2018 HSC Information Processes and Technology Marking Guidelines

Section I

Multiple-choice Answer Key

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

Section II

Question 21 (a)

Criteria	Marks
• Identifies hardware and software required for the system	2
• Identifies hardware OR software	1

Sample answer:

Hardware: Computer device, server (mail, web, database), mobile device (phone, iPad)

Software: Database, internet browser

Question 21 (b)

Criteria	Marks
• Describes a messaging system with justification relevant to the scenario	3
• Outlines a messaging system	2
• Identifies a feature of a messaging system	1

Sample answer:

The dental care centre would use a text messaging service to send the patients confirmation of the date, time and dentist for their appointment. They could send a reminder confirmation a few days prior to the customer's appointment. This would be a suitable messaging system as customers would only need to check their text messages, whereas using an email system the customer would need to search through their email for the appointment information.

Question 21 (c)

Criteria	Marks
• Describes how the report is created to display the daily appointments	3
• Outlines how a report would be created to display the daily appointments	2
• Identifies a feature of a report	1

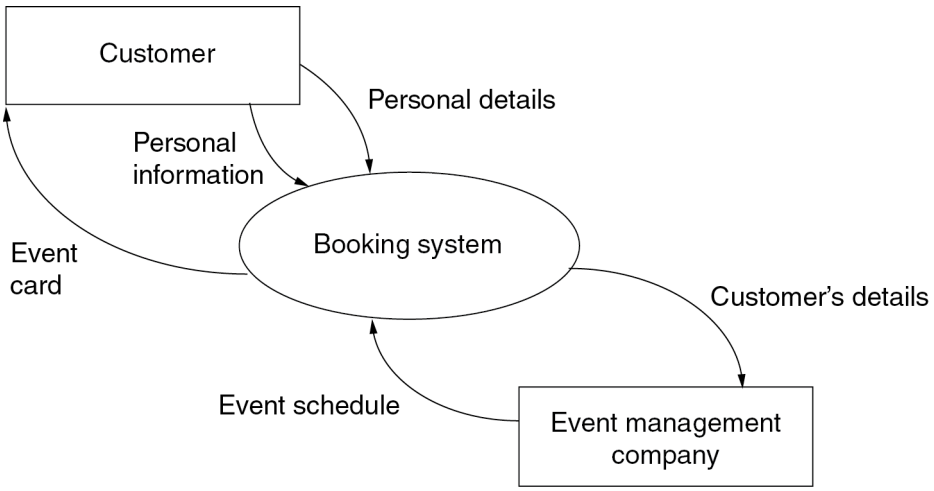
Sample answer:

A query would need to be created to obtain the appointment schedule for the dentist, ordered by date and time. Then using the report generator select the dentist, type of treatment, date and time fields.

Question 22 (a)

Criteria	Marks
• Draws a substantially correct context diagram of the booking system	3
• Draws a context diagram that reflects some of the features of the booking system	2
• Identifies a feature of a context diagram OR • Draws a diagram that shows some understanding of the booking system	1

Sample answer:



Question 22 (b)

Criteria	Marks
• Describes how data is used by the events management company in this system	3
• Outlines how the data is used by the events management company in this system	2
• Identifies a feature of data	1

Sample answer:

The events management company can use the data collected from this event to inform planning for future events. Data mining can be used to find patterns and use these to predict consumer behaviour in relation to the next festival. Management could also sell this data to interested parties who may want to include this data set in their own data analytics.

Question 22 (c)

Criteria	Marks
• Explains issues relating to the use of electronic banking for both the events management company and customers	4
• Describes issues relating to the use of electronic banking for the events management company and/or customers, with reference to the other	3
• Outlines issues relating to the use of electronic banking for either the events management company or customers	2
• Identifies an issue related to electronic banking	1

Answers could include:

- No money handling at the event improves security for purchasers.
- Unless a backup system or manual system is in place customers will not be able to purchase items in the event of a system failure.
- Ease of payments for the customer as they are able to transfer money electronically on demand or as needed to their card.
- The events management company needs to ensure that the connection they use for internet banking is secure so all transactions made are also secure.
- The system must also be secure from hackers at the event and theft, potentially from employees through unauthorised access to the system.
- It is essential that the company has considered the security of any passwords used for any transactions.
- They need to have a backup plan in case the internet fails – how will transactions be made?
- The event managers will need to have other facilities available, ie cash facilities if the customer's card fails to work.
- Potential theft of customer details; payments could be replicated and cards could be copied.
- If a customer loses a card they need to be able to cancel their card.

