2020 HSC
Information Processes and Technology
Marking Guidelines

Section I

Multiple-choice Answer Key

Question	Answer
1	B
2	A
3	B
4	D
5	C
6	A
7	A
8	C
9	B
10	D
11	C
12	B
13	A
14	C
15	D
16	C
17	B
18	B
19	D
20	A

Section II

Question 21 (a)

Criteria	Marks
• Shows a sound understanding of how a project manager could use communication skills to resolve a disagreement between team members	3
• Shows some understanding of how to resolve a disagreement using communication skills	2
• Shows a basic understanding of a communication skill	1

Sample answer:

The project manager could use active listening and conflict resolution with the team members having the disagreement to hear both sides, ask clarifying questions and summarise to ensure an appropriate solution is reached. The project manager may choose to interview team members and ask open-ended questions and clarify responses so as to determine the best outcome for the project. In some cases the project manager may also choose team-building strategies to build trust among the team member's, clarify each members role and ensure the project goals are being met.

Question 21 (b) (i)

Criteria	Marks
• Shows a sound understanding of why no transmission error was detected	2
• Provides some relevant information	1

Sample answer:

Even parity is used in the transmission of the two data bytes. The numbers of zeros in both data bytes are even. The received transmission didn't recognise an error as the number of ones in the received transmission remains even. However, during transmission one of the two data bytes was corrupted. A '1' bit was changed to a '0' in one of the data bytes.

Question 21 (b) (ii)

Criteria	Marks
• Shows a sound understanding of how checksum could be used to detect a transmission error in the scenario	2
• Identifies a feature of checksum	1

Sample answer:

Checksum would be a more appropriate method to detect the error as a checksum is a value that represents the number of bits in a transmission message. With this method all the 0s and 1s in the transmission are added to obtain a total sum. This total is sent to the receiver. If there is no match between the checksum and the data bytes received then an error is flagged.

Question 21 (c)

Criteria	Marks
• Describes the criteria for eligibility for each level of membership	3
• Outlines some criteria for eligibility for membership	2
• Provides some relevant information	1

Sample answer:

To attain a Silver membership, a person must hold a valid licence and have been a member for up to 5 years.

Gold membership is for a person who holds a valid licence and has been a member for more than 5 years but less than or equal to 15 years.

Platinum membership is available for a person who holds a valid licence and has been a member for more than 15 years.

Question 22 (a)

Criteria	Marks
• Shows a sound understanding of how internet and intranet technologies could be used in the system	3
• Shows some understanding of how internet and/or intranet technologies could be used in the system	2
• Identifies a feature of internet or intranet technology	1

Sample answer:

The zoo can use internet technology to provide a website for the public to get more information about its program. It will also allow the zoo to collect photos of moths and the related information from the public. The scientists from other zoos can use internet technology to log into the zoo's servers and examine the photos and related information. Intranet technology will allow scientists at the zoo to verify the photos and data collected, and update the zoo's database.

Question 22 (b)

Criteria	Marks
• Outlines technical issues that could occur when collecting and transmitting photos	3
• Outlines ONE technical issue that could occur when collecting or transmitting photos	2
• Identifies a relevant technical issue	1

Sample answer:

The quality of the photos will depend on the standard of the equipment used in the collection process. A good quality photo requires a high-resolution camera or mobile phone. If the user's mobile phone has a network dropout, photographs may not get uploaded to the zoo's server or be corrupted as they are transmitted. A good quality photo may be large in file size, which may also affect transmission.

Question 22 (c)

Criteria	Marks
• Describes wired and wireless transmission media that could be used in the system	4
• Outlines wired and/or wireless transmission media that could be used in the system	3
• Identifies wired and/or wireless transmission media that could be used OR • Outlines a wired or wireless transmission medium that could be used	2
• Shows a basic understanding of a transmission medium	1

Sample answer:

Members of the public could use 3G or 4G wireless technology when uploading the photos from their mobile device to the zoo's webserver. As the members of the public will be in different locations from the zoo 3G and 4G are both networks that will enable them to connect their phone to the internet. This type of data transmission is fast between the individual's mobile device and the zoo.

Suitable wired media at the zoo would be optical fibre cable and twisted pair cable. The optical fibre cable would be used as the backbone for the zoo's network and access to the internet. The twisted pair cable or copper cable would be used to connect the computers to the zoo's network. If the zoo used mobile devices, eg laptops, then a wireless network would be appropriate.

