2019 HSC
Information Processes and Technology
Marking Guidelines

Section I

Multiple-choice Answer Key

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

Section II

Question 21 (a)

Criteria	Marks
• Describes the task's progress at the time	2
• Identifies some aspects of the task's progress or an appropriate reason for testing the system	1

Sample answer:

The project team started the task three weeks late. They took four weeks instead of the planned six weeks to complete the task. Although they did not reach the project milestone on time, they saved some time and the task was behind the schedule by one week.

Question 21 (b)

Criteria	Marks
• Identifies an appropriate conversion method and provides a justification	3
• Describes a relevant conversion method	2
• Identifies a feature of conversion	1

Sample answer:

A combination of the pilot and parallel conversion methods is being used. Pilot conversion is used to trial the electronic driver's licence system in the selected areas before rolling out the system to the entire country. Parallel conversion is evident as drivers are required to carry both the plastic and electronic licences during the trial period.

Question 21 (c)

Criteria	Marks
• Explains why a user of the new system can also be considered a participant of the system	2
• Identifies a feature of a user or a participant	1

Sample answer:

Drivers are users of the new system. They can also be considered participants of the system because they carry out information processes such as retrieving and updating of licence details in the new system.

Question 21 (d)

Criteria	Marks
• Outlines how CRC can be used in the system	2
• Identifies a feature of CRC	1

Sample answer:

CRC is a method of detecting errors when data is being sent or received, for example, when a driver downloads their licence to their device. If an error is detected, a request can be made for the driver's licence to be downloaded again.

Question 22 (a)

Criteria	Marks
• Describes risks that should be considered in the feasibility study of this project	3
• Outlines risks that should be considered in the feasibility study of this project	2
• Identifies a relevant risk	1

Sample answer:

Scheduling – That the set time period, ie six months, is an appropriate and realistic amount of time in which to complete the development and activate the mobile app. If the mobile app is not completed within this time period, there could be additional costs for the gym owner.

Economic – Sufficient funds need to be available for the development and testing of the new mobile app. Cost involved in acquiring new technology if the current gym's system is not compatible with the new app.

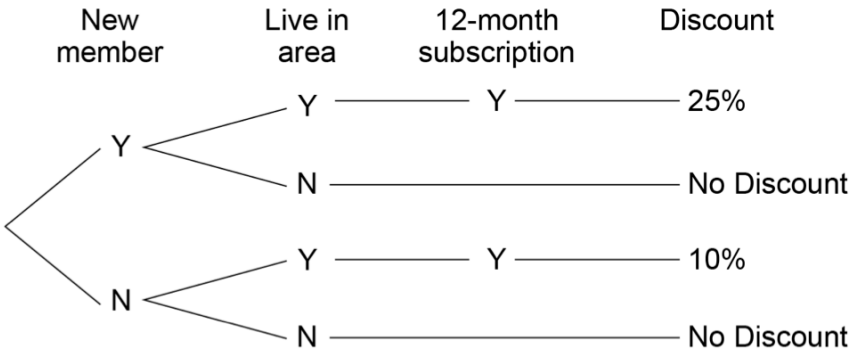
Technical – That the current gym's membership and payment system is compatible with the new mobile app, otherwise the current payment and membership system will need to be up-dated or a new system developed.

Operational – Current and new members may find the new mobile app difficult to navigate and operate. Development of the new mobile app may interfere with the current system's operation.

Question 22 (b)

Criteria	Marks
• Draws a substantially correct decision tree	3
• Draws a decision tree that shows some understanding of the rules	2
• Shows a basic understanding of a decision	1

Sample answer:



Question 22 (c)

Criteria	Marks
• Explains how hardware, software and communication systems can be used to secure gym members' data	4
• Describes methods in hardware, software and/or communication systems that can secure gym members' data	3
• Identifies methods that can secure gym members' data	2
• Identifies a feature of data security	1

Sample answer:

The gym's membership data, such as personal data, will be held in a database and stored on a server. The physical server needs to be held in a secure location/room to reduce data loss and unauthorised access. To prevent unauthorised access to the secure location/room, password, smart card or biometric readers would need to be installed. To ensure only authorised personnel can gain access to the data, use of password and username, different levels of permission are set by the database administrator.

The use of passwords, encryption and a firewall to secure of the gym's network ensures that the network is able to perform the required tasks. SSL protocols and encryption help to secure the processing of online payments between the gym's system and the bank.

