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INFORMATION TECHNOLOGY

Paper 9626/12
Theory

Key messages

Candidates' performance was of a similar standard to that seen in previous sessions. Responses showed that candidates had reasonable understanding of most areas of the syllabus. As has previously been the case, candidates tended to fare better with questions based on recall.

The structure of the answers seen was of a higher standard than has been seen previously, with candidates giving well structured answers in many instances.

A Cambridge International list of command words that are used in questions is published and explains what each word requires from candidates. It is very important that, when answering questions, candidates read the rubric and answer the questions in the appropriate manner. For example, evaluation requires candidates to judge or calculate the quality or importance of something. A detailed answer is needed, which cannot be achieved by writing bullet points. To gain full credit, candidates must produce a reasoned evaluation that weighs up the advantages and disadvantages for the given scenario/context. Where candidates are asked to justify a position or concept, they must only provide points that support the position.

Similarly, questions that ask candidates to 'analyse' or 'discuss' require detailed responses that include a proper analysis or discussion, rather than short or bullet-pointed responses.

General comments

Candidates are reminded that brand names for software should not be used in responses.

As with previous sessions, work at this level assumes a level of technical understanding.

Candidates are recommended to work to the marks available for each question, as indicated beneath each answer space. In some cases, candidates appear to be targeting these marks correctly and writing answers that make as many points as marks available, but in others, candidates are either writing too much or too little for the marks available. Furthermore, some candidates, in an apparent attempt to fill their answers with points, are repeating the points they are making. Clearly, any valid point may only be awarded once and so, this represents something of a waste of time during the exam.

Comments on specific questions

Question 1

Candidates seemed to struggle with two concepts here.

Firstly, candidates gave the impression that they did not understand the concept of a characteristic, and so gave quite general answers.

Secondly, many candidates missed that the question was asking about specific characteristics for computer modelling and gave general characteristics that were not linked to computer modelling.

Where candidates did address both issues correctly, some good marks were achieved.

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Question 2

The vast majority, if not all, candidates achieved at least two marks on this section, with many scoring much higher marks. Where marks were dropped, these were due to two clear issues.

Firstly, some candidates struggled to describe components. In some cases, this was because they were simply unable to do so, whilst in others, candidates were unable to describe the component, without relying on simply restating the component's name.

The second issue was that a number of candidates identified metadata as a component of a data dictionary. In doing so, they sometimes identified a further component that they had not yet identified, and so achieved a mark, but metadata was not accepted.

Question 3

Many candidates did well on this question and were able to both identify and describe a number of suitable types of utility software.

However, as with other questions on this paper, this question was restricted by the subject area, as well as context. Specifically, the question was about utility software that could be used to ensure that a computer was operating at optimum performance. Therefore, any type of utility software which ensured that processing was not impeded was acceptable.

Unfortunately, a number of candidates identified utility software that would not have a positive impact on computer performance, such as backup software.

Question 4

Many candidates misinterpreted these two questions as being about the process and advantages of online purchasing. Therefore, answers focused on the process of purchasing in both cases. For **Question 4(a)**, which was about how online processing works, the answers given often matched the answers required, and so marks could be awarded. However, for **Question 4(b)**, candidates tended to talk about the efficiency of not having to leave one's home, for example. Whilst this may be an advantage of online shopping, this is not an advantage of online processing. Other candidates gave answers about **4(b)** that were simply too vague, especially for A Level. For example, a number of candidates claimed that a benefit of online processing is that it is user friendly, which is both too vague and, realistically, not a relevant answer.

Question 5

Questions about control processes, especially when linked to the use of sensors, are often well answered, particularly where the candidate adopts a logical approach to the answer. For example, marks were available for stating that temperature would be collected, in an analogue format, and then converted to a digital format by the analogue to digital converter. This concept is nearly always relevant when considering the use of sensors by a system and is one from which candidates have been, historically, able to achieve at least two marks in recent sessions.

