question.

(c) This question was about ethernet technology. References to routing and the use of IP addresses are not correct. Good answers referred to its better security compared to wireless technologies and its ability to offer high rates of data transfer. When answering this type of questions, accuracy and precision in the response is required to gain marks. Vague answers such as *'it's faster than Wi-Fi'* do not gain credit.

Question 6

This question was about *how to* construct or draw a system flowchart rather than what a flow chart is used for. Descriptions of e.g. the use of lines and arrows to show the routes through a system, various symbols (with some examples) to represent inputs, outputs, process and events in a system were all given credit. Common mistakes were to incorrectly describe the meaning of a symbol or to describe how a system flowchart is used when developing a system – this did not answer the question. Accuracy and precision in answering the question is necessary to gain access to the full range of marks.

Question 7

This question was about the creation of a data mining model. Many candidates incorrectly answered the question by describing details of the search for fraudulent activity by the bank or by describing how the model discovered credit card fraud rather than the creation of a data mining model for this purpose. A common mistake was to concentrate on the detection of the fraudulent activity and how the bank could deal with the fraudsters.

A good answer to this question would have been to first identify the stages in the creation of a data mining model i.e. business understanding, data understanding, data preparation, data modelling, evaluating, and deployment and then to describe the processes that happen at each of the stages. For example, at the business understanding stage the requirements of the model and its justification are established, at the data understanding stage the data sets that are to be collected is identified and so on for each of the stages. To gain access to the full mark range, it was not necessary to identify and describe every stage in extreme detail but it was necessary that answers included sufficient details of the overall process.

Centres are advised to ensure that their candidates, when answering these types of questions, focus on the requirements in the actual question line and then target their answers to the scenario in the stem. In this case the question is *'describe the process of creating a data model'* and the scenario is *'detecting fraudulent activity in the use of credit cards'*.

Question 8

This question was about client-server networking and why it should be used. This type of question not only requires a detailed knowledge of the topic but an understanding of the command word. The command word '*justify*' requires answers to support a case so drawbacks do not gain credit unless they are of alternatives. Descriptions of how client-server methods establish a connection to exchange data were not required. A good answer referred to ease of adding clients e.g. new clients such as web browsers can be added without any additional configuration by administrators, control over access, updates and backups is centralised so management is easier, and many different devices can access the server giving users more choice or ease of access.

Question 9

Candidates did not focus their answers about project management software (PMS) on the specifics of the questions.

(a)   This question was about scheduling of project tasks using project management software. A good answer would have referred to PMS tools providing visual representations of e.g. the task sequences, milestones and the durations of tasks along with automatic updating as the project progresses. A common mistake was a lack of detail and precision in answers e.g. *'make sure everything is going to plan'.* Candidates need to demonstrate that they have a depth of knowledge of the topic and can apply that knowledge.

(b)   Most candidates correctly answered this question by referring to the expense of PMS and the extensive training necessary to use PMS as being unnecessary for small projects. Some also pointed out that the time taken to set up and use PMS on a small project may take longer than the actual project itself.

Question 10

Many candidates answered this question well giving numerous benefits and drawbacks of the use of chat rooms for social networking. However, some candidates repeated their statements while others made statements but did not expand upon them, so could not be awarded the many marks. The command word 'discuss' requires candidates to write in depth about a topic e.g. users can carry out other tasks while 'chatting' so their work rate may increase compared to e.g. having telephone conversations or users can give unfiltered opinions that would not be expressed in a live conversation as users do not know each other or are not physically present. A superficial answer such as *'can work while chatting'* or *'can chat more freely'* is not detailed or precise enough at this level. Answers should have been about 'individuals' and not about businesses or organisations.