Question 23 (a)

Criteria	Marks
• Describes the advantages to the city of conducting the census online rather than on paper	3
• Outlines advantages of conducting the census online rather than on paper	2
• Identifies an advantage	1

Sample answer:

Data collected online can be more accurate as input masks and validation procedures (eg reasonableness check) can be implemented. In addition, data collected online is in digital form, so less storage space is required compared to paper. Searching, analysing and processing will be easier and quicker with digital data than with paper-based data, so the results from the census can be available earlier.

Question 23 (b)

Criteria	Marks
• Explains why the website needs to be tested prior to its launch	3
• Shows some understanding of why and/or how the website needs to be tested prior to its launch	2
• Shows basic understanding of website testing	1

Sample answer:

By performing website testing the city can make sure that the web-based census is functioning properly and that any issues that could potentially go wrong before the web-based census goes live to the public are resolved. Volume testing will check the performance of the census website while collecting a large volume of data (population of six million people) being entered into a database, and the impact on response time.

Simulated testing will test the performance of the website under operational conditions ie when many users connect at the same time, to ensure the system does not crash or fail to load and check if the instructions provided are clear and that people can use the site. The website needs to be tested in multiple browsers and devices to ensure consistency in the displays.

Question 23 (c)

Criteria	Marks
• Describes the requirements for the system in terms of analysing and storing and retrieving	4
• Describes the requirements for the system in terms of analysing, and/or storing and retrieving	3
• Outlines either analysing, or storing and retrieving	2
• Identifies a feature of either analysing, or storing and retrieving	1

Sample answer:

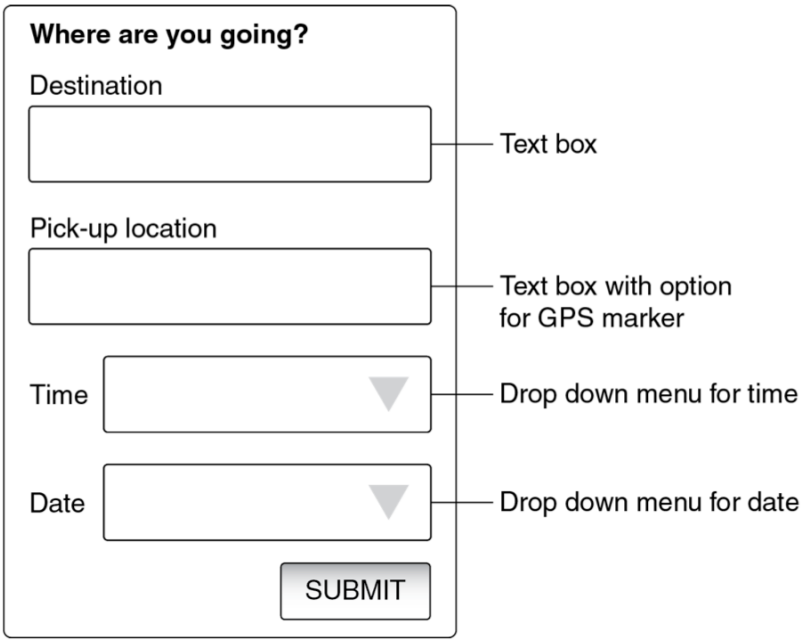
Since there will be a large volume of data and complex analyses, large amounts of primary and secondary storage will be required for efficient processing. Fast and powerful processors will be required to handle the complex manipulation of data (eg sorting, selecting and modelling). Analysis software will be needed to create charts and graphs and to identify trends. It is also important that data is not incorrectly analysed.

To support the efficient analysis of the census data, the data need to be stored in a direct-access storage device such as a database server for searching and retrieval of the data. As the database server is storing the data in real-time storage from all the residents, it needs to have sufficient storage space and RAM in order to store and retrieve the data and to host the database application. Data also need to be backed up to avoid accidental loss.

Question 24 (a)

Criteria	Marks
• Draws and labels a substantially correct booking screen for the information system	3
• Draws components of a booking screen for the information system	2
• Draws a feature of a screen	1

Sample answer:



Input screen should contain:

- destination
- current location
- date/time of pick-up.