Wireless transmission between scientists at different zoos or even in their own homes could be achieved by using a wireless network. This will enable the scientists to access the zoo's website via the internet.

Question 23 (a)

Criteria	Marks
• Describes benefits of converting from a flat-file to a relational database	3
• Identifies some benefits of converting from a flat-file to a relational database OR • Outlines a benefit of converting from a flat-file to a relational database	2
• Identifies a feature of a flat-file or a relational database	1

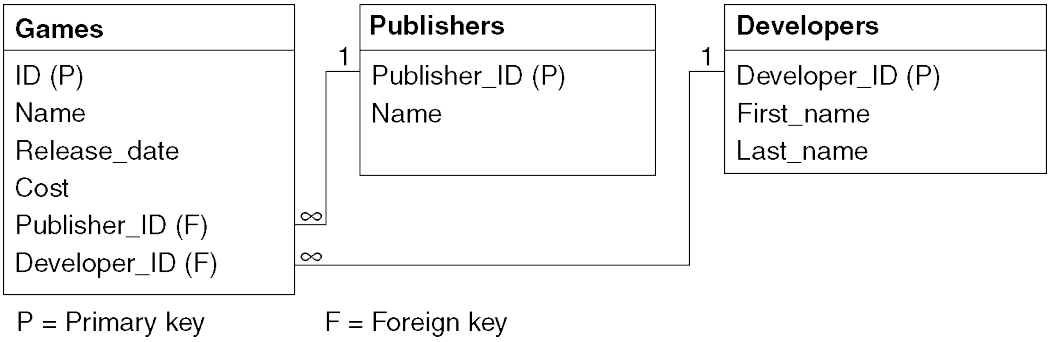
Sample answer:

By converting its flat-file database to a relational database, the games store could remove unnecessary repetition of data (eg the multiple occurrences of a developer's name) and reduce the amount of storage space required for its data. This would allow more efficient sorting, searching and querying, and minimise the amount of updating needed of the database. Since a relational database organises data into tables and links them using relationships, data input errors may also be reduced by applying data validation rules that can look up the relevant tables.

Question 23 (b)

Criteria	Marks
• Constructs a schema to represent the three tables • Identifies the primary keys, foreign keys and relationships	3
• Constructs a schema showing some understanding of the primary keys and/or foreign keys and/or relationships	2
• Shows a basic understanding of a schema	1

Sample answer:



Question 23 (c)

Criteria	Marks
• Designs a substantially correct SQL query that will display the required data in alphabetical order	3
• Designs a SQL query that fulfils some of the requirements	2
• Identifies a feature of an SQL query	1

Sample answer:

```
SELECT Name, Release_date
FROM Games
WHERE Release_date >= '01/03/2018' AND <='31/03/2020'
ORDER BY Name (ASC)
```

Question 24 (a)

Criteria	Marks
• Describes the changing nature of work for both parents and school employees as a result of the new system	3
• Outlines the changing nature of work for parents and/or school employees as a result of the new system	2
• Identifies a feature of the changing nature of work	1

Sample answer:

The system will enable parents to place uniform orders and electronically pay for excursions at a time that is convenient for them rather than having to go to the school. Parents will also need to ensure they have the appropriate technology and skills to use the system. School employees would spend less time interacting with parents and students and spend more time working on computers and organising orders. Training may be required for the school employees to be able to efficiently operate the system.

Question 24 (b)

Criteria	Marks
• Shows a thorough understanding of how the prototyping approach could be used to develop the new system	3
• Shows some understanding of how the prototyping approach could be used to develop the new system	2
• Identifies a feature of prototyping	1

Sample answer:

The prototyping approach may be used to develop a working model of the new system so that the school employees and parents can provide feedback regarding interface design and operation to the developers. The developers can use the feedback to make modifications to ensure the system meets the requirements and needs of the school and parents.

Question 24 (c)

Criteria	Marks
• Provides a comprehensive analysis, identifying features of processing and storing and retrieving in the new system and the relationship between them • Draws out and relates implications	5
• Describes the new system in terms of processing and storing and retrieving	4
• Outlines features of processing and storing and retrieving in the new system	3
• Identifies features of processing and/or storing and/or retrieving in the new system OR • Describes a feature of processing or storing or retrieving	2
• Identifies a feature of processing or storing or retrieving	1

Sample answer:

School employees process parents' personal details, such as name and contact information as well as products ordered through the system to produce a shopping list per customer. Orders are prepared and payment information such as credit card details is processed so that the parent is appropriately charged for their purchase.