Question 23 (a)

Criteria	Marks
• Describes TWO communication skills required by the project manager	3
• Outlines communication skills required by the project manager	2
• Identifies a feature of communication skills	1

Sample answer:

The project manager will need active listening and interviewing techniques to complete their job efficiently. Active listening will assist the project manager as they discuss their plan with the restaurant owners and staff to ensure the correct information is gained efficiently. The project manager would use different interview techniques to obtain feedback from the restaurant owners and staff about the design and development of the mobile app and online ordering system.

Answers could include:

- Team building
- Negotiation skills
- Conflict resolution skills.

Question 23 (b)

Criteria	Marks
• Constructs a Gantt chart showing the minimum time required	3
• Constructs a Gantt chart showing some features	2
• Identifies features of a Gantt chart	1

Sample answer:

Week / Task	1	2	3	4	5	6	7	8
Requirements gathering	■	■						
Technical benefit study			■	■				
Design and refine interface				■	■	■		
Build and test						■	■	■

Question 23 (c)

Criteria	Marks
• Explains why secure sockets layers, transmission control protocols and internet protocols are used during transmission in this system	5
• Describes why secure sockets layers, transmission control protocols and internet protocols are used during transmission in this system	4
• Outlines at least TWO of the three technologies (secure sockets layers, transmission control protocols and internet protocols) used in a system	3
• Outlines a feature of secure sockets layers and/or transmission control protocols and/or internet protocols	2
• Identifies a feature of a protocol	1

Sample answer:

The SSL protocol is established when a customer places an order using the mobile phone application. Data (ordering details, payment details) is transmitted from the customer's mobile device to the restaurant's web server via an internet connection. The SSL protocol ensures that the data being transmitted is encrypted, thus order and payment details are kept secure.

The mobile device's network carrier uses TCP and IP protocols to ensure the order and payment data are delivered to the restaurant's web server. These protocols break the data into packets, address the packets (TCP) and send them via the most efficient path available (IP). To ensure the data is received correctly a common set of rules is used. TCP and IP are the protocols that have been specifically developed for internet communication and are used with all internet capable devices.

Question 24 (a)

Criteria	Marks
• Describes the benefits of creating a prototype for this system	3
• Describes a benefit of creating a prototype for this system OR • Outlines the benefits of using a prototype	2
• Identifies a feature of a prototype	1

Sample answer:

Developing a prototype enables the company to provide and demonstrate a working system early in the process. It helps to identify and refine the bushfire detection system to ensure that the system does exactly what it is supposed to do early on in the process.

Prototyping allows the developer to explore ideas and exchange feedback with the clients.

Prototyping helps to firm up how the final solution will look and function.

Acceptance allows the developer to progress to the next stage and to be focused on what needs to be done.

Question 24 (b)

Criteria	Marks
• Explains why live data is used to test the system	3
• Describes why live data is used to test the system	2
• Identifies a feature of data that could be used to test a system	1

Sample answer:

Live data uses real data to test the functionality and accuracy of each sensor node to ensure they work under real conditions. It allows for real time data to be collected, ensuring each sensor node is working as expected within the bushland environment.

It will also test that data is transmitted from the sensor nodes back to the central command centre. It tests that a stable communication network exists between the sensor nodes in the bush and the central command centre.

