INFORMATION TECHNOLOGY

Paper 9626/12
Theory

Key messages

Overall, candidates appeared to have been well prepared for this assessment.

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

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

Evaluation requires the candidate to discuss the importance, weigh up the advantages and disadvantages, judge the overall effectiveness, and weigh up their opinions, of a number of options. It is important that comparisons are made rather than just giving features or uses.

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

General comments

At times, it appeared that candidates rushed into giving their answers whereas they would have been better advised to list their thoughts in rough before choosing, and elaborating on, items from their list that would be appropriate to their response to the question.

Candidates must read questions carefully before answering. A number of questions required descriptions such as **Question 6** where candidates often listed the method or gave a very brief outline without really describing the method. Another problem seemed to be the wide use by candidates of brand names in their answers. This was particularly the case with **Question 6**. This is made clear in the syllabus.

Comments on specific questions

Question 1

Candidates did fairly well on this question with the majority of candidates gaining three marks. A number of candidates appeared to misunderstand the relationship between data and information. Occasionally candidates ticked fewer than the four answers requested and missed the opportunity to gain marks.

Question 2

Candidates again did fairly well on this question with many gaining at least two marks with higher ability candidates gaining three, or even four, marks. Often candidates did not seem to appreciate the correct definition of TLS and ticked the incorrect statement. Again, a small minority of candidates ticked fewer than the four answers requested and missed the opportunity to gain marks.

Question 3

This question was well answered with the large majority of candidates gaining at least four marks. Candidates' responses were initially good, but where they were unsuccessful in gaining more than half marks it was usually down to missing out the later steps required in the importing process.

Question 4

On the whole, this question was answered well with many candidates gaining at least half marks. Part **(a)** tended to be better answered than part **(b)**.

(a) Most candidates described at least one characteristic well with the more able often describing two or three. Most candidates knew that it was a network within an organisation and many went on to mention restricted access and the most able mentioned the sharing of information or TCP/IP.

(b) Candidates did not do as well on this part of the question. Only the more able were able to describe a characteristic of an extranet and only the most able achieved full marks. Most candidates who gained marks referred to external users or customers having access to the company's network.

Question 5

Most candidates were able to gain at least three of the available eight marks, but only a few candidates were able to gain the highest marks. Most candidates did not expand on their description of the issue. It was clear that candidates knew the issues, but were unable to describe them in sufficient detail. They did much better with the descriptions of prevention methods.

Question 6

This question was, unfortunately, not well answered with candidates seeming to know ways of communication, but unable to describe them in the detail required at A Level. Many just named the way the internet would be used. Fortunately, this did not prevent the more able candidates from gaining marks for describing the drawback. It was disappointing to see the number of candidates who referred to email or video conferencing despite these being ruled out by the question.

Question 7

Most candidates seemed to be unfamiliar with this topic and seemed unable to answer the question well. The majority of candidates managed to gain at least one mark, but few managed to gain more than half marks. Most who gained marks did so for mentioning data compression and also coder/decoder, but few went into their answer with any more detail than this.

Question 8

This was reasonably well answered, but a number of candidates gave simplistic reasons for the data being displayed the way it was, often referring to cell size rather than length, size or type of the data. Only a minority of candidates knew the most efficient method to rectify the situation. Despite this, the vast majority of candidates gained marks with many gaining at least three of the available six marks.

Question 9

The vast majority of candidates gained both marks. Some candidates, however, did not appear to understand indices and a small number appeared to have little idea about formulae in general.

Question 10

This question was fairly well answered with the majority of candidates gaining at least half marks. Where candidates did not do so well, it was generally as a result of them not answering with regard to all aspects of the code. Many just concentrated on the colour of the clothing or the type of clothing, ignoring other aspects of the code.

Question 11

This question was not very well answered by candidates. Most candidates did not give advantages and/or disadvantages. Many just concentrated on how either type of software would be used in a payroll situation. When describing advantages and disadvantages it is important to make comparisons. Candidates identified points such as you can use spreadsheets to make calculations, but this is true of database software too, although it might be more difficult, but the majority of candidates did not make this distinction. Other uses were mentioned, but very few candidates made comparisons or described the effectiveness of either type of software for a particular use.

Question 12

Most candidates did quite well on this question demonstrating a fairly good understanding of relational databases.

(a) The majority of candidates gained at least half marks for this question. Some candidates did not appear to understand the concept of a compound key, often only giving a single field for their answer. Some candidates confused primary key with foreign key whilst others mentioned Coursecode as a primary key, but did not say to which table they were referring to.