INFORMATION TECHNOLOGY

Paper 9626/32
Advanced Theory

Key messages

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General comments

Centres must ensure that candidates target their answers to the questions as they are written and not at 'key' words in the questions. For example, **Question 1** asked candidates to describe how a Wi-Fi connection transfers data between devices, but many answers were about the use of Wi-Fi in general, such how to connect, its benefits/drawbacks over wired or even compared to Bluetooth, and not about the actual transfer of data by the connection. Centres are advised to remind their candidates to carefully read the whole question before attempting to write their answer.

Adequate descriptions or explanations cannot be made in short, brief, bulleted statements so candidates should be encouraged to write answers in proper sentences. Analyses, discussions and evaluations should be in free response with full sentences to properly answer the question. Further, if these answers are shown in a sketched table, they do not properly answer the question as there is, for example, no discussion.

Candidates should apply their knowledge to the scenario in the question set because the full range of marks is only available to candidates for answers referring to the question scenario. For example, **Question 7** was about the impact of technology-enhanced learning on the *autonomy* of learners and not about e.g. working from home.

Comments on specific questions

Question 1

This question was about how Wi-Fi connections transfer data between devices. Weaker answers referred to the establishment of the connection, to comparisons between Wi-Fi and e.g. cables or Bluetooth or the use of Wi-Fi by smartphones. These did not answer the question in any detail. Some candidates interpreted Wi-Fi as 'router' and wrote about these so did not gain many, if any marks. Good answers referred to Wi-Fi's use of wireless or radio waves and how the data is transferred using this technology. To score the higher marks, candidates should have mentioned e.g. the use of multiple channels on the (allowed) frequency bands e.g. 2.4/5Ghz which enable high bandwidths to be achieved, the encapsulation of user data in packets and frames and more of the technical details of Wi-Fi such as the use of encryption and the use of MAC addresses.

Question 2

This question was about how colours can be specified using HSL and many candidates could explain this, some in considerable detail. There were good explanations of the hue, saturation and lightness of a colour and its use of codes with examples of HEX values for colours, the ability to define gradients and ranges of colours. However, a common mistake was to confuse the roles of the hue, saturation and lightness values

and their available ranges. A few candidates referred, correctly, to the RGB colour model but some candidates could not define these as red, green and blue.

Question 3

This question was about 2D and 3D computer animation. Some good answers were seen but many answers were vague and lacked detail. A common mistake was to focus on viewer experience e.g. '3D animation is more fun to watch' rather than on the actual differences in the animation. Good answers gave details of the differences e.g. 2D objects lack texture or solidity whereas 3D objects can appear to have texture with solidity. To be able to score the full range of marks, answers must provide details e.g. 2D objects have height and width but not depth whereas 3D objects have height, width and depth, 2D objects do not look realistic in live scenes but 3D objects can be placed into live scenes and appear to be more realistic in their appearance.

Question 4

The question was about the use of JavaScript when developing an interactive website. The question asked about the testing of the script, how interactivity could be added and how the JavaScript code could be made to react to user actions on the web page.

(a) Many candidates could not properly describe white box testing but confused it with black box testing or with testing in general. Further, many candidates repeated the question, writing that 'white box testing is used to test the code'. In general, statements that repeat the question are not given credit. Comparisons with other methods of testing were not required. Good answers included the creation and use of a test plan by those familiar with how the code works, the details of white box testing such as testing every line of code, every branch in the code, and the testing of conditions, calculations and logic in the code.

(b) Most candidates answered this question correctly with an example such as 'add buttons' or the requirement for users to input responses or answer questions. To gain the mark, a user action was required. Weaker answers that described an alert or message on a web page without needing a user response were not given credit because these are informative but not interactive.

(c) References to the use and action of e.g. `onload()`, `onmouseover()` were seen in the good answers that described how JavaScript code could be used to react to HTML events. A common mistake was to describe how JavaScript returned values to HTML code.

Question 5

Data flow diagrams are used to visually show how data moves through a system.

(a) Good answers referred to the purpose as a visual representation of the flow of data through a system, adding details such as a DFD gives designers a better understanding of a system. A common mistake was to repeat the question without any further detail e.g. 'a DFD shows the data flow.'