Question 24 (b)

Criteria	Marks
• Describes the use of wireless communications in this system	3
• Outlines the use of wireless communications	2
• Identifies a feature of wireless technologies	1

Sample answer:

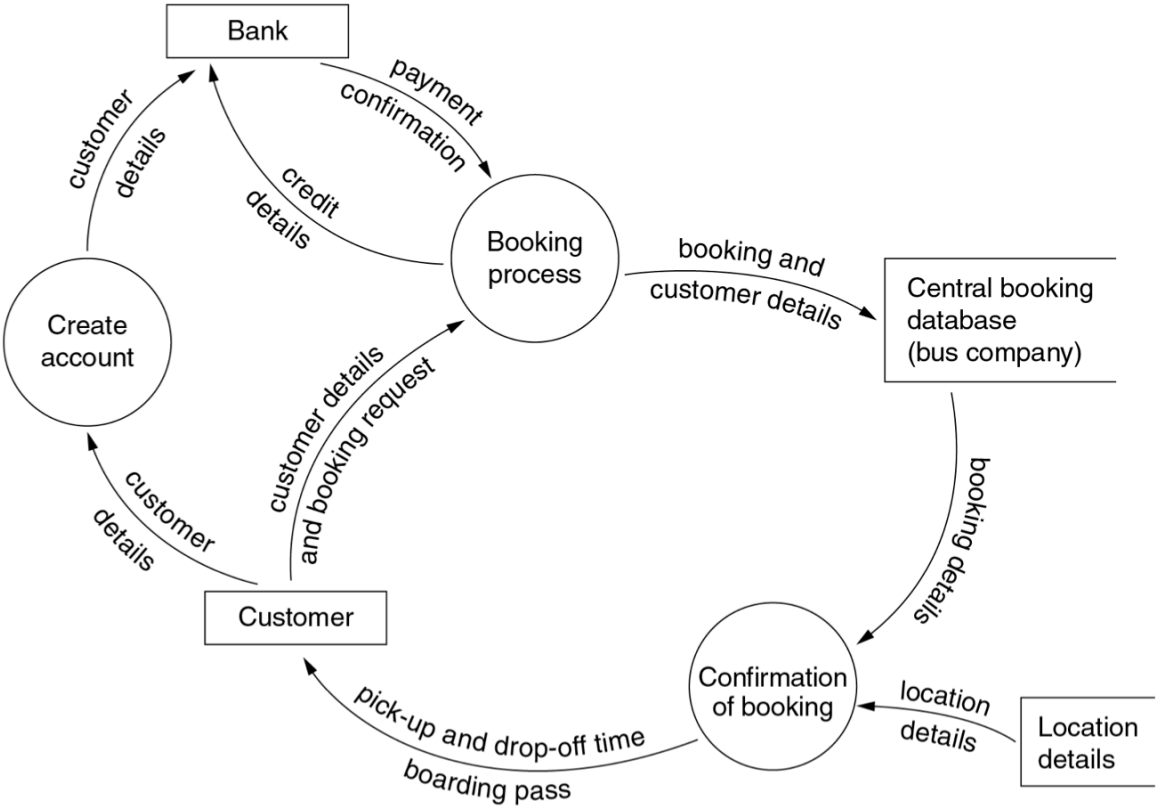
Satellite transmission is required to track the location of the bus via its global positioning system (GPS). The bus company uses this data to determine the approximate time and route the bus driver needs to take to arrive at the customer's location in real-time.

Wireless transmission between the customer and the bus company can be achieved using 3G/4G mobile technologies. The mobile technology enables the customer to communicate with the bus company using the mobile phone app to make a booking. When the booking is confirmed the bus company central computer sends a text message to the customer's mobile phone with the required details, ie boarding pass, pick-up time.

Question 24 (c)

Criteria	Marks
• Draws a substantially correct data flow diagram including all relevant entities, processes, data storage and dataflows for the information system	5
• Draws data flow diagram containing most relevant entities, processes, data storage and dataflows required for the information system	4
• Draws data flow diagram containing most relevant entities and/or processes, and/or data stores and/or dataflow required for the information system	3
• Draws a data flow diagram showing some relevant entities or processes or data stores or dataflow	2
• Identifies a feature of a data flow diagram	1

Sample answer:



Section III

Question 25 (a)

Criteria	Marks
• Describes essential features of bias, giving a relevant example	3
• Provides essential features of bias or provides a relevant example	2
• Identifies a feature of bias	1

Sample answer:

Bias in data collection is an inclination or leaning that encourages one outcome over another. The result of bias in collection is inaccurate data leading to inaccurate information from the system. For example, bias in data can result from a web survey containing only dropdown list options without an 'other' option. This forces participants to only select one of the listed options from the dropdown list.