As all orders are processed digitally, accurate and up-to-date records of stock quantities and availability need to be kept. Parents will now be required to check their emails for the receipt of their purchases and check these payments against their initial orders and perhaps even their banking statements. Where items are not sourced or are out of stock and a text message is sent, parents will need to check their receipts to ensure they have not been charged for items that are unavailable.

Parent details – personal and payment details as well as purchase requests are stored in the school supplies database. Employees who are sourcing and packing the orders retrieve the details from the database to help pack the order. Once an order is ready, parent phone or email information is retrieved from the database and a text or email sent to the parent so they know the order is ready for collection.

Section III

Question 25 (a)

Criteria	Marks
• Justifies a situation where batch processing is appropriate	3
• Shows an understanding of batch processing	2
• Identifies a feature of batch processing	1

Sample answer:

Batch processing is appropriate for preparing electricity bills. This is because electricity bills are issued periodically (eg monthly or quarterly). Electricity usage data needs to be collected and stored until the electricity bills are generated. It would be impractical to issue bills to customers in real time after each use.

Question 25 (b)

Criteria	Marks
• Describes how OLAP can be used in a transaction processing system using an example	3
• Outlines the use of OLAP in a transaction processing system	2
• Identifies a feature of OLAP	1

Sample answer:

Online analytical processing (OLAP) is a tool that provides an analysis of data from multiple database systems. OLAP data is multidimensional so the information can be compared in different ways. For example, a company might compare their sale figures in August and September then compare these results with sales from other locations, which could be stored in a different database.

Question 25 (c)

Criteria	Marks
• Explains the importance of data validation in the booking system • Provides examples of data validation methods	4
• Outlines the importance of data validation in the booking system • Provides at least one example of a data validation method	3
• Shows some understanding of the importance of data validation AND/OR • Provides example/s of a data validation method	2
• Shows a basic understanding of data validation	1

Sample answer:

Data validation is important in this booking system because an inaccurate or incomplete transaction may lead to confusion for the customer (eg booking a concert at the wrong venue) or financial loss to the booking system (eg incorrect credit card details). To prevent the customer from entering a concert or venue that cannot be recognised by the system, drop-down boxes are used. To improve the accuracy of the entry of credit card details, an input mask is used. A confirm button is included to provide customers with the opportunity to check their details. Inaccurate transaction data could lead to data corruption in the organisation's database or security issues eg a customer's details being sent to the wrong customer. Data validation methods ensure that the customer's input is accurate and valid before the transaction is processed.

Question 25 (d)

Criteria	Marks
• Identifies issues and provides points for and against the use of the grandfather, father, son back-up procedure in the medical centre	4
• Outlines the use of the grandfather, father, son back-up procedure in the medical centre • Identifies benefit/s and/or drawback/s	3
• Identifies features of the grandfather, father, son back-up procedure	2
• Identifies a feature of backup	1

Sample answer:

The grandfather, father, son (GFS) rotation enables the medical centre to undertake a daily, weekly and monthly backup of their data. This type of backup provides security for the medical centre. Should the data be compromised then there are three versions of the backup that can be used. The recovery of the data can be restored back to any day in the last week, any week in the month or any month in the year.

The GFS backup can use a combination of full and differential backup as father and son and a full backup as the grandfather. This means the medical centre can keep the long-term backups (grandfather) to be stored in an off-site storage facility and in the case of a disaster, there is a full backup of the data available.

The medical centre would need to purchase large numbers of tapes for each of the GFS rotations, which can become costly. The GFS backup means the medical centre would need to schedule the backup each day and weekly, as this type of backup does not permit continuous backup to take place.

Question 25 (e)

Criteria	Marks
• Explains why data accuracy, data security and data integrity are important in the scenario	6
• Describes why data accuracy, data security and data integrity are important in the scenario	5
• Describes why at least two of these: data accuracy, data security and data integrity, are important in the scenario	4
• Outlines features of data accuracy and/or data security and/or data integrity in relation to the scenario	3
• Identifies some features of data accuracy and/or data security and/or data integrity	2
• Identifies a feature of data accuracy or data security or data integrity	1

Sample answer:

Data accuracy is the extent to which data is free from errors. When the customer enters their personal and banking details, these need to be correct so that the correct account is accessed for payment. The bank will need to ensure that the purchase transaction belongs to that customer. If there were an error, it would be difficult to determine who is responsible.