(b) Most candidates could correctly point out that a level 1 DFD is more detailed than a level 0 DFD but few could add further details to gain a second mark. Additional details such as level 0 does not show data storage whereas level 1 does, or level 0 has only one process whereas level 1 (often) has more than one process. Where questions have a tariff of more than one mark, candidates are expected to add more detail to gain the second mark.

Question 6

Candidates did not focus their answers about project management software (PMS) on the specifics of the questions.

(a) Answers should have focussed on the financial aspects before and during a project e.g. keeping records of all transactions and/or payments relating to a project, showing indirect and direct costs, being able to import and export financial data from other software packages e.g. spreadsheets and the use by managers and accountants to monitor costs. A common mistake was to give vague answers such as 'work out the costs'.

(b)   Most candidates referred to the visual aspect which allows for a better understanding of a project's progress enabling better decision-making, but many answers were vague and lacked detail. Good answers included references to e.g. the organisation of project data to make it more accessible to decision-makers or to the export of data into documentation for analysis by decision-makers.

Question 7

Technology-enhanced learning incudes e.g. MOOCs, CBT, video conferencing which allow learners to take control of e.g. the speed and direction, or route through, their learning. Good answers gave details of these aspects and how this affects the autonomy, i.e. the independence, of the learners. An explanation requires a statement or description followed by a reason or purpose or further expansion of that statement e.g. technology allows learners to take control over when they learn because it is not directed by a teacher as it is in traditional classroom, face-to-face teaching. A less detailed answer, such as 'they can learn at their own pace' can be given credit as it is a correct statement of the effect, but it lacks the detail to gain any further credit because it does not add an expansion e.g. 'because there is not teacher to control the pace of the lesson'.

Question 8

This question was about the waterfall method of software development. Few candidates could properly describe the waterfall method and analyse its use in the detail necessary to access the full range of marks. The command word analyse means that candidates should *'examine in detail to show meaning, identify elements and the relationship between them'*. In this question, a detailed description of the waterfall method would have gained credit (e.g. identifying the stages and stating that it is a linear method) but few candidates were able to do this. Common mistakes were to confuse this method with other development methods and to describe aspects of all is there was just the one, to describe the wrong method or to compare the methods of software development. Marks were available for detailed reasons why the waterfall method would be used as well as for detailed reasons why it would not be suitable. While it was possible to gain full credit without doing so, a full analysis should have given details of both 'for' and 'against' the use of the waterfall method in the question scenario i.e., for creating an app for a smartphone.

Question 9

This question focussed on the use of a print server and a file server in a company network. Candidates were asked to consider the use of a print server on company networks and the use of FTP to access the file server.

(a)   The command word 'discuss' requires candidates to provide a structured answer, so a bulleted list of brief statements is not properly answering the question and does not gain access to the full range of marks. Further, the question explicitly required both 'benefits' and 'drawbacks' to be discussed so candidates that did not address both could not gain access to the full range of marks. Most candidates were able to describe a print server, but few could adequately describe or expand upon the benefits or the drawbacks of its use on a company network or answers concentrated on 'hacking' or failure of the server leading to 'loss of files'. A good answer would have referenced the sharing or networked printers, the reduction in the overall number of printers, the queuing of print jobs and the benefits to the company users of these along with drawbacks such as a loss of access to printers if the server fails or malfunctions, the lack of individual error messages in some situations or the increased administration overheads associated with print servers. To access the full range of marks, candidates must provide detailed answers.