Question 25 (b)

Criteria	Marks
• Describes a difference between Online Analytical Processing and Online Transaction Processing	3
• Outlines a difference between Online Analytical Processing and Online Transaction Processing	2
• Identifies a feature of Online Analytical Processing or Online Transaction Processing	1

Sample answer:

OLAP is mainly used for business reporting and data analysis, including budgeting, planning, simulation, data warehouse reporting and trend analysis, giving definite answers to queries.

OLAP can only be used with a database that has been set up using correct structures. As a result of having only one data structure to query, it is faster to search. OLAP allows data to be atomised and summarised, but can only answer generic, unstructured questions.

OLTP is typically used for order entry, financial transactions and retail sales. OLTP is characterised by a large number of short transactions. It typically automates daily operational functions and can run real-time reports and analysis; processes that are critical to any business. OLTP has the ability to ensure that two users cannot change the same data at the same time.

Question 25 (c)

Criteria	Marks
• Describes advantages and disadvantages of both batch and real-time processing with a relevant example of each	4
• Provides advantages and disadvantages of batch and real-time processing	3
• Outlines batch and/or real-time processing	2
• Identifies a feature of batch or real-time processing	1

Sample answer:

Batch processing occurs when transactions are processed in bulk, often outside business hours to maximise computer time. An example of this is a large company running a batch process to pay its staff overnight. A disadvantage of batch processing is that it will stop on any error and cannot proceed without the error being corrected. For example, if there is an error in the batch payment system for staff, there may be delays in all staff members being paid in a timely manner.

An advantage or real-time processing is that it gives immediate feedback to users. For example, if a user is booking a seat on a flight to Melbourne, they will get immediate confirmation of the booking and no-one else will be able to book that seat. A disadvantage of real-time transaction processing is that it must always be online and secure, which can be very expensive to maintain. For example, an ATM must have a secure, continuous connection to its main bank database so that it can read and make customers' transactions in real time.

Question 25 (d)

Criteria	Marks
• Explains benefits of using a combination of partial backup and full backup	4
• Describes benefits of using a combination of partial backup and full backup	3
• Outlines a benefit of either a partial backup or full backup	2
• Identifies a feature of a backup	1

Sample answer:

A partial backup is undertaken by the rental agency each night and only backs up data that has been changed or created since the last backup (whether differential or incremental). This backup procedure is faster and requires significantly less storage space than a full backup as there is less data to back up.

A full backup is a complete backup of all data in the rental agency's information system, including the software and configuration settings, on a regular basis, eg weekly. The benefit to the rental agency is, should their data become corrupted, lost or deleted, then the latest version of the full backup is copied or loaded back into the operational system.

It is beneficial for the agency to use both full and partial backups in their information system to ensure that, in the event of a system failure, their restoration procedure is easy and they can restore most if not all of their data.

Question 25 (e)

Criteria	Marks
• Discusses relevant issues that could arise from implementing the shop, scan and go payment system • Provides points for and against	6
• Discusses issues that could arise from implementing the shop, scan and go payment system • Provides points for or against	5
• Describes issues that could arise from implementing the shop, scan and go payment system	4
• Outlines issues that could arise from implementing the shop, scan and go payment system	3
• Outlines an issue relating to the shop, scan and go payment system	2
• Identifies an issue relating to the shop, scan and go payment system	1

Sample answer:

The new shop, scan and go payment system changes the nature of work for employees at the supermarket due to the automation of their job. Both customers and staff will require training in order to implement and use this system. Fewer staff are required at the checkout as customers are able to pay online when they tap the 'finish shopping' button. However, there would be need for a greater security presence in the store to ensure customers are being honest.

There is less social interaction between customers and staff owing to the self-service nature of the supermarket. However, customers will have a faster shopping experience because there are no queues at checkouts.

It is important that data in the system is accurate, so that when a customer scans a barcode, the correct item appears in their list and they are charged the correct price for the item.

Question 26 (a)

Criteria	Marks
• Describes how a management information system can be used to support decision making	3
• Outlines how a management information system can be used to support decision making	2
• Identifies a feature of a management information system	1

Sample answer:

A management information system (MIS) is an information system that gathers, stores and processes data within an organisation. The data can be processed into different forms, such as graphs, charts, diagrams or reports to generate accurate and relevant information to support the decision making in the organisation. This enables the organisation to plan and control operational functions and day-to-day activities to be carried out more efficiently.