(b) Although reasonably well-answered, most candidates did not do as well as on part **(a)**. A common issue was to write about the use of the Courses table and performing a query or filter on the Course title, despite the question telling candidates to use the Student table only.

Question 13

It appeared that candidates, regardless of ability, either understood the topic well or did not understand it at all. Many gained three or four marks whist others gained fewer than two marks. A number of candidates made a clever use of the TEXT function to obtain the answer.

Question 14

Once again, despite it being an evaluate question, most candidates did not give advantages and/or disadvantages. Many were able to explain what each did, but did not make comparisons. A number of candidates spent a large part of the answer describing backups and why they are needed without mentioning the effectiveness of the media in question.

INFORMATION TECHNOLOGY

Paper 9626/02
Practical

Key messages

For this examination, the main issues to note are as follows:

- Candidates need a better understanding of the application of basic formulae to solve problems.
- Candidates need to be more familiar with applying their theoretical knowledge to practical tasks.
- Candidates need a better understanding of the differences between formulae and functions in a spreadsheet.
- Candidates need more practice and experience in the creation of pivot tables.
- Candidates need to consider carefully the most appropriate chart to use for a given task.
- Candidates need more practice and experience in appropriately labelling charts.
- Candidates need to ensure that they submit a single version of each completed file in the specified file format.

General comments

A significant number of candidates omitted one or more of the required files to be submitted for assessment, or submitted the files in the wrong file format, (for example, a report required in pdf or rtf format was produced as a spreadsheet or database report).

Comments on specific questions

Question 1

Many candidates found this question challenging, although many candidates correctly identified at least one of the errors in the **Dest** worksheet, few went on to evaluate the impact of these errors. Where candidates had correctly identified both errors, a significant number did not determine the relative significance of each of these errors. In a number of cases, candidates did not identify an error/the errors, yet corrected them within their subsequent spreadsheet submissions.

Question 2

Many candidates successfully inserted the new row and inserted the text as instructed. A significant number of candidates inserted the text into cell A2 as specified but introduced a case error in cell B2.

Question 3

This step was completed using a variety of methods. A significant number of candidates extracted the correct elements from the Bus Code, although a number used inefficient methods to do so, electing to use `RIGHT` and `LEFT` functions rather than the `MID` function. Several candidates used a large number of extra rows and columns to assist them; while this is accepted at IGCSE Level; at AS Level candidates must also consider the efficiency of their solutions, using nested functions and formulae where appropriate. A significant number of candidates did not extract the destination name in the Destination column, instead extracting the single letter destination code.

Question 4

Not all candidates successfully completed this question. The most efficient solution involved the use of `AVERAGEIF`, and although a number of candidates did successfully use `SUMIF` and `COUNTIF` to attain the results, a significant number of candidates unsuccessfully attempted to use an `AVERAGE` function with no conditional elements, or listed all the cells that matched the condition within an `AVERAGE` function.

Question 5

The majority of candidates selected the most appropriate chart type (although not always using the correct data series), few titled ad labelled the chart with sufficient detail. At AS Level, a chart must clearly indicate to the user exactly what the data represents, in this case it also required the candidates to adjust the *y*-axis scaling to single (or half) minutes rather than allowing the software to use its default increments of 0.043 minutes for this data. Few candidates completed this chart as required.

Question 6

A significant number of candidates attempted to create a pivot table. A significant number of these set the row labels as the destination code rather than the destination name (which would be much more meaningful to the user of the data). A significant number of candidates used `COUNT` rather than `SUM` to calculate the values for the pivot table. Despite the instructions in the question, many candidates did not remove the totals for each destination, presumably allowing the wizard to determine the requirements rather than following the instructions. Likewise, few candidates ensured that all gridlines were present in their pivot table when they included it in the report for their manager. Almost all candidates who created the pdf document, including the chart and pivot table, included essential information for their manager, which must include an appropriate title and some very brief information suggesting what the report contained. Many candidates also ignored the instructions to place the report on a single portrait page with their candidate details in the footer.

Question 7

Many candidates completed the export as specified.