(b)   FTP is a long-established network protocol but many answers showed a lack of knowledge of not only its use but what FTP actually is. Further, there were numerous inaccuracies in the answers. Common mistakes were to incorrectly state that FTP was' secure because it used encryption', that 'passwords were always required' when using FTP or that it uses 'MAC addressing to route data'. None of these are correct. Again, to access the full range of marks, candidates must provide detailed answers but also, when answering questions requiring candidates to 'evaluate', it is expected that both 'for' and 'against' points with expansions be made, each with a judgment on their importance or value. Good answers referred to e.g. the ease of transferring large quantities of data/large files, the possibility of simultaneous multiple file transfer, the fact that FTP can be used on almost any device and also to e.g. the insecure aspects of FTP because it does not use encryption by default but can be used in association with SSL/TLS (as FTPS) to add a level of security, and anonymous logins means no tracking or auditing of access is possible. An overall

reasoned conclusion, while not explicitly required for the full marks, may be helpful in summarising the points in an answer but should not merely repeat the points already made.

INFORMATION TECHNOLOGY

> **Paper 9626/33**
> **Advanced Theory**

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Comments on specific questions

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Answers to this type of question have to be accurate and precise to gain the marks.

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(b) Common mistakes on this question was to confuse the actions of the types of loops. Good answers correctly explained e.g. that in a `do…while` loop the condition is at the end of the code block so the code is always executed at least once. Answers that explained the converse were also accepted e.g. in a `while` loop the condition is at the start of the code block so the code block may never be executed.

(c) The most common mistake was, again, to confuse the actions of the types of loops. A good answer was accurate and precise e.g. a while loop is used when the number of iterations is not known beforehand or the converse: in a for loop the number of iterations is already determined.

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This question was about the use of stroke and fill settings in computer animation. To gain the full marks, answers should have contained specific, separate references to both stroke and fill as the settings affect different aspects of objects. Good answers referred to stroke settings affecting the outline and fill settings affecting the contents of text, the object given in the scenario of the question, and expanded to describe how each of these could be altered using the settings.

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Vision enhancement is designed to provide visually impaired persons with images of their surroundings in order to enable them to better navigate and enjoy their surroundings either for work or pleasure. While some candidates had an understanding of vision enhancement, many could not accurately describe the benefits of the technologies. Common errors included stating that 'it enables blind people to see' or 'it restores colour vision to colour-blind people' without the necessary accuracy to make these statements worthy of credit. The question placed the vision enhancement in the scenario of health care, so candidates were expected to target their answers to its use in or by e.g. hospitals, health centres, doctors and surgeons. Although some general answers were deemed acceptable as health care examples e.g. the use of smart glasses with augmented reality to overlay details of environmental features or to change the colours of signs so that a wearer is more safe or mobile. Vague answers that referred to vision enhancement outside health care were not usually given credit. There was also confusion between the use of vision enhancement and augmented reality technologies. It is accepted that there is considerable overlap but they are not the same technology.

The command word 'discuss' requires answers be in a structured format, so it is important that candidates write in free-response and avoid bulleted, short answers in lists. Answers should make a point in a statement and then expand with further information e.g. *vision enhancement is used by surgeons or doctors when carrying out surgery so that the surgery can be less invasive and more precise which improves the speed of the patient's recovery.*

Question 5

This question was about the limited range of Wi-Fi connections. Some candidates interpreted a wireless access point (WAP) as a 'router' and wrote about these so did not gain credit.

(a) Answers referring to the absorption of radio waves by solid materials, e.g. obstacles such as the materials in walls, were commonly seen as was the attenuation (in air) of radio waves over

distance. These were awarded credit. Few candidates, however, pointed out that local regulations usually restrict the power of the radio transmitters in WAPs, and in devices, to a low level which has a significant effect on the range of Wi-Fi connections.

(b)   Despite not mentioning it in an answer to part **(a)**, some candidates correctly suggested increasing the power of the radio transmitters used for Wi-Fi connections. The most common answers, however, were to remove or avoid obstacles and install repeaters (boosters) or more WAPs. The introduction of more WAPs (or the use of repeaters) was given credit despite not being strictly accurate because this increases the *area of coverage* not the *range* of a particular connection. Also, it is an accepted means of extending Wi-Fi throughout buildings. A very common mistake was to suggest using a cabled connection instead of Wi-Fi. While this is also an accepted method of extending a *network*, it does not answer this question.