Where candidates then went on to address the process, in this instance by addressing temperature above, below **and within** a range of lower and higher temperatures, with reference to actuators and microprocessors, a good number of marks were achieved.

Question 6

Candidates clearly had a good understanding of how Command Line Interfaces (CLI) are used, but were unable to apply this knowledge to a question where they were then asked to evaluate.

In order to evaluate, candidates need to be able to explain positive and negative points. In this case, candidates could, for example, build an argument around CLIs requiring specialist training or accurate syntax, and therefore may be considered not as useful as other interfaces. On the other hand, CLIs use less memory than other interfaces, which is, obviously, a positive aspect of CLIs.

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Question 7

(a) This was a relatively low demand question, with which the majority of candidates coped well. The major issue seemed to be the requirement for candidates to describe the advantage, a requirement with which some candidates seemed to struggle. Descriptions need to be in slightly more depth than a mere identification and need to say something about the answer. So, for example, one of the advantages of off-the-shelf software is that it less likely to have bugs. This is a statement, and not a description. However, by stating that lots of people will already have used the software and so any bugs would already have been reported, makes this a description of an advantage. In many cases, a description of an advantage is likely to be why that advantage occurred, or why it may be considered an advantage.

(b) Again, this was a relatively low demand question, but due to some candidates apparently being more comfortable with off-the-shelf software, rather than custom written software, marks were slightly lower for this question, on average, than for the previous.

Question 8

Any question that asks why two methods both have to be used is likely to require candidates to understand how the shortcomings of one method are covered by the other, and vice versa. Validation and Verification are an example of this. Furthermore, where candidates are asked to explain why this is needed 'in this scenario', candidates are expected to base their answers on the scenario itself.

Many candidates explained verification and then explained validation, but failed to address the issue of why both were needed. Therefore, despite showing good understanding of both concepts, they did not achieve full marks as they had not addressed the fundamental focus of the question, which is why both are required.

Question 9

As with the previous question where candidates were asked to evaluate, candidates largely failed to come to any realistic conclusion about encryption, which reduced the marks scored on the question.

However, many candidates also described the process of encryption, or focussed on different methods, typically in order to consider which they would use. This is fairly typical with questions about encryption. Candidates often miss the point of the question and write about any aspect of encryption they choose. This is rarely effective.

Question 10

(a) (b) Very few candidates gave meaningful answers for these two questions.

Question 11

This question focussed on open-source file formats, rather than open-source software. This appeared to confuse candidates, many of whom gave answers about open-source software. Where candidates did correctly interpret the question, few scored more than two marks.

Question 12

Questions about the digital divide require candidates to concentrate on the specific focus, otherwise answers tend to be generic, unfocused and, usually, largely irrelevant. Answers to this question were of this nature.

In a few cases, candidates gave very good structured answers that fully addressed the digital divide between technologically and less technologically aware nations. Typically, these addressed the importance of different levels of awareness. So, for example, candidates stated that a lack of awareness of the benefits of technology could result in some people choosing not to use technology, as they cannot understand the positive impact this would have on their lives. Some candidates then introduced a wider understanding of the topic and suggested that a technological divide may exist within any socio-economic or age group and were marked highly for doing so.

However, other candidates gave vague answers, or linked technological awareness to wealth, and then focused on wealth impacts, rather than awareness.

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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 databases designed to Third Normal Form (3NF).
- Candidates need to take greater care when examining data files that will be used to create a normalised database and ensure that appropriate duplicate data is removed to achieve 3NF.
- 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 understand the difference between a field calculated at run time within a query and data stored within a table.
- Candidates need to be able to create a calculated control in a report using efficient methods.
- Candidates need to ensure that they can use wildcard searches efficiently within a database query.
- Candidates need to take greater care to ensure the consistency of formatting within a database report, especially when displaying a group and sub-group.
- Candidates need to be precise in their timings within a video, both in terms of splicing clips and adding text to the clips.
- Candidates must follow the instructions on the question paper in relation to **not** using transitions unless instructed to do so.