Question 24 (c)

Criteria	Marks
• Provides and justifies appropriate transmission media between sensor nodes, from the central command centre to the sensor nodes and within the central command centre	5
• Provides and describes appropriate transmission media between sensor nodes, from the central command centre to the sensor nodes and within the central command centre	4
• Describes transmission media between sensor nodes, from the central command centre to the sensor nodes and within the central command centre	3
• Outlines transmission media between sensor nodes and/or from the central command centre to the sensor nodes and/or within the central command centre	2
• Identifies a feature of a network	1

Sample answer:

An encrypted wireless network could be built into each sensor node allowing nodes to communicate with each other through the bush. This is an appropriate medium as it is wireless, thus ensuring it is not damaged by animals or plants (and animals can't get caught in it). Each node will be able to use this medium to communicate with surrounding nodes.

A 3G or 4G network would be appropriate for communication between each sensor node and the central command centre. As nodes are placed throughout the bush, some of them will be a long way from the central command centre. It is a good transmission medium to use as data transmission is fast between the nodes and central command centre, giving the fastest possible notification to the command centre in the event of a fire breaking out. This means that the command centre can move quickly to control the spread of a fire.

Within the central command centre a combination of fibre-optic, copper and wireless media could be used. The fibre-optic cables could provide the backbone of the network and access to the internet, while copper cables could connect workstations to the network. If the central command centre uses hand-held or portable devices, a wireless network would be appropriate. This would ensure all devices have fast and reliable access to the network.

Section III

Question 25 (a)

Criteria	Marks
• Outlines limitations of batch processing	2
• Identifies a feature of batch processing	1

Sample answer:

There is a time delay between the event and its processing. Data needs to be stored securely during this time.

Question 25 (b)

Criteria	Marks
• Provides how web-based and non-web-based transaction processing systems differ, including an example of each	3
• Outlines a difference between a web-based and a non-web-based transaction processing system	2
• Identifies a feature of a web based or a non-web-based transaction processing system	1

Sample answer:

A non-web-based transaction processing system is not connected to the internet and does not use a browser. An example is point of sale in a shop or checking into a flight at the airport.

A web-based transaction processing system is connected to the internet and uses a web browser. It uses live, sensitive data and is most likely encrypted to maintain security. Checking in online before a flight is an example of this or financial transactions in online banking.

Question 25 (c)

Criteria	Marks
• Explains how a transaction processing system and a management information system can work together	3
• Provides information about how a transaction processing system and a management information system can work together	2
• Identifies a feature of a transaction processing system OR a management information system	1

Sample answer:

A transaction processing system keeps track of transactions between items in inventory and items going out. The stored data can be sent to a management information system (MIS) and this system can be used by the MIS to generate workflows for stock replenishment, paying wages and assigning tasks to logistics.

Question 25 (d)

Criteria	Marks
• Describes advantages and disadvantages of the online ordering system for both customers and employees	4
• Describes advantages and disadvantages of the online ordering system for customers or employees	3
• Outlines an advantage and disadvantage of the online ordering system for either customers or employees	2
• Identifies an advantage or disadvantage of the online ordering system	1

Sample answer:

Advantages for employees include being able to focus on completing their key job of making coffee as quickly and efficiently as possible. This is because the process of ordering and paying for coffee has been moved to the customer.

Advantages for the customer include getting their orders faster, because orders can be placed before they arrive at the café.

Disadvantages for both customers and employees include the changing nature of work in the café. There is less human interaction for both so the workers in the café may feel their job is becoming robotic, resulting in less job satisfaction. There may also be fewer jobs as there is increased efficiency. Customers may also suffer from less interaction as the café is encouraging them to use technology rather than engage with others.

Question 25 (e) (i)

Criteria	Marks
• Describes the purpose of the transaction log in this system	3
• Outlines the purpose of the transaction log in this system	2
• Identifies a feature of a transaction log	1

Sample answer:

The purpose of a transaction log is to record each instance of a customer hiring a bicycle. This allows accounts to be reconciled at the end of the month as a batch transaction.

Question 25 (e) (ii)

Criteria	Marks
• Explains why data integrity, security and quality are important in this transaction processing system	5
• Describes why the data integrity, security and quality are important in this transaction processing system	4
• Outlines why data integrity, security and quality are important in this system	3
• Outlines either data integrity or security or quality in this system	2
• Identifies a feature of either data integrity or security or quality	1

Sample answer:

Data security – data is protected by passwords, back-ups, encryption against accidental or deliberate damage. In this system this is important because customers want their accounts to be secure and protected so no-one else can access their information including payment details.