Data security involves implementing safeguards to protect the data from being stolen, destroyed or maliciously modified. The customer would need to add a password or use facial recognition identification to prevent other people from accessing their banking and payment details when shopping online. This protects the privacy of the customer and protects the customer from hackers who may steal their money. There needs to be a secure connection when the customer enters their details on the shopping website and when the shopping website interacts with the customer's bank.

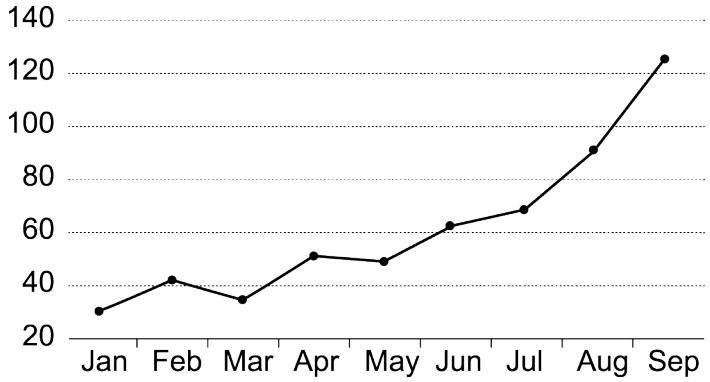
Data integrity refers to the completeness and reliability of data. It is important for the bank and the shopping website to have the same details so the correct amount of money is deducted and the correct number of payments is made. The bank and the shopping website also need to be accountable to the customer if an error occurs. The bank and the shopping website would need to implement data validation and verification checks to ensure that transaction details are complete and reliable.

Question 26 (a)

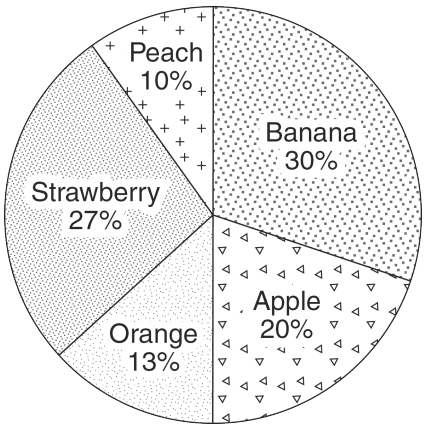
Criteria	Marks
• Recognises the differences between a line chart and a pie chart • Includes an example of each	3
• Shows some understanding of a line chart and/or a pie chart	2
• Identifies a feature of a chart	1

Sample answer:

A line chart is a way of plotting data points on a line. It is used to show trend data, or the comparison of two data sets. An example is shown below.



Where a pie chart is used to compare data slices of different sizes are marked on a circle (ie the pie) based on what part of the whole they represent. An example is shown below.



Question 26 (b)

Criteria	Marks
• Describes the purpose of an intelligent agent	3
• Shows some understanding of an intelligent agent	2
• Identifies a feature of an intelligent agent	1

Sample answer:

An intelligent agent is a program that can be used to independently gather information on a regular, programmed schedule or when prompted by the user in real time. The intelligent agent program uses parameters to search all or some part of the internet, gathers information the user is interested in and presents it to them on a periodic or requested basis. Data intelligent agents can extract any specifiable information, such as included keywords or publication date.

Question 26 (c)

Criteria	Marks
• Identifies issues and provides points for and against the use of data mining in a decision support system	4
• Outlines points for and/or against the use of data mining in a decision support system	3
• Shows some understanding of data mining in a decision support system	2
• Identifies a feature of data mining	1

Sample answer:

Data mining is the process of finding patterns, trends and relationships among large sets of data. The findings are often useful for decision support systems. For example, a supermarket may analyse customers' shopping data to determine which products are popular in order to plan their sales campaign.

However, if the data used for data mining are inaccurate, limited or biased, erroneous inferences can be made. For example, if a supermarket uses customer data collected from a small town to make predictions about which products are popular and applies the findings to a nationwide sales campaign, the inference is unlikely to be valid. Furthermore, data mining raises privacy concerns as individuals are not always aware of how or for what purpose their personal information is being used.