General comments

Some candidates performed well when setting up their database, but they did not always apply knowledge of normalisation to the third normal form (3NF) to solve the task.

Most candidates performed well on the video editing task although many used transitions when instructed **not** to do so.

Comments on specific questions

Question 1

Many candidates successfully combined the data from these files into a single file. A significant number of them did not carefully examine the data within each of these files. Had they done so, they would have identified that the columns were not always presented in the same order, and the file m24chain.csv did not contain any data for the ‘stones’ used in the jewellery. Some presented the column headings in the correct order, but the integrity of the data was not always maintained - with some data being placed under the wrong headings.

Some candidates did not sort the data, and the small number that did, lost the integrity of the data within the sort, presumably by selecting only some of the columns rather than all of them. While many candidates saved this correctly as a spreadsheet and with the appropriate name, a significant number saved it as a text file with comma separated values.

In summary, the instructions to manipulate the data and place the columns in the given order were not always followed.

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Question 2

Many candidates successfully identified the three tables required to create the database to 3NF. Fewer candidates placed the fields in the most appropriate table for each data item. The stock/product table, using the imported data from the file combined in step 1, was usually created with the correct records imported. Not all candidates split the contents of m24orders.csv correctly into the data for each customer and each order, so that no duplicate data was present as required for 3NF. A number of candidates included a superfluous 'link' table in their database structure.

The Customer table was often created with an appropriate table name and the correct 7 fields. Selecting appropriate field names caused some candidates more of a challenge, especially keeping them short and meaningful, but also without spaces in them. An example sometimes seen of an inappropriate field name was for candidates who called the table Customer and then named a field CustomerFirstName, as the repeat of the word Customer in both the table and field made the field name too long. The data types within this table were usually appropriate to the data.

The Order table was often given an appropriate name and had appropriate field names. The selection of a key field proved more challenging to candidates. In this case many candidates opted for a new ID field (as the data in the order number field did not contain unique values, although some candidates selected this as a primary key) or some of the more able candidates opted to set a compound key using order number and item/product code fields. The date was not always imported as specified into this table (and in some databases import error tables were seen). Despite many candidates setting appropriate data types for the fields in this table, some did not set the quantity field as an integer.

The Stock table was usually structured as specified with the primary key set on the product code field. This table was often not given an appropriate table name with many accepting the default table name JJstock from the imported spreadsheet file. Fewer candidates set the cost price and sale price fields into currency with 2 decimal places and/or the stock held field as an integer.

Many candidates created Relationships between their tables, these were often created correctly with one-to-many relationships, but fewer candidates enforced referential integrity on the appropriate relationship.

Question 3

This question required a report to be created based on a query. Not all candidates used a query to select the products containing opals for the three customer numbers specified, nor did all the candidates include a calculated field within the query with the specified name or the correct fields multiplied together. The report was often based upon this query although a significant number of candidates found grouping on two levels a challenge. A number of different attempts were made to match the formatting of the report without grouping the data, some candidates even attempting to create the report in a word processor or spreadsheet before exporting it into portable document format. Many candidates did group the data within the database and produced a report that appeared similar to the layout shown. A number of typographical errors were seen in the report title and the most common grouping error appeared to be where candidates had set the primary group by forename rather than surname, therefore placing Jamine Gunn's data before Louise Baiardo's. These candidates did not appear to check their reports against the excerpt of the report given in the question paper. Where grouping was not attempted candidates were unable to attain the marks for sorting within the groups or the calculated controls for the item totals for each order and the entire report.

A number of candidates submitted reports in portable document format without any evidence of creating a database, a small number of candidates even attempted this in a spreadsheet which gained the candidates' no credit. Few candidates inserted their name, centre number and candidate number at the bottom left of each page and the report did not always fit a single A4 portrait page.