Question 26 (b)

Criteria	Marks
• Describes the difference between a formula and function including an example of each	3
• Describes a formula and/or a function	2
• Identifies a feature of a formula or function	1

Sample answer:

A formula is an equation that the user of a spreadsheet defines, eg =(D1+D2)/A$5. A function is a built-in operation, such as SUM(B2:B10), AVERAGE(C6:C23). The difference is that a function is a built-in calculation, while a formula is a user-defined calculation.

Question 26 (c)

Criteria	Marks
• Explains why the fatigue monitoring system is a neural network and not an expert system	4
• Links features of the fatigue warning system to features of a neural network • Shows an understanding of expert system in the context	3
• Shows some understanding of a neural network and/or an expert system	2
• Identifies a feature of a neural network or expert system	1

Sample answer:

Neural networks are a tool for finding patterns used in machine learning. The fatigue monitoring system can be considered a neural network as it is learning driver behaviour via the infra-red camera which is constantly monitoring the driver's facial and head movements. It compares the driver's driving behaviour with previous collected data in order to determine if the drive is fatigued or distracted. If a fatigue related situation occurs, then the system will alert the driver either visually or through audio. Whereas an expert system requires a knowledge base which would contain all the if-then rules for all the different possibilities for eyelid closure, facial and head movement for a range of different individuals.

Question 26 (d)

Criteria	Marks
• Explains the responsibilities of the emergency managers in making decisions	4
• Describes the responsibilities of the emergency managers in making decisions	3
• Outlines the responsibilities of the emergency managers in making decisions	2
• Identifies a responsibility related to the use of decision support systems	1

Sample answer:

The emergency managers need to ensure that the data entered into the 3D flood modelling system is accurate and up-to-date, otherwise any decision made will be inaccurate. The 3D flood modelling system is designed to assist the emergency managers in suggesting potential solutions in the case of a flood rather than providing a definite solution. The emergency managers will require training and practice in using and interpreting the information provided by the modelling system, in order to make the best possible decision.

Question 26 (e)

Criteria	Marks
• Explains the relationship between data warehousing and data mining in assisting in the decision making process	6
• Describes the relationship between data warehousing and data mining in assisting in the decision making process	5
• Describes features of data warehousing and data mining in assisting in the decision making process	4
• Outlines features of data warehousing and data mining in assisting in the decision making process	3
• Outlines either data warehousing or data mining	2
• Identifies a feature of either data warehousing or data mining	1

Sample answer:

Both data mining and data warehousing are tools that are used to turn information (or data) into actionable knowledge and decisions.

Data warehousing describes the process of designing how the data is stored in order to improve reporting and analysis. They are large separate databases that include data from all the banking operational databases. Each of the banking databases needs to be connected. The data contained in these databases relate to the other relevant data so that all the data can be examined together for reporting and analysis.

Data mining is a process used to turn raw data into useful information. The bank will have multiple records on its customers' banking history. Using software to sort through large data sets allows the bank to identify patterns and establish relationships between customers' spending patterns and payment details, saving patterns, loan repayments through data analysis.

The relationship between data mining and data warehousing is that data, properly warehoused, is easier to mine, allowing for more meaningful and efficient queries being run to improve the decision making. This enables the bank to determine which of the new products should be offered to which customer.

Question 27 (a)

Criteria	Marks
• Describes the purpose of production scheduling in an automated manufacturing system	3
• Outlines the purpose of production scheduling in an automated manufacturing system	2
• Identifies a feature of production scheduling	1

Sample answer:

Production scheduling is an important step in planning that supports the timing, organisation and cost of production of the manufacturing process. Production scheduling is used to arrange, allocate and control machine resources, human resources, materials and workloads in an automated manufacturing system.

Question 27 (b)

Criteria	Marks
• Distinguishes between a batch and continuous processing system • Includes an example of each	3
• Shows some understanding of batch and/or continuous processing systems	2
• Identifies a feature of a batch or continuous processing system	1

Sample answer:

Continuous – no set starting or finishing point with the system performing the same job. It is a closed system which uses feedback to adapt its functioning to the current condition. For example, an oil refining, power generation, air conditioning/heating unit in a building which runs 24 hours a day.

Batch – is a system with a very clearly defined start and end to process separate production runs, with the system being modified in between to perform different but similar functions. It queues the job until there are sufficient to process, and then completes one identical set of products at a time. For example, seasonal fruit being canned or different drink flavours being bottled.