Data integrity – data must be reliable and accurate. This can be ensured by the use of validation and verification checks. Need to eliminate all unnecessary data, redundant data. Data verification ensures that data collected and stored match the source of the data. When the customer logs on to the system their details must be entered correctly. When they scan the bike it matches the details on the system.

Data quality – is concerned about the reliability and effectiveness of the data. To achieve effectiveness, data must be accurately collected using the correct instrument. Here the data must be correct for the business to operate. They need to know who is borrowing the bike, the frequency and length of loans, payment amount and method.

Question 26 (a)

Criteria	Marks
• Outlines the purpose of certainty factors in an expert system	2
• Identifies a feature of a certainty factor	1

Sample answer:

The purpose of a certainty factor is to measure the level of certainty in a fact or conclusion in determining whether the response is correct.

Question 26 (b)

Criteria	Marks
• Provides how online analytical processing supports decision making in a decision support system	3
• Outlines a function of online analytical processing	2
• Identifies a feature of online analytical processing	1

Sample answer:

Online analytical processing (OLAP) enables a decision maker to easily and selectively extract and view data from different points of view in real time. The decision maker can request that data be displayed visually, eg a chart from a spreadsheet, for further analysis which can be used in decision making.

Question 26 (c)

Criteria	Marks
• Explains how the group decision support system could be used to improve the process	3
• Describes how the group decision support system could be used to improve the process	2
• Identifies a feature of a group decision support system	1

Sample answer:

Group decision support systems (GDSS) are information systems that facilitate decision-making activities between multiple participants. The use of a GDSS by the retail company offers the use of computer-based tools to assist the department managers to contribute to the decision-making process without having to meet at head office every month. As each department manager has access to their own computer, they all have the ability to contribute to the meeting creating a collaborative atmosphere. The retail company can make use of the GDSS features, eg electronic questionnaires, to aid in the organisation in pre-meeting planning by identifying issues and by ensuring key planning information is not overlooked.

Answers could include:

- Electronic brainstorming is possible when the department managers simply enter their thoughts on matters/issues and the system then sorts and priorities these thoughts into a sequence for display and action by the department managers.
- The ability to vote on matters/issues electronically – the votes are counted and displayed electronically enabling the retail company to set priorities.
- As decisions are made, the system can store these keyed-in minutes and decisions in a central storage area for future meetings. The GDSS allows each department manager to contribute while maintaining a meeting structure and the quality of decision-making.

Question 26 (d)

Criteria	Marks
• Provides formulae for C9, D10 and E11 that are essentially correct	4
• Provides TWO essentially correct formulae OR • Shows a sound understanding of the development of formulae involving multiple operators and the use of LOOKUP	3
• Provides ONE essentially correct formula OR • Shows some understanding of the development of formulae involving multiple operators and/or use of LOOKUP	2
• Recognises a feature of a formula	1

Sample answer:

C9: =($B$4–B9)/$B$4*100

D10: =VLOOKUP(C10,$C$14:$D$17,2)

E11: =(B11*$B$5)+(B11*D11)

Question 26 (e) (i)

Criteria	Marks
• Explains how a geographical information system is used to support decision making in the system	3
• Describes how a geographical information system is used to support decision making in the system	2
• Identifies a feature of a geographical information system	1

Sample answer:

A geographical information system (GIS) presents geographical real-world data and information. The company uses a real world map and overlays the location of all the bicycles, providing a visualisation via the interactive hiring app. This enables the customer to determine the nearest location of a bicycle, which walking route to take to get to that bicycle and how long it will take.