Question 4

Most candidates set the required aspect ratio and used the correct video file, but fewer candidates trimmed the clip to remove the first 2.6 seconds (or did so with inaccuracy). Some candidates retained the first 2.6 seconds and trimmed the end of the clip. Most candidates spliced the second file as specified although not all used an appropriate transition between the two clips. Some candidates did not apply a transition. Many candidates set the new clip to run at 0.25 times the original speed, but fewer candidates trimmed the clip so that exactly 10 seconds remained. Most candidates successfully exported the new clip with the specified file name and file format.

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Question 5

Most candidates completed Task 5 well with most setting the timings and the background image with few problems. However, placing the text as specified and entering it with 100% accuracy was not always well done. The timings were usually correct, but a significant number of candidates included transitions on the text which was explicitly forbidden in the question paper. A sans-serif font style was not always applied to the title and/or subtitle. Many candidates did not consider the presentation of the text on the still frame. The title and subtitle were frequently presented in the same font size and the font colour used did not always contrast well with the background image. Subtitle text should be smaller than the title text to differentiate between the two styles. Most candidates exported the video clip with the correct filename and in the correct file format.

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INFORMATION TECHNOLOGY

Paper 9626/32
Advanced Theory

Key messages

In Paper 3, questions can be set on any, and all, areas of the A Level topic syllabus so Centres are reminded to ensure that their candidates have a depth of knowledge and understanding of all the content of the subject topics. Centres should also ensure that candidates are able to customise their responses according to the command words in the questions. Assessment Objectives 1 and 3 (AOs 1 and 3) require candidates to *Recall, select and communicate knowledge and understanding of IT* and to *Analyse, evaluate, and present reasoned conclusions.* The command words used in questions are carefully chosen to give candidates the opportunity to show their wider knowledge and understanding of IT topics and demonstrate that they can meet these AOs. The command words are shown on page 45 of the current (2022-2024) syllabus but note that in the 2025-2027 syllabus they are shown on page 66. Centres should note that there are some amendments so are strongly encouraged to read them carefully and to ensure that candidates are familiar with them.

General comments

Again, as noted in previous reports, Centres are advised to remind their candidates to carefully read the whole question before attempting to write their answer. This is to ensure that they understand exactly what the question is asking and not write answers based solely on 'key' words that they have 'spotted'. For example, **Question 4** asked candidates to *Justify* the use of lossy compression but, many candidates ignored the command word and wrote, it appeared, all they knew about lossy, and lossless, compression rather than stating facts and using these as reasons why lossy compression would be used. A Level is not only about recall of knowledge but, and more importantly, also about how that knowledge is applied in different scenarios.

Candidates should be discouraged from writing bulleted, short statements in their responses but instead be encouraged to write answers in full sentences. Analyses, discussions and evaluations should be in free response with full sentences to properly answer the question. Short, brief statements do not usually adequately provide descriptions or explanations. Further, if these are shown in a sketched table, they do not properly answer the question as there is no e.g., 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 8** was about the use of cryptocurrency by *individuals* and not by *businesses* or *governments.*

Comments on specific questions

Question 1

This question was about how mobile devices make use of Near Field Communication (NFC Weaker answers referred to how the NFC connection is set up rather than what is used for or described the features of NFC compared to e.g., Wi-Fi or Bluetooth. Although one mark was available for a valid description of the operation of NFC, details of how NFC works were not specifically required by this question. Good answers were those that described e.g., exchange the setup credentials for the setup of other wireless connections (e.g., Wi-Fi and Bluetooth) so that the connection can be made more quickly, the use in social networking to share contacts or images and the use in contactless payment systems. Any description of a valid use was given credit.

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Question 2

This question listed three elements of JavaScript programming and asked why each would be used in JavaScript code. Good answers were concise in explaining the use. Examples were not required but were credited when given in a valid context.

(a) An explanation is statement of fact with a reason or expansion giving its purpose. Weaker answers confused the break statement with the line break tag in HTML. A good answer stated that break is used to exit a e.g., loop so that the code in the loop stops executing.