(c)   This question was about ethernet technology. References to routing and the use of IP addresses are not correct. Good answers referred to its better security compared to wireless technologies and its ability to offer high rates of data transfer. When answering this type of questions, accuracy and precision in the response is required to gain marks. Vague answers such as *'it's faster than Wi-Fi'* do not gain credit.

Question 6

This question was about *how to* construct or draw a system flowchart rather than what a flow chart is used for. Descriptions of e.g. the use of lines and arrows to show the routes through a system, various symbols (with some examples) to represent inputs, outputs, process and events in a system were all given credit. Common mistakes were to incorrectly describe the meaning of a symbol or to describe how a system flowchart is used when developing a system – this did not answer the question. Accuracy and precision in answering the question is necessary to gain access to the full range of marks.

Question 7

This question was about the creation of a data mining model. Many candidates incorrectly answered the question by describing details of the search for fraudulent activity by the bank or by describing how the model discovered credit card fraud rather than the creation of a data mining model for this purpose. A common mistake was to concentrate on the detection of the fraudulent activity and how the bank could deal with the fraudsters.

A good answer to this question would have been to first identify the stages in the creation of a data mining model i.e. business understanding, data understanding, data preparation, data modelling, evaluating, and deployment and then to describe the processes that happen at each of the stages. For example, at the business understanding stage the requirements of the model and its justification are established, at the data understanding stage the data sets that are to be collected is identified and so on for each of the stages. To gain access to the full mark range, it was not necessary to identify and describe every stage in extreme detail but it was necessary that answers included sufficient details of the overall process.

Centres are advised to ensure that their candidates, when answering these types of questions, focus on the requirements in the actual question line and then target their answers to the scenario in the stem. In this case the question is *'describe the process of creating a data model'* and the scenario is *'detecting fraudulent activity in the use of credit cards'*.

Question 8

This question was about client-server networking and why it should be used. This type of question not only requires a detailed knowledge of the topic but an understanding of the command word. The command word '*justify*' requires answers to support a case so drawbacks do not gain credit unless they are of alternatives. Descriptions of how client-server methods establish a connection to exchange data were not required. A good answer referred to ease of adding clients e.g. new clients such as web browsers can be added without any additional configuration by administrators, control over access, updates and backups is centralised so management is easier, and many different devices can access the server giving users more choice or ease of access.

Question 9

Candidates did not focus their answers about project management software (PMS) on the specifics of the questions.

(a)   This question was about scheduling of project tasks using project management software. A good answer would have referred to PMS tools providing visual representations of e.g. the task sequences, milestones and the durations of tasks along with automatic updating as the project progresses. A common mistake was a lack of detail and precision in answers e.g. *'make sure everything is going to plan'*. Candidates need to demonstrate that they have a depth of knowledge of the topic and can apply that knowledge.

(b)   Most candidates correctly answered this question by referring to the expense of PMS and the extensive training necessary to use PMS as being unnecessary for small projects. Some also pointed out that the time taken to set up and use PMS on a small project may take longer than the actual project itself.

Question 10

Many candidates answered this question well giving numerous benefits and drawbacks of the use of chat rooms for social networking. However, some candidates repeated their statements while others made statements but did not expand upon them, so could not be awarded the many marks. The command word 'discuss' requires candidates to write in depth about a topic e.g. users can carry out other tasks while 'chatting' so their work rate may increase compared to e.g. having telephone conversations or users can give unfiltered opinions that would not be expressed in a live conversation as users do not know each other or are not physically present. A superficial answer such as *'can work while chatting'* or *'can chat more freely'* is not detailed or precise enough at this level. Answers should have been about 'individuals' and not about businesses or organisations.

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Key messages

Few candidates were able to design a database report to match the requirements given in the question paper. Centres should pay particular attention to the guidance detailed in the comments pertaining to the **task 1b**.

General comments

Apart from the design of the reports, most candidates demonstrated appropriate levels of skill with the other tasks and submitted solutions to all the tasks.