Question 26 (d)

Criteria	Marks
• Describes how an expert system works using information from the diagram	4
• Describes some components of an expert system OR • Shows a sound understanding of how an expert system works	3
• Outlines how ONE component of an expert system works OR • Shows some understanding of how an expert system works	2
• Shows a basic understanding of an expert system	1

Sample answer:

The user interface is the system that allows the user to query the expert system by asking a question/s. The user interface is designed to be simple to use. The inference engine uses the query to search the knowledge base, ie examine the knowledge base for information that matches the user's query (questions). Forward and backward chaining determine the order in which rules are tested. Forward chaining starts from the known facts and moves forwards by applying inference rules to extract more data, and it continues until it reaches the goal. Backward chaining starts from the goal, moving backwards by using inference rules to determine the facts that satisfy the goal. The knowledge base is a collection of facts and rules that is created from information that is provided by human experts. The interface then provides an answer or some advice to the user.

Question 26 (e)

Criteria	Marks
• Explains how a variety of formulae have been used to calculate the weekly pay • Makes specific reference to cells E3, C9, D9, E9 and B14:C17	6
• Describes how a variety of formulae have been used to calculate the weekly pay including the use of IF and table lookup	5
• Describes features of cells E3, C9, D9, E9 and B14:C17	4
• Outlines features of formulae in the spreadsheet	3
• Shows some understanding of the use of formulae in the spreadsheet	2
• Shows a basic understanding of a spreadsheet formula	1

Sample answer:

Cell C9 uses an IF statement to calculate the number of hours worked as overtime. If cell B9 is more than cell B4, the regular number of hours worked in a week, ie the IF statement is true, then the value in B4 is subtracted from B9. If the IF statement is false then zero is entered.

Cells B14:C17 use VLOOKUP to find the overtime pay rate per hour between the different rows in the overtime rate table, and return a pay rate amount per hour worked as overtime.

Cell D9 is the result from the VLOOKUP table as $35.35 is in the 2nd row of hours between 1 and 5. Any hours within that range will be paid at $35.35 per hour as overtime.

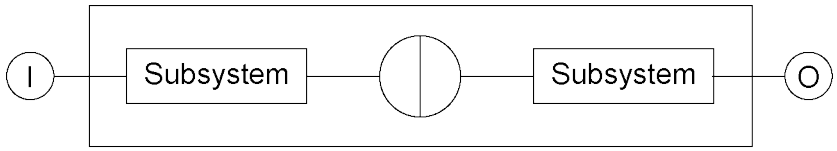
Cell E9 calculates the weekly wage for each employee using the weekly standard pay (E3) and the overtime hours and overtime pay rate. Since cell E3 is the weekly standard pay and the cell value does not change, it needs to be an absolute reference for the cell value to remain constant when copied to other cells in the column. The overtime pay rate is obtained from the VLOOKUP table. The number of overtime hours worked is calculated using the IF statement in cell C9.

Question 27 (a)

Criteria	Marks
• Shows a sound understanding of how block diagrams may be used to describe automated manufacturing systems	3
• Shows some understanding of how block diagrams may be used to describe automated manufacturing systems	2
• Identifies a feature of a block diagram	1

Sample answer:

A block diagram is a graphical representation of an automated manufacturing system. It provides an understanding of the system's function and helps to create the interconnections between the external inputs and outputs, which are represented by circles, and the interface between the two systems, which is represented inside a rectangle.



Automative Manufacturing System

Question 27 (b)

Criteria	Marks
• Recognises the differences between underdamping and overdamping • Includes an example of each	3
• Shows some understanding of underdamping and/or overdamping	2
• Identifies a feature of damping	1

Sample answer:

Underdamping occurs if the change is completed too fast and the actuator misses the desired level potentially causing an oscillation, such as a very soft suspension in a car causing a very bouncy ride.

Overdamping occurs if the change is too slow and the actuator takes longer to reach the desired level or position. A very hard suspension in a car will have no 'give' when driving on a bumpy road.

Question 27 (c)

Criteria	Marks
• Describes how a solenoid and a hydraulic pump could be used in an AMS using examples	4
• Outlines how a solenoid or a hydraulic pump could be used in an AMS using an example, and outlines some features of the other	3
• Shows some understanding of a solenoid and/or a hydraulic pump	2
• Identifies a feature of a solenoid or a hydraulic pump	1

Sample answer:

A solenoid is part of a car's starting system that activates switches for the ignition to the motor. A solenoid is described as a coil of wire usually wrapped around a metal core. When the solenoid receives an electric current from the ignition, it creates a magnetic field, which extends the metal core to engage the starter motor.