(b) Many candidates produced good answers explaining that, in JavaScript, functions are a declared set of statements used to perform tasks and are arranged so that they can be re-used without being written again. Examples of functions did not gain credit unless they explained why functions were used.

(c) Many candidates could produce good answers explaining that, in JavaScript, comments are used to annotate and explain the code so that others can understand how it works. However, a significant number only stated that comment make the code more readable so did not gain the full marks.

Question 3

The agile method of software development has distinct stages i.e., Initiation, Planning, Documentation, Development, Support and maintenance and a mark was available for identifying at least four of these. Many candidates could do these but a significant number did not gain this mark because they either did not identify enough stages or muddled the method of development with other methods. Marks were then awarded for descriptions of the activities that occur at each stage. This meant that, to gain full marks, candidates were expected to show that they could describe the activities in at least three stages of the method. Many candidates were not able to adequately describe the activities at each stage but did gain some marks for their descriptions of the overall process. Good answers were those that took each stage in turn and described the activities in each stage, e.g.: in the Initiation stage ideas are formed and team members are identified and in the Development stage the specifications are used to create the product in sprints and iterations of development.

Question 4

This question asked candidates to justify i.e., support a case with evidence and argument for using lossy compression when storing and using bitmap images. Answers that referred to lossless compression without explaining the drawbacks compared to lossy were not given credit. Nor were references to the *drawbacks* of lossy compression or why lossy compression should not be used. Similarly, references to vector images did not gain marks. Good answers described features of lossy compression and explained why these made it a good choice for the storage and use of bitmap images. For example, a justification for the use of lossy compression would be that it reduces the amount of data needed to represent the image which reduces the file size and allows more images to be stored on a fixed amount of disk space.

Question 5

This question asked about the properties of objects in computer animation. These can be altered in the property parameters of the object in computer animation software.

(a) The orientation of an object in a computer animation the angle of rotation around the x, y and z axes of the point of origin i.e., its roll, yaw or azimuth settings. It is used to set camera angles or provide e.g., a sense of gravity to the object. Many candidates referred incorrectly to the portrait or landscape orientation of e.g., document pages or images and so gained no marks.

(b) Weak answers stated that transparency is *'how transparent an object is'* which, while correct, repeated the question stem and added no further information in the way of a description. These answers gained no marks. Candidates were expected to produce descriptions such as the transparency property determines the visibility of the objects or layers so that other layers in the display can be seen underneath and can be set to different percentages to change the visibility of layers underneath. Good answers should include details.

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Question 6

This question asked candidates to draw and describe the purpose of three symbols that are used in data flow diagrams (DFD). The symbols used in this syllabus are shown in the current syllabus (page 62) and candidates were expected to draw these. Most candidates gained full marks but a significant number did not because they either confused DFD symbols with those used in other types of flowcharts e.g.: system flowcharts or drew the shapes so poorly that markers could not determine what the symbol was meant to be. Credit was given for other valid symbols other than those shown in the syllabus but only if it was clear what it was and could not be confused with other symbols. Centres should note that the symbols are specifically shown in the syllabus to avoid such confusion.

Question 7

This question was about controlling the access to computer data. Descriptions of specific access controls were not demanded so candidates could use any valid example of an access control method to explain how the risks are reduced. Weaker answers described user IDs and passwords or the use of key pads on locked doors to control who can access data but did not explain or add expansions about how these reduced the risk. Marks were awarded for the answers which e.g.: explained that access control ensures that users are who they say they are (i.e., authenticating the user) so it ensures that all users have the appropriate access to data, it provides selective access to data so that the company controls who has access to what data and so that the distribution of data is known.