Question 8

Of the candidates who attempted this question, the majority successfully inserted the Driver ID and full name of the driver into the **Bus** worksheet. The copying of the data into a new worksheet called **Report** was often completed as specified, but few candidates considered automating the copying process so that the results would automatically update themselves if any changes were to be made to the data. The majority of correct candidate responses to the list of drivers who had more than one journey on time or early involved the use of the `COUNTIFS` function, although equally valid responses were seen using `COUNT` with `AND` as well as the two conditions. Few candidates exported this in the correct rich text format.

Question 9

This question did not elicit many good responses from candidates. Most could identify that `IF` and `RANDBETWEEN` were functions, but few understood in any depth the differences between a formula and a function. Consequently, the majority of candidates performed poorly on this question.

INFORMATION TECHNOLOGY

Paper 9626/32
Advanced Theory

Key messages

Again, it was noted that candidates appear to look for, or 'spot', 'key words' in the question and then proceed to write answers based on those key words; centres are again reminded to ensure that candidates read the questions carefully before attempting their answers as there is often little application of their knowledge to the question or scenario. Answering questions in this manner may score a few marks but will not give access to the full range of available marks.

Many candidates appeared to have good subject knowledge and some good technical descriptions were seen, but most did not apply their knowledge to the given scenarios or to the context set in the questions. It is essential that candidates read the short scenarios before a set of questions very carefully and apply their knowledge when answering the subsequent questions. Many answers were generic and did not address the scenario set and, as noted in previous reports, the consequence of this was that, while candidates appeared to know the syllabus content quite well, they did not score the higher marks because their knowledge was not appropriately applied and they did not answer the question set.

It is very important that, when answering questions, candidates read the rubric and answer the question in the appropriate manner. There were a number of candidates who created numbered bullet points for questions that required free-response descriptions. As has been noted in previous reports, this is to be discouraged as, for example, in **Questions 3(b)** and **7**, candidates are asked to 'explain' or 'describe' a topic, but when using numbered bullet points they rarely produce little more than simple points or short statements with no explanations or descriptions. These answers rarely score the marks. Candidates who wrote in sentences and paragraphs produced explanations/descriptions that scored marks, e.g. in **Question 3(b)** to simply state 'a router sends packets from network A to network H' is not sufficient; to gain credit a candidate must explain the router role in some detail.

Comments on specific questions

Question 1

This question was answered quite well by candidates who explained how the characteristics of bitmap images made them suitable for use on web pages. Good answers referred to, e.g. the fact that bitmap images are best for photo-realism with continuous tones compared to vector images which makes them appear more realistic. Individual pixels can be modified to customise the image, so images of advertised items are more appealing/attractive. They can be compressed so that the file size is reduced resulting in faster loading times. Weak answers mentioned the characteristics, but did not relate them to the scenario or simply stated basic facts, e.g. 'bitmap images are made of pixels'.

Question 2

An 'analysis', as defined in the current syllabus, page 32, requires candidates to explain the main points in detail. This question required candidates to analyse the impact of network bandwidth on video-conferencing. Candidates were given some credit for describing 'bandwidth' and/or 'video-conferencing' but good, accurate descriptions were required. Candidates who gave brief, inaccurate descriptions did not gain credit. Good answers explained how bandwidth requirements are higher when video-conferencing to allow more detail in video images and video-conferencing requires higher resolution video because there are often several people on screen at once, low bandwidth does not allow high definition images so you would not be able to properly see the faces of multiple participants and low bandwidth requires a trade-off between resolution and frame rate.

Question 3

(a) Good answers explained that each packet takes a different route through the network, so the time taken along different routes is not the same resulting in packets arriving at different times at network H. Many candidates answered this question well, but many did not understand the role of the router and gave inaccurate answers about their function; this type of question requires good technical knowledge to be applied to a scenario. Some candidates did not read the question properly and gave an answer more appropriate to **part (b)**.

(b) Many candidates repeated their answers from **part (a)**, but did not gain credit for this as it did not answer the question. Good answers showed good technical knowledge applied to the scenario and included references to, e.g. the stored lookup table of IP addresses held by each router, and the dynamic routing protocols that build up a table of preferred routes between connected routers.

Question 4

(a) Some candidates correctly identified the first two milestones but many chose milestones from elsewhere in the path.

(b) Most candidates could correctly identify the critical path and describe it. A good answer gave the path and its length.

(c) This question required candidates to draw *and label* a Gantt chart that could have been used to create the PERT chart. Many candidates drew good charts with accurate task lengths and correct labels.

Question 5

(a) This question required candidates to explain that a filter on the 'Invite' field in the data source should be used to select only those with 'Yes'. A new data source could be created of these records and used for the mail merge. Poor answers lacked sufficient detail.