A hydraulic pump is a mechanical source of power that converts mechanical power into hydraulic energy such as flow or pressure. In a hydraulic brake system, when the brake pedal is pressed, a pushrod exerts force on the piston in the master cylinder. This causes fluid from the brake fluid reservoir to flow into a pressure chamber through a compensating port.

Question 27 (d)

Criteria	Marks
• Identifies issues and provides points for and against the automation of the chocolate factory	4
• Outlines points for and/or against automation of the chocolate factory	3
• Shows some understanding of automating the chocolate factory	2
• Identifies a feature of automation	1

Sample answer:

Automation of the chocolate factory would enable faster and more consistent quality production of the chocolate products. This reduces labour costs associated with manually producing the chocolate products. This could also free up workers to take on other more skilled roles within the company.

On the other hand, the initial cost associated with purchasing and setting up the technology to automate the chocolate production can be high. Staff will need to be trained to use the new technology. There would also be ongoing maintenance costs associated with ensuring that the technology is working efficiently.

Question 27 (e)

Criteria	Marks
• Provides a comprehensive comparison of the use of Drone-RFID with the use of barcodes for stock management	6
• Describes the use of Drone-RFID and the use of barcodes for stock management, recognising some key differences	5
• Describes the use of Drone-RFID and the use of barcodes for stock management	4
• Provides a thorough description of the use of Drone-RFID or the use of barcodes for stock management OR • Outlines the use of Drone-RFID and the use of barcodes for stock management	3
• Shows some understanding of the use of a drone and/or RFID and/or barcodes for stock management	2
• Identifies a feature of a drone or RFID or barcodes	1

Sample answer:

Although both the Drone-RFID and the barcode reader require human operators, the Drone-RFID can work more efficiently than the barcode system in the warehouse. Barcode scanning is time consuming and prone to errors as the operator has to align the reader and code exactly to scan it successfully. On the other hand, the drone flies through the warehouse scanning the tags as it moves around. RFID tags do not need line of sight to be read, hence as the drone is flying throughout the warehouse it would be able to scan for signals that could be hidden behind other parcels/objects in the warehouse.

Unlike the use of barcodes, as the drone is flying throughout the warehouse a tag collision may occur if the reader picks up signals from multiple tags at the same time or there is interference caused by metal, water or other magnetic fields in the warehouse.

As the drone is constantly moving throughout the warehouse there could be a signal delay between the RFID tag and the reader. This means that some of the parcels or objects could be missed and not catalogued, therefore the stocktaking records would be inaccurate. In comparison, the barcode system could be more accurate if the operator is careful.

Question 28 (a)

Criteria	Marks
• Recognises the differences between morphing and distorting • Includes an example of each	3
• Shows some understanding of morphing and/or distorting	2
• Identifies a feature of morphing or distorting	1

Sample answer:

Morphing is an animation process that requires two images of similar proportions and dimensions. One image is slowly faded/changed, pixel by pixel until the second image emerges. For example, if you had two portrait/ passport photo images of a person, one when they were a child and the other as an adult, the child photo would slowly change into the adult photo one pixel at a time.

Distorting only requires one image. Its pixels are changed by stretching or resizing so the image results in a different form. For example, enlarging someone's eyes without enlarging any other feature.

Question 28 (b)

Criteria	Marks
• Provides similarities and/or differences in TWO techniques that can be used to compress image files	3
• Describes ONE technique that can be used to compress image files OR • Outlines TWO techniques that can be used to compress image files	2
• Identifies a feature of compression	1

Sample answer:

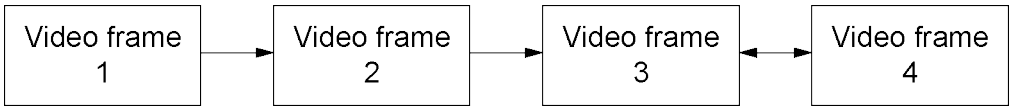
Two methods are lossy and loss-less compression. Both can be used to reduce the file size of an image. Lossy compression provides a higher compression rate, however, a number of bytes are often removed from the file, reducing the quality of the image eg jpeg. Loss-less compression works by identifying repeated patterns in the image and can be restored in full eg gif.

