# CERTIFIED PUBLIC ACCOUNTANT

# FOUNDATION LEVEL 2 EXAMINATIONS

# F2.3: INFORMATION SYSTEMS

# DATE: TUESDAY 27, MAY 2025

# MARKING GUIDE AND MODEL ANSWERS

**QUESTION ONE**

**Marking Guide**

| Sub question | Criteria | Marks |
|---|---|---|
| a) | 2 marks for each explained category. If outlined only 1 mark | 8 |
| b) | 2 marks for the definition of hardware platforms | 2 |
| c) | 1 mark for each outlined advantage | 10 |
| | **Total** | **20** |

**Answer Model**

**a) Four Main Categories of Computers for John and Jacob**

To modernize their online trading system, John and Jacob can consider the following seven categories of computers:

1. **Supercomputers:** These are the most powerful and fastest, used for specialized tasks like scientific research, weather forecasting, and space exploration.
2. **Mainframe computers:** Large and powerful computers used by large organizations to handle massive amounts of data and multiple users simultaneously.
3. **Minicomputers:** Mid-sized computers often used by businesses for tasks like managing networks and databases.
4. **Microcomputers (Personal Computers):** The most common type of computer, used for personal and individual use, including desktops, laptops, and smartphones.

**b) Meaning of Hardware platforms**

A **hardware platform** refers to the physical components of a computer system that support and enable the execution of software applications. It encompasses the central processing unit (CPU), memory, storage devices, and input/output interfaces. These platforms serve as the foundation upon which software operates, ensuring compatibility and performance.

**c) Ten advantages of cloud computing**

1. **Cost efficiency**

Cloud computing eliminates the need for significant upfront investments in hardware and infrastructure. Organizations can adopt a pay-as-you-go model, paying only for the resources they use, leading to substantial cost savings.

2. **Scalability**

Cloud services offer the ability to scale resources up or down based on demand. This flexibility ensures that businesses can adjust their IT infrastructure to meet changing needs without overprovisioning.

3. **Flexibility**

Users can access cloud services from anywhere with an internet connection, using various devices. This accessibility enhances collaboration and supports remote work environments.

4. **Automatic updates**

Cloud providers handle software updates and maintenance, ensuring systems are always up to date. This reduces the burden on internal IT teams and ensures the latest features and security patches are applied promptly.

5. **Disaster recovery**

Cloud services offer data backup solutions, minimizing the risk of data loss. In the event of hardware failure or other disasters, data can be quickly restored, ensuring business continuity.

6. **Enhanced collaboration**

Cloud storage enables real-time collaboration among users, improving productivity. Multiple users can access and edit documents simultaneously, facilitating teamwork and efficient workflows.

7. **Security**

Reputable cloud providers implement robust security measures, including encryption, access controls, and regular security audits. This enhances the protection of sensitive data and reduces the risk of cyber threats.

8. **Performance**

Cloud services often offer high-performance computing resources, ensuring optimal application performance. Advanced infrastructure and load balancing contribute to improved speed and reliability.

9. **Environmental impact**

Cloud computing reduces the carbon footprint by optimizing resource usage and energy efficiency. Shared infrastructure leads to better utilization of resources, minimizing waste and environmental impact.

10. **Innovation**

Cloud computing provides access to advanced technologies, fostering innovation and competitive advantage. Businesses can leverage tools like artificial intelligence and machine learning without heavy upfront investments.

11. **Rapid deployment**

Cloud services enable quick provisioning of resources, allowing businesses to deploy applications and services rapidly. This agility supports faster time-to-market for new products and services.

12. **Global reach**

Cloud providers have data canters worldwide, enabling businesses to serve customers globally with low latency. This global infrastructure supports international expansion and improves user experience.

13. **Compliance**

Many cloud providers adhere to industry standards and regulations, assisting businesses in meeting compliance requirements. This includes certifications for data protection and privacy laws.

## QUESTION TWO

### Marking Gude

| Sub question | Criteria | Marks |
|---|---|---|
| a) | 2 marks for each discussed component. Outline only is 1 mark | 8 |
| b) | 2 marks for each discussed example. Outline only is 1 mark | 6 |
| c) | Each outlined challenge is 1 mark | 3 |
| d) | Each outlined step is 1 mark | 3 |
| | **Total** | **20** |

### Model Answer

**a) Components of an expert system in an Attendance Management System (AMS)**

An expert system designed for an AMS utilizing face detection technology comprises several key components:

1. **Knowledge base**

The knowledge base stores all the information necessary for the system to function effectively. In the context of AMS, it includes facial data of staff members, attendance policies, and rules for identifying unauthorized individuals. This database enables the system to make informed decisions about attendance and security.