Question 26 (e) (ii)

Criteria	Marks
• Explains the data/information requirements for the new system in terms of collecting, organising and analysing	5
• Describes the data/information requirements for the new system in terms of collecting, organising and analysing	4
• Outlines the data/information requirements for the new system in terms of collecting, organising and analysing	3
• Outlines either collecting or organising or analysing in the system	2
• Identifies a feature of either collecting or organising or analysing	1

Sample answer:

Collecting
To create the different maps required for the mobile app showing the customer's location, graphical data is collected from either satellite or aircraft photographs of different locations. These digital images are then imported into the GIS software.

Organising
The GIS software then organises the collected digital images into different layers in order to plot the landmark features. Each layer is represented as a different colour to show the different landmark features such as streets, parks, traffic and buildings.

Analysing
The zoom feature within the mobile app allows customers to locate the nearest bicycle/s available for hire. Customers by zooming into their location are able to determine the distance and time to walk to the nearest available bicycle.

Question 27 (a)

Criteria	Marks
• Outlines the purpose of critical damping in an automated manufacturing system	2
• Identifies a feature of critical damping	1

Sample answer:

Critical damping is a quick response to a change in the system and a quick return to stability. The effective removal of fluctuations within the system enables the automated manufacturing system to return to its normal state.

Question 27 (b)

Criteria	Marks
• Describes the effects of de-skilling when working in an automated industry	3
• Outlines the effects of de-skilling when working in an automated industry	2
• Identifies a feature of de-skilling	1

Sample answer:

Participants in automated industries who were previously classified as skilled may become redundant or replaced by less skilled workers. Reducing employees' knowledge leads to fewer individuals required/involved in completing different repetitive tasks. It is essential that skilled workers retrain or apply their depth of knowledge to the improvement of the automated systems performing these tasks.

Automation may also raise knowledge (up-skilling). The changing nature of work will require individuals to learn new programs, eg CAD/CAM and CNC.

Question 27 (c)

Criteria	Marks
• Distinguishes between human-centred and machine-centred systems, giving an example of each	3
• Outlines the difference between human-centred and machine-centred systems, giving an example	2
• Identifies a feature of human-centred or machine-centred automated manufacturing systems	1

Sample answer:

In human-centred automotive manufacturing systems, the human provides the guidance, inspiration, intelligence and creativity while the technology provides the back-up and the tools to complete the job. A CAD operator, for example, is in a human-centred task.

In machine-centred automotive manufacturing systems, the human worker is there to assist the machine. A worker who removes the finished product from an assembly line and packs it into boxes is performing a machine-centred task.

Question 27 (d)

Criteria	Marks
• Clearly describes how both the stepping-motor and the microprocessor in the joystick operate the flying of the drone	4
• Describes how the stepping-motor and/or the microprocessor in the joystick operate the flying of the drone	3
• Outlines how either the stepping-motor or microprocessor operates the drone	2
• Identifies a feature of a stepping-motor or a microprocessor	1

Sample answer:

The microprocessor in the joystick receives input via the user which the stepping-motor in the drone then interprets as data. When using the joystick, the farmer can make very fine adjustments to the positioning of the drone. The stepping-motors can be individually manipulated to increase and decrease speed in very small increments, controlling the flight path and position of the drone more accurately.

Question 27 (e) (i)

Criteria	Marks
• Describes how sensors are used when riding the bicycle	3
• Outlines how sensors are used when riding a bicycle	2
• Identifies a feature of a sensor	1

Sample answer:

The light and motion sensors work to determine when the bicycle is being ridden at night, and to turn its lights on.

The light and temperature senses work to switch on the solar-powered charging circuit.

Accelerometer/motion sensors turn on/off the charging circuit when the bike is moving.

Question 27 (e) (ii)

Criteria	Marks
• Explains how quality can be consistently maintained in the manufacturing of the bicycles	5
• Describes how quality can be consistently maintained in the manufacturing of the bicycles	4
• Outlines how quality can be consistently maintained in the manufacturing of the bicycles	3
• Outlines features of quality control in the manufacturing of bicycles	2
• Identifies a feature of quality control	1

Sample answer:

Quality control ensures that consistency is maintained in the manufacturing of the bicycles. From a construction perspective, it is essential in the production of the bicycles that they are all of the same structural quality. The AMS can be calibrated so that every bicycle produced has met these tolerances. Because it is an automated system, there can be a higher degree of consistency and quality control with each bicycle manufactured. Automated spray painting ensures precision application of paint to the bicycle during manufacture. The paint thickness has to be optimised to prevent rust and this is balanced against the added weight of the paint. This also reduces waste and mistakes which leads to lower costs than if a human was spraying the bikes. Repetitive tasks are subject to human error and fatigue but an AMS will continue the process until it runs out of supplies or breaks down. Reliability is important to ensure a consistent quality of manufacturing. There is less variation from one item to the next.