Question 28 (c)

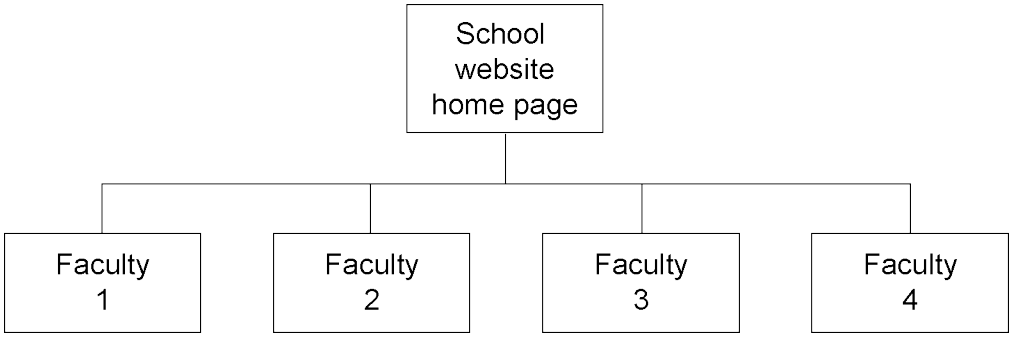
Criteria	Marks
• Identifies an example of each storyboard layout in the website • Provides a justification for each	4
• Identifies an example of each storyboard layout in the website • Justifies two examples of storyboard layouts in the website	3
• Identifies an example of each storyboard layout in the website OR • Justifies an example of a storyboard layout in the website	2
• Identifies a feature of a storyboard	1

Sample answer:

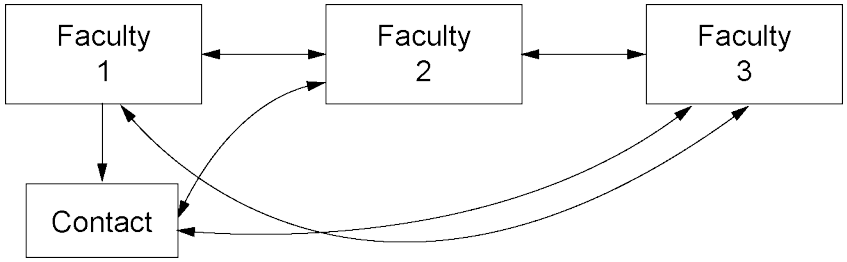
A linear storyboard layout would be used to depict a student's video on a faculty page as videos are presented sequentially, frame by frame.



A hierarchical storyboard layout is depicted when viewing the top level of the website (home page) and how a user navigates to the list of all the faculties.



A non-linear storyboard layout depicts the movement within and between faculty pages. Movement from a faculty page to other faculties is accessed non-sequentially and without having to return to the home page each time. This allows for greater user choice in navigation between the user and the components of the website.



Question 28 (d)

Criteria	Marks
• Shows a thorough understanding of how head-sets and speakers might be used to enhance user experience in this system	4
• Shows a sound understanding of the use of head-sets and speakers to enhance user experience	3
• Shows some understanding of the use of head-sets and/or speakers	2
• Identifies a feature of a head-set or speakers OR • Shows some understanding of enhancing user experience	1

Sample answer:

Headsets in this system allow for an immersive experience by giving learner drivers the ability to have a realistic, 360° view of their surroundings.

Realistic, three-dimensional images are displayed in the headset and this simulation will assist the learner driver in applying the road rules to different weather conditions before they encounter them in real life.

Stereo quality sound can be incorporated via built in speakers in the head-up display or via external, surround sound speakers. The addition of sound will enrich the experience and mimic real-life sounds such as the sound of rain, other cars passing by and emergency services sirens. The combination of the headset and speakers will assist the learner driver in how they react to their surroundings when on the road. This will in turn help build their confidence and reaction to conditions before they get behind the wheel.

Question 28 (e)

Criteria	Marks
• Explains software, communication and processing technologies relevant to the creation of the MMS	6
• Describes software, communication and processing technologies relevant to the creation of the MMS	5
• Describes at least two categories of technologies relevant to the creation of the MMS	4
• Outlines features of software and/or communication and/or processing technologies relevant to the creation of the MMS	3
• Identifies features of software and/or communication and/or processing technologies relevant to the creation of the MMS	2
• Identifies a feature of a relevant technology	1

Sample answer:

Authoring and animation software have evolved enabling graphic designers, animators and other people in multimedia roles the ease of creating high quality multimedia items that can be used to enhance the virtual world experience. Improvements in bandwidth allow the components of the virtual world such as graphics, animation and audio to be experienced in real time and without the staggered nature buffering issues can create. This enables users of the virtual world the ability to interact with other users.