2. **Inference engine**

The inference engine applies logical rules to the knowledge base to deduce new information or make decisions. For AMS, it processes input from the face detection module to determine if the detected face matches an authorized staff member or if an unauthorized person is present, thereby updating attendance records accordingly.

3. **User interface**

The User interface allows users to interact with the system. In AMS, this interface displays real-time attendance data, alerts for unauthorized access, and provides options for manual overrides or corrections. A user-friendly User interface ensures that administrators can efficiently manage and monitor attendance.

4. **Explanation module**

This component provides reasoning behind the system's decisions. **For example**, if an unauthorized person is detected, the explanation module can detail how the system identified the individual, enhancing transparency and trust in the system's operations.

5. **Knowledge acquisition subsystem**

This subsystem facilitates the updating and expansion of the knowledge base. It allows for the addition of new staff facial data, updates to attendance policies, and modifications to recognition algorithms, ensuring the system remains current and effective.

6. **Learning component**

The learning component enables the system to improve over time by analysing patterns and outcomes. In AMS, it can adapt to changes in staff appearance or environmental conditions, enhancing the accuracy and reliability of face detection and attendance tracking.

7. **Interface to external systems**

This component ensures that the expert system can communicate with other organizational systems, such as payroll or human resources databases. It allows for seamless integration, ensuring that attendance data is accurately reflected across all relevant platforms.

**b) Examples of Knowledge Work Systems**

Knowledge Work Systems (KWS) are designed to support the creation and dissemination of knowledge within an organization. Here are some examples of knowledge work sytem:

1. **Computer-Aided Design (CAD) Systems**

CAD systems assist engineers and architects in designing products or structures by providing tools for drafting, modelling, and simulation. These systems enhance creativity and precision in design processes.

2. **Virtual Reality (VR) Training Systems**

VR training systems immerse users in simulated environments for training purposes. They are particularly useful for complex or hazardous scenarios, allowing learners to practice without real-world consequences.

3. **Geographic Information Systems (GIS)**

GIS systems analyse spatial and geographic data, aiding in decision-making processes related to urban planning, environmental management, and logistics. They provide insights into spatial patterns and relationships.

4. **Expert Systems (ES)**

Expert systems emulate the decision-making abilities of human experts. They are used in various fields, such as medical diagnosis and troubleshooting, to provide solutions based on a set of rules and knowledge.

5. **Document Management Systems (DMS)**

DMS facilitate the storage, retrieval, and management of electronic documents. They support collaboration and ensure that employees have access to the latest versions of documents and information.

6. **Decision Support Systems (DSS)**

DSS assist in making informed decisions by analysing large volumes of data and presenting it in an accessible format. They are used in areas like finance and marketing to evaluate options and predict outcomes.

**c) Challenges in implementing Knowledge Management Systems**

Implementing Knowledge Management Systems (KMS) presents several challenges:

1. **Resistance to change**

Employees may be reluctant to adopt new systems due to comfort with existing processes or fear of increased workload. Overcoming this resistance requires effective change management strategies and clear communication about the benefits of the new system.

2. **Lack of leadership support**

Without strong backing from organizational leadership, KMS initiatives may lack the necessary resources and attention. Leaders must actively champion knowledge management efforts to ensure their success.

3. **Poor data quality**

The effectiveness of a KMS depends on the accuracy and reliability of the data it contains. Inaccurate or outdated information can lead to poor decision-making and erode trust in the system.

4. **Siloed information**

Information trapped within departmental silos can hinder collaboration and knowledge sharing. Breaking down these barriers requires fostering a culture of openness and implementing systems that facilitate cross-departmental communication.

5. **Information overload**

An overwhelming amount of information can make it difficult for users to find relevant knowledge. Implementing effective categorization, search functionalities, and filtering mechanisms can help manage this issue.

6. **Technological limitations**

Outdated or incompatible technology can impede the implementation of KMS. Ensuring that the chosen technology aligns with organizational needs and integrates well with existing systems is crucial for success.

**d) Steps to obtain values for Knowledge Management Systems**

To derive value from Knowledge Management Systems, organizations should follow these steps:

1. **Identify Organizational Goals**

Align the KMS with the organization's strategic objectives. Understanding the goals ensures that the system supports key initiatives and delivers relevant outcomes.

2. **Engage Stakeholders**

Involve employees, managers, and other stakeholders in the design and implementation of the KMS. Their input ensures the system meets user needs and encourages adoption.

3. **Measure and Evaluate Performance**

Establish metrics to assess the effectiveness of the KMS. Regular evaluation helps identify areas for improvement and demonstrates the system's impact on organizational performance.