Question 8

The syllabus lists the types of digital currencies and the groups that are impacted by digital currencies (Topic 12.1, page 35). This question asked candidates to consider the benefits and drawbacks of the use of cryptocurrencies by individuals. References to the other groups did not gain credit unless they were in the context of individual use. Answers must be focussed on the scenario in the question. When the question asks candidates to '*discuss'* they are required to write *'in depth in a structured way'.* Marks are not usually awarded for brief statements. Most candidates could demonstrate an understanding of cryptocurrency but the majority of marks were only available to those who expanded their responses. The best answers took the concept of a decentralised currency to explain that the transactions cannot be reversed by the sender for without the consent of the recipient, transactions can be anonymous so financial transactions cannot be tracked and are a cost-effective option for e.g., immigrants who have left their homes to find work and wish to send payments to their families in other countries without having to exchange currency or pay fees. They also explained the converse that a decentralised cryptocurrency is not backed by a government bank so is subject to risks e.g., price volatility and regulatory intervention and may not be legal in some countries. Where answers do not give details or in-depth discussion points they cannot be given the full range of marks.

Question 9

A description of botnets was not required as this is given in the question. To gain the full range of marks, candidates were expected, as stated in the question, to describe how botnets attack systems. Good descriptions included the method of access to the system e.g., downloaded and installed without the consent or knowledge of the user, how they are set up e.g., communicating with controller devices on remote servers and how they attack and affect computer systems. Many candidates mentioned the most common form of attack which is a Denial-of-Service (DoS) attack on server but most did not refer to the other methods of attack e.g. reducing performance by using system resources or downloading other malware such as spyware.

Question 10

Some confusion between alpha and beta testing was seen in a number of responses. Centres are advised to ensure that candidates read the question carefully: the question stated that alpha testing is carried out in the final stages of software development so those candidates that described testing by end-users, after deployment or at later stages did not gain credit. Good answers described the process as involving the developers, reviewing specifications, creating and using text plans, detecting and correcting errors and producing reports that are used to improve the software.

Question 11

There was some confusion by many candidates between virtual servers and cloud computing. Answers that discussed cloud-computing did not answer this question. In this instance, a mark was available for a full

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description of a virtual server e.g.: *a virtual server uses virtualisation to emulate multiple servers which run on the same physical hardware of a server.* Few candidates could produce this description. In answering this question, candidates were expected to know and give facts about virtual servers and show how these were of benefit or were a drawback when hosting websites. References to scenarios other than hosting websites did not answer the question so were not given credit. To gain access to the full range of marks, answers must give both benefits and drawbacks. Good answers included benefits such as e.g.,: website owners can move their web hosting from their own local physical servers to cloud-based virtual servers to reduce their costs of maintenance and physical hardware requirements. Drawbacks include e.g., websites may be at greater security risk due to the sharing of hardware, the hardware needs to high performance to run all virtual servers at peak performance else user experience is not optimal and a failure of the physical hardware affects all the virtual servers with the result that all of the hosted websites are offline.

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INFORMATION TECHNOLOGY

Paper 9626/04
Advanced Practical

Key messages

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

- candidates need considerable experience of challenging tasks that develop problem-solving skills .
- it is vital to stress the importance of playing close attention to the formatting and positioning of text and images, as these seemingly minor details can impact the final score.
- candidates would benefit from experience of nesting formulae and concatenating results accurately, the use of pivot table filters and the creation of dynamic chart titles.
- in graphics tasks, attention to detail is crucial, especially for apparently simple images.
- in animations, candidates need to be aware of the importance of configuring the number of frames and the length and precision of incremental changes in order to display smooth movements and precise timings.
- candidates need experience of using external .js files in programming for the web, and the experience of challenging programming tasks that involve looping techniques for efficient solutions.
- focusing on details and understanding the nuances of each task can significantly impact overall performance.

It is also important to acknowledge that there are marks for formatting and the positioning of text and images that may seem unimportant compared to the skills required for the task but could possibly enable the final score to cross a grade boundary.

General comments

Most candidates demonstrated appropriate levels of skill and submitted solutions to all the tasks.
There were a few common issues with which candidates seemed to struggle but in general most seem well prepared for the examination.