Images, animation, audio and video used in virtual worlds will require greater CPU processing capacity and increased RAM. Realistic images, audio animation and video will generate large file sizes and the hardware required to create and view the final product needs to enable the timely rendering of these data types to ensure the product is viewed smoothly and seamlessly.

2020 HSC Information Processes and Technology
Mapping Grid

Section I

Question	Marks	Content	Syllabus outcomes
1	1	9.1 Project management tool	H5.1
2	1	9.3 Messaging systems	H1.1
3	1	9.2 Hypertext	H1.2
4	1	9.3 Network topologies	H1.1, H1.2
5	1	9.1 Context diagram	H5.1
6	1	9.3 Messaging systems	H1.1, H1.2
7	1	9.3 Network administrator	H1.1
8	1	9.1 Feasibility study	H1.2
9	1	9.3 SSL protocol	H1.1, H1.2
10	1	9.3 Protocols	H1.1
11	1	9.1 Identifying problems within a system	H6.1
12	1	9.2 Validating information from the internet	H1.2
13	1	9.3 Data packets	H1.1
14	1	9.2 Organisation of a relational database	H1.1
15	1	9.2 Data dictionary	H5.1
16	1	9.3 Email features – BCC	H1.2
17	1	9.2 Distributed databases	H1.1, H1.2
18	1	9.3 Hardware components of a communication system	H1.1
19	1	9.1 Conversion methods	H1.1, H1.2
20	1	9.1 Development approaches	H6.2

Section II

Question	Marks	Content	Syllabus outcomes
21 (a)	3	9.1 Techniques for managing a project	H7.1
21 (b) (i)	2	9.3 Error detection – parity bit	H1.1
21 (b) (ii)	2	9.3 Error detection – checksum	H1.1
21 (c)	3	9.1 Decision table	H5.2
22 (a)	3	9.3 Internet and intranet	H1.1, H1.2
22 (b)	3	9.3 Technical issues in collecting and transmitting	H2.1, H2.2
22 (c)	4	9.3 Wired and wireless technologies	H1.1, H1.2
23 (a)	3	9.2 Flat-file database and relational database	H1.1
23 (b)	3	9.2 Schema	H1.1
23 (c)	3	9.2 SQL	H1.2
24 (a)	3	9.3 Changing nature of work	H3.2, H5.2

Question	Marks	Content	Syllabus outcomes
24 (b)	3	9.1 Prototyping development approach	H1.1, H6.1
24 (c)	5	9.2 Information processes	H2.2

Section III

Question	Marks	Content	Syllabus outcomes
25 (a)	3	9.4.1 Batch processing	H1.1, H1.2
25 (b)	3	9.4.1 Online analytical processing	H1.1, H1.2
25 (c)	4	9.4.1 Data collection and validation	H1.1, H5.1
25 (d)	4	9.4.1 Grandfather, father and son backup	H1.1, H4.1
25 (e)	6	9.4.1 Data accuracy, data security and data integrity	H1.1, H3.1
26 (a)	3	9.4.2 Charting	H1.1, H5.2
26 (b)	3	9.4.2 Intelligent agents	H1.1
26 (c)	4	9.4.2 Data mining	H1.1, H4.1
26 (d)	4	9.4.2 Expert systems	H1.1, H1.2
26 (e)	6	9.4.2 Formulae and functions in a spreadsheet	H1.1, H1.2
27 (a)	3	9.4.3 Block diagrams	H1.1, H4.1
27 (b)	3	9.4.3 Underdamping and overdamping	H1.1, H1.2
27 (c)	4	9.4.3 Solenoid and hydraulic pump	H1.1, H4.1
27 (d)	4	9.4.3 Automation	H1.1, H1.2
27 (e)	6	9.4.3 RFID and barcode	H1.1, H3.1
28 (a)	3	9.4.4 Morphing and distorting	H1.1, H1.2
28 (b)	3	9.4.4 Compression techniques	H1.1, H1.2
28 (c)	4	9.4.4 Storyboard layouts	H1.1, H4.1
28 (d)	4	9.4.4 Headset and speakers	H1.1, H4.1
28 (e)	6	9.4.4 Advances in technology	H1.1, H1.2, H4.1