There were some common issues with which candidates seemed to struggle in the mail merge task but providing solutions with the accuracy necessary for good marks in the graphics task seemed to cause candidates the most problems.

Comments on specific questions

Task 1

(a)   The first part of the task involved calculating the cost of the number of each variety of cake ordered and the total cost of the complete order. Some of the cake varieties were subject to an additional tax as a percentage of the cost of the order. The task called for a single replicable formula to be created which needed absolute, partial and relative referencing. Candidates needed to use a lookup formula to determine the cost of each variety of cake and determine whether the tax should be applied. This then needed to be multiplied by the number of cakes ordered for each variety. The vast majority of the candidates managed to calculate the sums correctly, but many did not use a single formula which was capable of being replicated across the columns. Candidates need experience and practice of writing formulae with mixed references.

Another common issue was that despite the question paper showing an example showing the first seven correct values for each column, many candidates only created a pivot table to calculate the monthly total for each company. These totals were required later in the task and had to feature in the database reports in task **1b**. Calculating them as part of task **1a** was not required and using the totals in the data import made task **1b** much harder.

(b)   Few candidates managed to create the reports correctly. Most did actually create the query required to extract the data needed for the report but could not use the design options to display the data as required. In particular, only a few candidates knew how to ensure the report for each company appeared on separate pages. Candidates needed a better appreciation of the report sections in the design view. The design of reports, the placement of data and labels in the headers, detail and footer sections.

(c)   The source data for the mail merge was best created by a query in the database.

The task asked candidates to read the entire question before beginning the task because inspecting the template for the merge document should have led candidates to realise that they needed to create a field for the first name of the customer contact.

Since some candidates did not separate the names before importing the data into the database, some of these candidates decided to extract the data for the merge in the spreadsheet. This method was acceptable but very few candidates who attempted the task using the spreadsheet managed to extract only the nine correct recipients with only two receiving the 'sum outstanding' text.

In general, although, all candidates seemed to have the necessary skills to create and configure a mail merge successfully, some were unable to process the logic of the conditional fields to create the correct letters to the correct recipients.

Task 2

At first glance recreating the image of the cake probably seemed simple. As with all graphics tasks. However, attention to detail and precision was crucial. Only a few candidates matched the image shown in the question paper very closely and the proportions were not often replicated with sufficient accuracy. The colour changes in each component were subtle and it was clear that candidates needed more practice in manipulating gradients.

For the second part of the task candidates had to add shapes in front of their whole cake image in order to make it to look like a slice had been cut out. Most candidates attempted this method and made reasonable attempts, but few candidates demonstrated the skill necessary to ensure the joints aligned with the original image; the shapes could have been made to align accurately by node editing.

Task 3

This task was done well by many candidates. To achieve the impression of each letter being filled incrementally instead of the whole letter changing colour at once, a mask was needed and for many candidates this posed few problems but there were quite a few who merely animated each letter probably as a stop motion animation. The use of masks is an essential feature of animations, and all candidates need experience of using them even in fairly simple tasks such as this. The only other issue that caused candidate to lose marks was the accuracy of the timings. There should have been a pause before the animation of the colour changes began and a pause before the animation looped. Although most candidates set the timing of each of the colour changes fairly accurately many did not set the pauses at all.

In conclusion

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

- It is important that candidates have experience with mixed references in a spreadsheet formula.
- When designing database reports candidates need a clear appreciation of purpose of the sections in the design view and the importance of pagination.
- Candidates should be encouraged to read all the instructions before starting each question in order to determine the full requirements of the task and subtasks before starting to formulate their solutions.
- Candidates need to have experience of using conditional fields and determining the logic when the fields could be nested.
- It is vital to stress the importance of playing close attention to detail and maintaining the proportions of images.
- Candidates need considerable node editing skills in order to achieve the necessary accuracy when creating vector images.
- Candidates need experience in recognising when masks are required in animations.