(b) Good explanations referred to replacing the second <<City>>field/<<City>>field in body of letter because this does not show correct city for meeting, but repeats the address city, then inserting a variable field in place of this field to select meeting city based on the Country field. Many candidates could explain this but did not elaborate on the next steps of, e.g. the use of a nested IF statement to produce the correct city for the meeting.

Question 6

Many candidates answered this question well showing good understanding of how to construct JavaScript code. While many answers had minor syntax errors, credit was given for declaring the variables correctly, capturing the input of the age, checking that the age was a number, displaying error messages, comparing the age and displaying appropriate messages in the web page.

Question 7

Given that this topic is specifically mentioned in the syllabus, it was expected that candidates would have an up-to-date and wide knowledge, but many candidates concentrated only on the use of smart watches and fitness trackers and neglected the wider aspects of wearable computers in healthcare. While these descriptions gained credit, to access the full range of marks good answers should have referred to the much wider use in medicine/healthcare of wearable computer systems, e.g. the transfer of data directly to a head-up display or to the retina of a doctor or surgeon during medical procedures; wearable systems (e.g. e-skin) on patients including sensors to send data direct to doctors, the enhancement of patient-doctor interaction and patients assisted in managing and controlling pain or having personal fitness regimes.

Question 8

This question required candidates to describe the advantages of evolutionary prototyping compared to throw-away prototyping, so good answers should have included descriptions of, e.g. clients or prospective users may decide that the early version is all that is needed so development is cut short; developers can focus on developing parts of the system that they understand and improvements or add-ons to the system can be created later. Many candidates produced good responses to this question.

Question 9

(a) This question required a description of PPP but many candidates could not do this. Most did not know that PPP is point-to-point protocol and could not therefore describe it. Descriptions could have included that it provides authentication (using passwords) and used in dial-up connections.

(b) A significant number of candidates answered this question by repeating the information in the question and gained little credit for their responses. Good answers included, e.g. descriptions of using multiple email clients simultaneously, such as allowing the use of the same email system on mobile devices and PCs at the same time with changes on one device being reflected on the other devices connected at same time. The provision of multiple mail boxes with the use of folders or mailboxes on the server. IMAP, the use of flags stored on the server to check whether the message has been dealt with. Poor answers did not describe the features in sufficient detail and some candidates just provided lists of points.

Question 10

'Evaluate' required candidates to discuss the advantages and disadvantages of asymmetric and symmetric key cryptography and weigh up the importance of these. Many candidates could describe the use of keys in cryptography, but few could accurately describe both asymmetric and symmetric key cryptography and give the advantages and disadvantages of each to gain access to the higher marks. Most candidates did not make a reasoned judgement about the importance. When answering 'evaluate' questions, candidates should write their responses as free-response text and avoid the use the use of bulleted lists because such lists are often statements of points with no descriptions, explanations or discussions.

Question 11

An 'analysis', as defined in the current syllabus, page 32, requires candidates to explain the main points in detail. This question required candidates to analyse the impact of the introduction of high definition television. Many candidates could describe high definition television systems but did not explain the impact that introducing these has had. Good answers included references to the ability to use much larger screens without loss of perceived picture quality, the need to install higher bandwidth networks to allow streaming of HD television and the consequential increase in costs to the consumer.

Question 12

'Discuss' required candidates to give the important arguments for and against the use of online banking in society and explain how this has affected society. This question was answered quite well by most candidates although some generic answers were seen. The question was about the impact on society of online banking not just about what can be done or how it works. Good answers should have included references to banking being available at any time so financial transactions can occur at any time and there are no issues with banks being closed or with international time zones; demand for access to technology and the internet has increased due to customers and banks moving to online banking, but the increase in online banking has led to a decrease in the number of bank branches and personal customer service. Good answers also referred to the impact of the security issues that have arisen due to the increased use of online banking.

INFORMATION TECHNOLOGY

Paper 9626/04
Advanced Practical

General comments

It is clear that most candidates had been properly prepared for entry in this session and almost all were able to produce reasonable attempts at solutions for each task.

Comments on specific questions

Task 1

(a) Create an animation

In the first task candidates were required to create a simple key frame animation of a shape following a path and rotating. This was to be followed by the appearance of two words, the letters of each appearing one by one. The criteria for this task included the precise timing of each part of the animation. Most candidates managed to complete an animation successfully, but quite a few set the shape to rotate once instead of twice. Most candidates did, however, set the timings with sufficient accuracy. Although this was a straightforward animation, centres are to be congratulated for preparing candidates well for this task.