Question 28 (a)

Criteria	Marks
• Outlines the importance of integrity of source data in development of a multimedia product	2
• Identifies a feature of integrity of source data	1

Sample answer:

Integrity is important in source data as it is important to acknowledge the source of media and ensure the information provided is reliable and valid.

Question 28 (b)

Criteria	Marks
• Describes the difference between path-based and cel-based animation including an example of each	3
• Outlines differences between path-based and cel-based animation	2
• Identifies a feature of animation	1

Sample answer:

Path-based animation is a technique where the animator creates the first and last frames of the animation and the computer fills in the rest of the frames (tweening), for example creating a motion or shape tween.

Cel-based animation is a technique where the animator creates every frame of the animation, for example old-fashioned cartoons of the mid-20th century eg Disney cartoons.

Question 28 (c)

Criteria	Marks
• Explains why the roles of both project manager and technical support staff in developing a multimedia product are important	3
• Describes why the roles of project manager and technical support staff in developing a multimedia product are important	2
• Identifies a feature of developing a multimedia product	1

Sample answer:

A project manager's role is to oversee all staff working on a project and ensure tasks are completed to a high standard and in a timely manner. They also negotiate solutions with staff when conflict arises.

Technical support staff provide the framework or structure of a project that content providers and other contributors add to a project. They ensure information systems are maintained. They provide technical support to compress media to ensure the highest quality for the smallest file size in a product.

Question 28 (d)

Criteria	Marks
• Describes the software required to create each element of the interactive multimedia blog	4
• Describes some of the software required to create the interactive multimedia blog	3
• Outlines some of the software required to create the interactive multimedia blog	2
• Identifies a feature of software	1

Sample answer:

Software required to create the interactive multimedia blog could include:

- A web-based blogging platform to create and host the blog as well as manage pages, videos and galleries. The blog platform could also provide the sporting club with information about page visits, gallery and video views to show them which content and pages are popular.
- A video and audio editor to capture, edit and export videos of games to a suitable format for streaming within the blog.
- An image editor to manipulate and export images for the image galleries. A suitable format for exported images could be JPG, as the file format is compatible with most web browsers and images are displayed in high quality.
- A web browser to log into the blogging site, upload videos and image galleries and add data to the social media feeds.

Question 28 (e) (i)

Criteria	Marks
• Explains why the interactive user guide can be considered an information kiosk	3
• Provides why the interactive user guide can be considered an information kiosk	2
• Identifies a feature of an information kiosk	1

Sample answer:

An interactive guide is a modern, updated version of an information kiosk because it is a dedicated multimedia information system, containing interactive content that users can access to get answers to their questions about the bicycle sharing system. The interactive user guide provides customers with an explanation of the hiring process. Customers can read the text version or watch the video.

Question 28 (e) (ii)

Criteria	Marks
• Explains the data/information requirements for the new information system in terms of displaying, processing, and storing and retrieving	5
• Describes the data/information requirements for the new information system in terms of displaying, processing, and storing and retrieving	4
• Outlines the data/information requirements for the new information system in terms of displaying, processing, and storing and retrieving	3
• Identifies the data/information requirements for the new information system in terms of displaying and/or processing, and/or storing and retrieving	2
• Identifies a feature of an information system	1

Sample answer:

The data/information requirements of the information system will be quite specific owing to the nature of the system. Displaying the data appropriately requires a high-resolution screen with good quality speakers, as the instructional videos need to be clear and easy to understand when displayed.