Comments on specific questions

Task 1 – Data Analysis and Visualisation

The first part of the task involved tidying and formatting the data so the analysis could be carried out. A surprising number of candidates did not successfully complete one of the most accessible mark points, that of removing the ‘Gratis’ entries. Candidates should be reminded of the possible consequences of neglecting such a step since all subsequent stages will have incorrect data and may lose a significant number of marks. Fortunately for this session, follow through marks were allowed for the ensuing results.

The addition of the calculated columns caused few problems but calculating and formatting the Quarter data proved too difficult for many. The formula for calculating the quarter was provided but the correct determination and formatting of the suffixes was rarely seen. Centres may wish to develop similar practice tasks that involve nesting and concatenation.

The analysis and visualisation required the use of pivot tables and pivot charts. Nearly all candidates completed the first three tables and charts but a number struggled with configuring the number of orders for each customer where the user is able to select the year to display. Also, very few candidates managed to produce the fourth chart which required the data for each quarter and year to be selectable.

In general, many candidates seemed unfamiliar with the use of filters in pivot tables and charts.

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Additionally, it seemed that making the title of the chart dynamic in order to display details of the selection made by the user was an element that few had experienced.

Task 2 – Vector graphics

It was quite difficult to create a case as regular as the example shown in the question paper but there were certain features that were important for candidates to recognise. Importantly, the front of the case needed to appear slightly concave, and the rear needed to be convex. There was some tolerance for the regularity of the peaks and troughs, but the case had to appear symmetrical with smooth sides and bottom.

Most candidates made a fair attempt but only a few seemed able to demonstrate the skill necessary to produce a good result.

Their attempts for the cake were better but it was a much simpler task. Even so, the attention to detail was often lacking and some results looked a bit hurried. Candidates need to be reminded that in attempting apparently simple tasks attention to detail will be crucial.

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The topping image was quite well done by most candidates but many of those candidates who attempted to reverse engineer one of the images supplied for the programming task did not manage to save a sufficiently accurate result. It was a perfectly reasonable method but simply recreating the image would have been quicker and more likely to meet the criteria of matching the shapes, colours and outlines shown in the question paper.

Task 3 – **Animation**

Almost all candidates managed to complete all stages of the animation but very few took enough care with the positioning of the moving elements.

The case and the cake had to move smoothly along the bottom of their respective tubes and be sized to fit as shown in the question paper. Similarly, the case and the cake had to descend in the centres of the chutes and move along the bottom of the image. Only a few candidates met these criteria and even fewer managed to ensure the speed of all the movements was consistent throughout the animation.

The topping had to grow as it flowed from the nozzle and it should have occupied the whole space between the nozzle and the case. Most candidates managed to make appear to grow as if it flowed from the nozzle, but a number of candidates just made the whole topping appear at once. There were not many convincing animations for this part of the task.

This is an area where centres might benefit from providing more experience for candidates. It important that the animation of objects is smooth and at an appropriate speed. Many submissions showed the case and the cake moving at inconsistent speeds.

Task 4 – Programming for the web

Once again, an important issue with this task was the use of an external JavaScript file. Copying the code and pasting it into the html page was not what the task required. It is possible that candidates misunderstood the instructions, but centres need to ensure that candidates are aware of the need to use external scripts in their solutions.

Most candidates managed to provide appropriate code to display the correct images, and many made a fair attempt to create the code for each ingredient for the cupcakes. Whilst several submissions did not work properly, most of these candidates were able to gain a fair number of marks.

As is often the case with JavaScript tasks, there are several ways to achieve successful results. Many candidates used a linear approach with separate code blocks for each option, but centres should be aware that in some cases there may be marks for the efficiency of the code and candidates would benefit from practice with conditional statements and loops.

It is worth noting that a little experience beyond the syllabus is very useful in teaching JavaScript since the required knowledge and understanding can be fortified by more challenging programming experience.

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