Question 27 (c)

Criteria	Marks
• Discusses the use of rapid prototyping in an automated manufacturing system	4
• Describes the use of rapid prototyping in an automated manufacturing system	3
• Outlines use of rapid prototyping in an automated manufacturing system	2
• Identifies a feature of rapid prototyping	1

Sample answer:

Rapid prototyping provides manufacturers, engineers, designers and development teams with distinct advantages that include the ability to explore and realise concepts more quickly and efficiently. This efficiency in time and the lowering of cost allows teams to move beyond the mere visualisation of a product, making it easier to grasp the properties and design of a product.

Answers could include:

- Using rapid prototyping on designs can be applied repeatedly to incorporate real-time changes that allow for the prompt evaluation and testing of the product.
- This technique provides the opportunity to communicate concepts concisely and effectively by taking ideas, images and concepts from flat and two-dimensional visuals to hands-on products that clients, colleagues and collaborators can then see in action.
- Rapid prototyping provides the process to thoroughly test and refine a concept before it is manufactured in large quantities and to minimise design flaws.
- Small volume rapid prototyping can help eliminate costly design flaws that might not be evident during an early assessment and testing. Rapid prototyping also allows for 3D printing of parts, components and body limbs in the medical field and can be designed and developed more accurately and to order.

Question 27 (d)

Criteria	Marks
• Describes the relationship between CAD, CAM and CNC as used by the dental technician	4
• Describes the relationship between CAD and/or CAM and/or CNC used by the dental technician	3
• Outlines features of CAD or CAM or CNC	2
• Identifies a feature of CAD or CAM or CNC	1

Sample answer:

The dental technician uses CAD (Computer Aided Design) software to design the specifications and measurements used in creating accurate 2D drawings and 3D models of physical components for the dental restoration. The CAD design is then input into the CAM (Computer Aided Manufacturing) software. CAM converts the CAD design into data that can be directly entered into the CNC system. CNC is a computerised method of carrying out specific tasks. The CNC machine uses the data from CAM to make the dental parts, such as the dental implants or dentures.

Question 27 (e)

Criteria	Marks
• Explains how sensors and actuator technology are used in an automated warehouse to process an online order	6
• Describes how sensor and actuator technology are used in an automated warehouse to process an online order	5
• Describes sensor and actuator technology used in an automated warehouse to process an online order	4
• Outlines features of either sensor and/or actuator technology in an automated warehouse	3
• Outline features of some technology in an automated warehouse	2
• Identifies a feature of technology	1

Sample answer:

To complete an order that has been placed, robotic technology in the warehouse locates and packs the item. Electric motors and motion sensors are used to move robots around the factory to locate specific items. When reaching for and picking up an item, the robots use stepping motors for fine, precise movement along with light and pressure sensors to ensure the item is not crushed, knocked over or dropped as it is lifted. A hydraulic robotic arm is used to reach an item on a shelf. Hydraulic arms are used because of their fast response and precise movements. Each order being processed is given a unique barcode linking to relevant data including item location, customer name and delivery address. To track inventory and locate products, all barcodes are recorded in the factory's database. Light sensors will read the barcode by reading reflected light from the scanned code. Light detectors also measure package sizes, while pressure sensors measure package weights.

Question 28 (a)

Criteria	Marks
• Describes how multimedia systems can be used in education and training with an example	3
• Outlines how multimedia systems can be used in education and training	2
• Identifies a feature of a multimedia system	1

Sample answer:

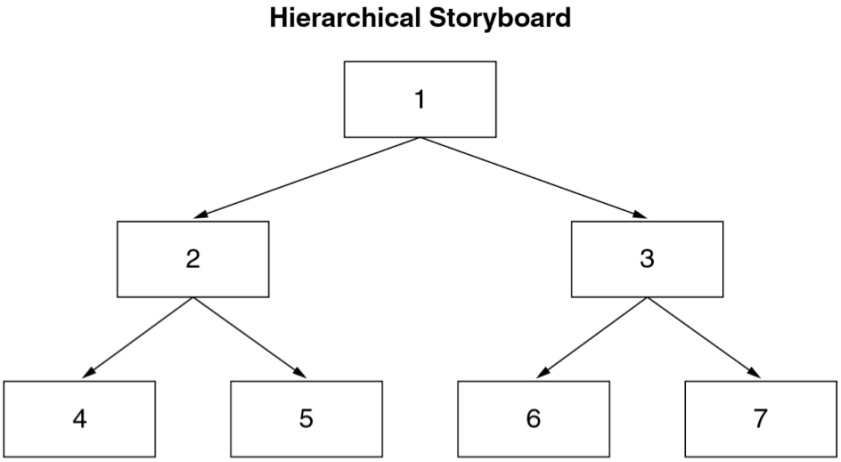
Education and training use multimedia systems to provide the opportunity to learn in new and different ways as they provide a more realistic and immersive environment for individuals. Virtual reality and games can be used in an educational setting to teach a particular concept or to visit a virtual museum in another country, such as the Louvre. Simulations can be used in training scenarios in a more realistic manner, such as the use of simulation to train doctors in surgical techniques, training pilots to fly different aircraft.