**QUESTION THREE**

| Sub question | Criteria | Marks |
|---|---|---|
| a) | 2 marks for each explained kind of organization change. Outline only is 1 mark | 8 |
| b) | 2 Marks for the explanation | 2 |
| c) | 1 mark for each explained perspective of feasibility study. Outline only is 0.5 mark | 5 |
| d) | 1 mark for each explained category of fourth generation. Outline only is 0.5 mark | 5 |
| | **Total** | **20** |

**a) Four types of organizational change enabled by information systems**

Information systems play a pivotal role in driving various forms of organizational change. Here are six key types:

1. **Process Reengineering**

Information systems facilitate the radical redesign of business processes to achieve significant improvements in performance, efficiency, and effectiveness. By automating workflows and eliminating redundant tasks, organizations can streamline operations, reduce costs, and enhance service delivery.

2. **Digital Transformation**

The integration of digital technologies across all areas of a business leads to fundamental changes in how organizations operate and deliver value to customers. Information systems enable this transformation by providing platforms for data analytics, cloud computing, and customer engagement, thereby fostering innovation and agility.

3. **Strategic Innovation**

Information systems support strategic innovation by providing tools for data analysis, market research, and trend forecasting. This enables organizations to develop new products, services, or business models that differentiate them in the marketplace and create competitive advantages.

4. **Knowledge Management**

Information systems facilitate the collection, storage, and dissemination of organizational knowledge. By implementing knowledge management systems, organizations can ensure that

valuable insights and expertise are accessible to employees, fostering collaboration and informed decision-making.

5. **Customer Relationship Management (CRM)**

CRM systems enable organizations to manage interactions with current and potential customers. By analysing customer data, businesses can personalize marketing efforts, improve customer service, and build stronger relationships, leading to increased customer loyalty and satisfaction.

6. **Supply Chain Optimization**

Information systems enhance supply chain management by providing real-time data on inventory levels, order status, and supplier performance. This allows organizations to optimize procurement, reduce lead times, and improve coordination across the supply chain, resulting in cost savings and improved service delivery.

**b) Business Process Reengineering (BPR)**

Business Process Reengineering (BPR) is a management strategy that involves the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical performance measures such as cost, quality, service, and speed. BPR aims to help organizations fundamentally rethink how they do their work in order to improve customer service, cut operational costs, and become world-class competitors.

**c) Five perspectives of feasibility study in system investigation**

A feasibility study evaluates the practicality of a proposed project. The five key perspectives include:

1. **Technical feasibility**

Assesses whether the current technology infrastructure can support the proposed system. It examines hardware, software, and technical expertise required to implement and maintain the system.

2. **Economic feasibility**

Evaluates the cost-effectiveness of the project. It involves estimating the total cost of development and comparing it with the expected benefits to determine if the investment is justified.

3. **Legal feasibility**

Determines whether the proposed system complies with legal and regulatory requirements. It includes considerations of data protection laws, intellectual property rights, and industry-specific regulations.

4. **Operational feasibility**

Assesses whether the organization has the capability to operate and support the system. It looks at factors such as user readiness, training needs, and alignment with organizational goals.

5. **Schedule feasibility**

Evaluates whether the project can be completed within the desired timeframe. It considers project timelines, resource availability, and potential delays to ensure timely delivery.

**d) Five categories of fourth-generation language (4GL) tools**

Fourth-generation languages (4GLs) are designed to be closer to human language, making them more user-friendly for developers. The five categories include:

1. **Query languages:** This is a high-level language that is used to retrieve data from database and file. It can be used for ad-hoc queering for information.
2. **Report generators:** These enable the extraction of data from files or databases to create reports.
3. **Graphics languages:** These are used to display data from files or databases in graphic format.
4. **Application generators:** These are modules that can be used to generate programming code for input, processing, update and reporting once the users provide specifications for an application.
5. **Very high-level programming languages:** These can be used to perform coding with far fewer instructions than conventional programming languages.
6. **General purpose software tools:** These include software packages such as word processing, data management, graphics, desktop publishing and spreadsheet software that can be utilized by end user developers to build basic systems**.**

**QUESTION FOUR**

| Sub question | Criteria | Marks |
|---|---|---|
| a) | 2 marks for each explained example of electronic payment. Outline only is 1 mark | 10 |
| b) | Each outlined limitation of e-commerce is 1 mark | 5 |
| c) | 1 mark for each explained category of m-commerce. Outline only is 0.5 mark | 5 |
| | **Total** | **20** |

**a) Seven Examples of Electronic Payment Systems for E-Commerce**

1. **Credit and debit card payments**

Credit and debit card payments are among the most widely used electronic payment methods in e-commerce. Customers enter their card details on a secure payment gateway, which processes the transaction by communicating with the bank. This method is convenient and widely accepted across online platforms.

2. **Digital wallets**

Digital wallets store users' payment information securely, allowing for quick and easy transactions. Services like PayPal, Apple Pay, and Google Pay enable users to make purchases without re-entering card details, enhancing convenience and security.