Processing audio and video data places demands on the system, therefore powerful hardware is required to decode and display the data. The videos will need to be compressed to a suitable file format, such as MP4 for video and MP3 for audio. These are good file formats because they are compressed for modern smartphones which contain powerful hardware to process and display compressed video data.

Storing and retrieving the information contained in the information system needs to be efficient. As the videos are likely to be streamed through the internet, they will need to be optimised to take up the least amount of space when stored, ensuring they are retrieved and streamed to a user's device efficiently.

2018 HSC Information Processes and Technology
Mapping Grid

Section I

Question	Marks	Content	Syllabus outcomes
1	1	9.1 Project management tools	H5.1
2	1	9.3 Error correction method	H2.1
3	1	9.3 Current and emerging trends	H3.1
4	1	9.2 Organisation of hypermedia – Metadata	H2.1
5	1	9.1 Development approach	H6.2
6	1	9.3 Protocols in a communication system	H2.1
7	1	9.2 Information processes	H1.2
8	1	9.3 Transmission media	H3.1
9	1	9.3 Communication Protocol – Handshaking	H1.2
10	1	9.3 Hybrid topologies	H1.1
11	1	9.3 Communication hardware	H1.1
12	1	9.1 Understanding the problem – Requirement report	H6.1
13	1	9.1 Designing a solution	H6.2
14	1	9.2 Data mining	H2.1
15	1	9.1 Conversion methods	H6.2
16	1	9.2 Search engines	H2.1, H2.2
17	1	9.2 Screen elements	H6.1
18	1	9.2 Data types	H6.1
19	1	9.1 Decision tables	H6.2
20	1	9.2 Schema	H6.1, H6.2

Section II

Question	Marks	Content	Syllabus outcomes
21 (a)	2	Information Technology	H1.1
21 (b)	3	Messaging systems – Communications	H5.1
21 (c)	3	Creating a report in a database	H7.2
22 (a)	3	Context diagram	H5.1
22 (b)	3	Use of data	H6.1
22 (c)	4	Social and ethical issues	H3.1, H5.2
23 (a)	3	Communication skills	H3.1
23 (b)	3	Gantt chart	H6.2
23 (c)	5	Transmission protocols	H1.1
24 (a)	3	Prototyping	H1.1, H6.2

Question	Marks	Content	Syllabus outcomes
24 (b)	3	Test a system	H6.2
24 (c)	5	Transmission media	H1.1, H1.2

Section III

Question	Marks	Content	Syllabus outcomes
25 (a)	2	Batch processing	H1.1, H1.2
25 (b)	3	Web and non-web transaction	H1.2
25 (c)	3	Management Information Systems	H2.2
25 (d)	4	Social and ethical issues	H3.1, H3.2
25 (e) (i)	3	Transaction log	H1.1, H1.2
25 (e) (ii)	5	Data security, integrity and quality	H2.2, H3.1
26 (a)	2	Certainty factors	H1.2
26 (b)	3	OLAP	H3.1, H4.1
26 (c)	3	Group decision support systems	H3.1, H4.1
26 (d)	4	Spreadsheets	H6.1
26 (e) (i)	3	Geographical Information Systems	H3.1
26 (e) (ii)	5	Information processes – Collecting, organising and analysing	H1.2, H2.1
27 (a)	2	Critical damping	H1.1, H2.1
27 (b)	3	De-skilling	H3.1
27 (c)	3	Human and machine-centred systems	H1.1
27 (d)	4	Stepping-motors and microprocessors	H1.1, H1.2
27 (e) (i)	3	Sensors	H2.1
27 (e) (ii)	5	Quality control, precision and tolerance and automated spray painting	H3.1, H3.2
28 (a)	2	Integrity of source material	H3.1
28 (b)	3	Path and cel-based animation	H1.2, H6.1
28 (c)	3	Project manager and technical staff	H6.2, H7.1
28 (d)	4	Software	H1.1, H5.1
28 (e) (i)	3	Information kiosk	H2.1, H3.1
28 (e) (ii)	5	Information processes – displaying, processing and storing and retrieval	H1.2, H2.1