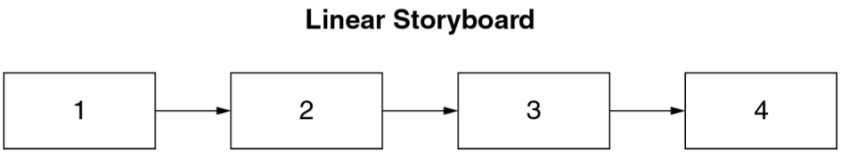
Question 28 (b)

Criteria	Marks
• Describes the difference between hierarchical and linear storyboards with a diagram of each	3
• Outlines differences between hierarchical and linear storyboards	2
• Identifies a feature of a storyboard	1

Sample answer:

Hierarchical storyboards offer multiple paths to be taken, while a linear storyboard offers only a single path. Linear storyboards are best used in films or television, whereas hierarchical storyboards can be used in designing educational or leisure systems.





Question 28 (c)

Criteria	Marks
• Explains how advances in processing power have influenced the development of multimedia systems	4
• Describes how advances in processing power have influenced the development of multimedia systems	3
• Outlines how the advances in processing power have influenced the development of multimedia systems	2
• Identifies a feature of multimedia development	1

Sample answer:

Advances in processing power have resulted in more powerful CPUs and graphic processing units (GPUs) and have seen the development of more interactive multimedia systems such as 3D movies and games and high definition video. This in turn has seen the development of higher resolution display devices for these media.

Faster CPUs and GPUs enable complex multimedia systems to be experienced on a wide variety of hardware and improved bandwidth allows for streaming to multiple devices including mobile devices.

More powerful CPUs allow for faster compression and decompression of data using new codecs that allow for high quality media to be stored in smaller files. This enables developers to create bigger projects with a greater variety of elements that can be stored or streamed more efficiently.

An increase in processing power has seen the need for larger storage devices with faster access to store and retrieve data such as high-resolution images and high definition video.

Question 28 (d)

Criteria	Marks
• Describes the fields of expertise required to develop this system	4
• Outlines some of the fields of expertise required to develop this systems	3
• Outlines a field of expertise required to develop a multimedia system OR • Identifies some fields of expertise to develop a multimedia system	2
• Identifies a field of expertise to a develop a multimedia system	1

Sample answer:

Developing the new touch-screen ordering system requires the skills of different experts including project managers, design and layout and technical personnel. Project managers are responsible for developing the project plan for the touch-screen ordering system. This includes planning, scheduling of tasks, managing resources, and monitoring the project team. The project manager needs to be able to communicate and negotiate with the project team and the client.

Design and layout experts, ie graphic designers, use a variety of features, such as fonts/font sizes, colour, images to organise the layout of the food items, pricing and orders on each of the touch screens to ensure a consistent look for the multimedia system.

Technical personnel need to have technical knowledge of the hardware and software required to ensure that the ordering system will operate on each of the touch-screen devices located in the restaurant. The system should also be intuitive for the employees and customers to navigate from screen to screen.

Question 28 (e)

Criteria	Marks
• Recommends appropriate file formats for images, animation, audio and video and provides a detailed justification of their use in the presentation	6
• Provides an explanation of appropriate file formats for images, animation, audio and video and justifies their use in the presentation's development	5
• Describes file formats for image, animation, audio and video and of their appropriateness to be used in the presentation's development	4
• Outlines features of file formats for images or animation or audio or video used in the presentation's development	3
• Outlines features of file formats for images or animation or audio or video	2
• Identifies a feature of a file format	1

Sample answer:

The producer could use JPG as the image file format, as it compresses the original image while still maintaining high-quality images. This is relevant as the producer will want high quality images to produce the best quality presentation possible.