(b) Describe and explain the term 'Morphing'

For tasks such as these, it is important for candidates to be aware of the specific requirements of the terms 'Describe' and 'Explain'. For the term morphing, candidates were required to *set out characteristics* of morphing and *set out the purposes or reasons* for morphing. Most candidates managed to include some characteristics and purposes, but very few manage to provide a coherent approach to their response. Centres would benefit from making candidates more aware of the specific requirements of key words in questions such as these.

Task 2

(a) Complete a spreadsheet

Almost all candidates demonstrated the skills necessary for this task. There were, however, two common errors. First, many candidates did not set error alert messages for the data validation necessary for the 'Number of bedrooms' and 'Number of nights' cells and second, many set the limit on the 'Number of nights' to less than or equal to 21 which would have allowed users to enter zero or negative numbers.

Although the requirement to include error alerts was not specified in the task, candidates should have realised that at this level they must demonstrate that they recognise the needs of good practice.

(b) Evaluate spreadsheet modelling features

For this part of the task candidates were required to 'evaluate' two features of modelling software. For an 'Evaluate' question candidates should '*discuss the importance of, weigh up the advantages and disadvantages, judge the overall effectiveness'.* The question referred to the use of spreadsheets to create models and most candidates realised that detailing features such as the use of formulae, automatic recalculation, scenarios and charts, etc. would be suitable. A few, however, chose to cover computer simulation. In covering this aspect, candidates did not refer to the specific requirements of the key words in the question and generally scored quite poorly.

Task 3

Perform a mail merge

The mail merge task was straightforward, but full evidence of the selection of recipients was lacking for many candidates. Since evidence was shown in the prompt dialog as the merge document was opened, it was clear that most candidates had used the 'Mailings – Edit Recipients' filter to select only recipients satisfying the mailing list criterion. Very few, however, provided any evidence of how Lucy Walters and Joseph Schofield were excluded. This issue may be a corollary of the decisions candidates made about which files to include in the submission of their work. Most candidates seem to have 'tidied' the folder they submitted. Most did not, therefore, include the source file for the mail merge. While this omission did not affect the marking of the merge document or the resultant letters, it may have stopped them gaining marks for evidence of their method of selection or exclusion. Centres would profit from considering the issue of selecting the files to include in the submission of work.

In general, though, centres are to be congratulated on preparing candidates well for this mail merge task, but the logic of the conditional fields did defeat a number of candidates. Most did create a solution that produced correct outcomes, but very few provided an efficient configuration of the conditional fields. Some candidates combined the Accommodation_type and Accommodation_style fields in the source file for an efficient solution, but candidates that understood that the conditional text for both standard and luxury apartments was the same, were able to produce an even more efficient solution using nested fields such as:

```
{ IF { MERGEFIELD Accommodation_type } = "Apartment" "Come and see our fantastic new apartments. They are very stylish and very affordable." "{ IF { MERGEFIELD Accommodation_style } = "Luxury" "Come and see our fantastic new luxury villas. They are the best around." "Come and see our fantastic new villas. They are very stylish and very affordable." }" }
```

Task 4

(a) A Javascript exercise

Candidates were far better prepared for this task than in the previous session. Most produced a fair attempt at a solution. The most common error was that the password setting messages were displayed in an Alert dialog box rather than on a new page as specified. Perhaps some candidates were unaware of the *document.write()* method.

Other than that, many candidates clearly understood the structure and syntax required.

(b) Programming/Javascript questions

In answering the first part of this question, most candidates did not *set out the characteristics* of a function explicitly. Most gained some marks for mentioning valid elements, but it does seem that centres need to give candidates more guidance on how to determine and address key words such as Analyse, Describe, Evaluate and Explain. A glossary that includes these terms is provided on page 32 of the current syllabus.

For the second part of this task candidates had to record the result of JavaScript functions applied to a string of text. Many candidates did provide correct results, but quite a few did not remember that strings and arrays are numbered from zero and the first character or item has the position 0.

In conclusion

For this session, the main issues that centres need to address seem to be:

- awareness of the specific requirements of key words in questions
- attention to accepted 'good practice'
- logic and efficiency in the use of conditional mergefields
- careful consideration of the files needed in the final submission of work.