Animations could be exported into GIF format, which supports both transparency and animation. GIF files are highly compatible with other media and players, giving producers a high quality animation that can be included with the video when exporting the presentation to file.

Audio can be captured, saved and exported in WAV and MP3 format. The presentation's sound captures from nature and theme music could be captured and saved as a WAV file to maintain very high quality audio. When the final audio is ready for export, it could be compressed to MP3. MP3 is high quality but compressed audio format that uses limitations of human hearing to remove parts of a sound that are not heard, reducing the file size but keeping the quality high.

MP4 is a video format that is most compatible with internet streaming and playback on a variety of devices. MP4 compresses the video, reducing file size while still maintaining high quality for television playback. MP4 supports streaming and is the current standard for Blu-Ray players.

2019 HSC Information Processes and Technology
Mapping Grid

Section I

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2	1	9.1 Project management tool	H7.2
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4	1	9.3 Analogue to digital conversion	H1.1
5	1	9.2 Database issue (accuracy)	H5.2
6	1	9.2 Database file size calculation	H1.1
7	1	9.3 Handshaking	H2.1
8	1	9.3 Intranet, extranet and internet	H1.1
9	1	9.3 Communications system framework	H1.1
10	1	9.1 Operation manual	H7.2
11	1	9.3 Thin client	H1.1
12	1	9.3 Parity bit	H2.1
13	1	9.2 Free text search	H2.1
14	1	9.3 Communication protocols	H2.1
15	1	9.2 Database sort	H1.1
16	1	9.3 Data packets	H1.2
17	1	9.1 Requirements prototype	H6.1
18	1	9.1 Requirements report	H6.1
19	1	9.2 SQL	H1.1
20	1	9.2 Normalisation	H1.1

Section II

Question	Marks	Content	Syllabus outcomes
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21 (b)	3	9.1 Conversion method	H6.2
21 (c)	2	9.2 Users and participants in a system	H1.2
21 (d)	2	9.3 CRC	H1.1
22 (a)	3	9.1 Feasibility – risk	H6.1
22 (b)	3	9.1 Decision tree	H5.2
22 (c)	4	9.2 Security of data	H3.1, H2.2
23 (a)	3	9.3, 9.2 Advantages of online census	H3.1
23 (b)	3	9.1 Data testing method	H6.2
23 (c)	4	9.2 Information processes – collecting, analysing, storing and retrieving	H2.1, H1.2
24 (a)	3	9.2 Input screen	H6.2, H2.2

Question	Marks	Content	Syllabus outcomes
24 (b)	3	9.3 Wireless transmission	H1.1
24 (c)	5	9.1 Data flow diagram	H6.2

Section III

Question	Marks	Content	Syllabus outcomes
25 (a)	3	9.4.1 Bias in data collection	H3.2
25 (b)	3	9.4.1 OLAP and OLTP	H1.2, H1.1
25 (c)	4	9.4.1 Batch and real-time processing	H3.2
25 (d)	4	9.4.1 Partial and full backup	H1.1
25 (e)	6	9.4.1 Issues related to TPS	H2.1, H1.2
26 (a)	3	9.4.2 Management information system	H1.2, H1.1
26 (b)	3	9.4.2 Formulas and functions	H1.1
26 (c)	4	9.4.2 Neural network and expert systems	H1.2, H1.1
26 (d)	4	9.4.2 3D modelling systems in a DSS	H4.1
26 (e)	6	9.4.2 Data warehousing and data mining	H1.2, H1.1
27 (a)	3	9.4.3 Production scheduling	H1.1
27 (b)	3	9.4.3 Batch and continuous processing	H1.2
27 (c)	4	9.4.3 Rapid prototyping	H1.1
27 (d)	4	9.4.3 CAD/CAM and CNC	H1.2, H1.1
27 (e)	6	9.4.3 Technologies used in an automated warehouse	H2.1, H1.1
28 (a)	3	9.4.4 MMS in education and training	H1.1
28 (b)	3	9.4.4 Storyboards	H1.1
28 (c)	4	9.4.4 Processing power and MMS	H1.2, H1.1
28 (d)	4	9.4.4 Fields of experience in developing MMS	H4.1, H1.1
28 (e)	6	9.4.4 File formats	H1.2, H1.1