3. **Bank transfers**

Bank transfers involve direct payments from a customer's bank account to the merchant's account. IDEAL is a popular example in the Netherlands, allowing customers to pay online through their own bank's secure environment.

4. **Cryptocurrency payments**

Cryptocurrency payments involve using digital currencies like Bitcoin or Ethereum for transactions. These payments are processed through blockchain technology, offering decentralized and secure transactions, though they are not yet widely adopted for everyday e-commerce.

5. **Buy Now, Pay Later (BNPL) Services**

BNPL services allow customers to make purchases and pay for them in instalments, often interest-free if paid within a specified period. This option can increase average order value and attract new customers.

6. **Unified Payments Interface (UPI)**

UPI is a real-time payment system that enables users to transfer money between bank accounts using a mobile app. It has revolutionized digital payments in India, offering a fast and secure method for e-commerce transactions.

7. **QR Code payments**

QR code payments involve scanning a QR code displayed by the merchant using a mobile device to make a payment. This method is increasingly popular in various regions, offering a contactless and secure way to pay.

**b) Five Limitations of E-Commerce**

1. **Security issues**

E-commerce platforms are prime targets for cyber threats like hacking and data breaches. Protecting sensitive customer information, including payment details, is critical to maintaining trust. A breach can lead to financial losses and damage a business's reputation.

2. **Shipping and delivery issues**

Timely delivery is crucial in e-commerce, but it's complex. Shipping costs, delays, and logistical issues pose significant challenges. Small businesses, in particular, need help in establishing efficient shipping processes.

3. **Limited sensory experience**

E-commerce can't replicate the tactile experience of physical stores. Shoppers can only touch, feel, or try out products after buying, a drawback for items like clothing, furniture, or cosmetics where texture and fit matter.

4. **Absence of personalized assistance**

In traditional stores, sales associates provide personalized assistance, helping customers make informed choices. E-commerce relies on chatbots and automated recommendations, which, while helpful, can't fully replace human interactions.

5. **Regulatory and taxation hurdles**

E-commerce navigates a complex regulatory landscape. Countries have varying tax laws and consumer protection rules, challenging global operations. Collecting sales taxes, especially for cross-border transactions, is a logistical puzzle.

**c) Five categories of M-commerce services**

1. **Mobile shopping**

Mobile shopping enables customers to buy products using a mobile device with an application such as Amazon or a web app. A subcategory of mobile shopping is app commerce, which is a transaction that takes place over a native app.

2. **Mobile banking**

Mobile banking is online banking designed for handheld technology. It enables customers to access accounts and brokerage services, conduct financial transactions, pay bills, and make stock trades.

3. **Mobile payments**

Mobile payments are an alternative to traditional payment methods, such as cash, check, credit, and debit cards. They enable users to buy products in person using a mobile device. Digital wallets, such as Apple Pay, let customers buy products without swiping a card or paying with cash.

4. **Mobile ticketing**

Mobile ticketing allows users to purchase and store tickets for events, transportation, or entertainment directly on their mobile devices. This service offers convenience and reduces the need for physical tickets.

5. **Location-Based Services (LBS)**

LBS provide users with information or services based on their geographical location. Examples include navigation apps, local restaurant recommendations, and location-based advertising, enhancing user experience and personalization.

**QUESTION FIVE**

| Sub question | Criteria | Marks |
|---|---|---|
| a) | Each outlined benefit of database management system is 1 mark | 5 |
| b) i | Definition of acquiring | 2 |
| ii | Definition of disseminating | 2 |
| iii | Definition of classifying | 2 |
| iv | Definition of standardizing | 2 |
| v | Definition of sharing information | 2 |
| c) | 1 mark for each explained problem. Outline only is 0.5 mark | 5 |
| | **Total** | **20** |

**a) Five benefits of a Database Management System (DBMS) at Urumuri inc.**

1. **Centralized data management**

A DBMS centralizes all employee, project, and departmental data, providing a unified platform for data storage and management. This centralization ensures consistency and reduces redundancy, making it easier to maintain and update records.

2. **Enhanced data security**

DBMSs offer robust security features, including user authentication, access controls, and encryption. These measures protect sensitive information, such as employee personal details and project costs, from unauthorized access and potential breaches.

3. **Improved data integrity and accuracy**

By enforcing data validation rules and constraints, a DBMS ensures that only accurate and consistent data is entered into the system. This is crucial for maintaining reliable records of employee skills, project assignments, and departmental information.

4. **Efficient data retrieval and reporting**

DBMSs provide powerful querying capabilities, allowing users to quickly retrieve and analyse data. For instance, generating reports on employee assignments by city or tracking project costs becomes more efficient, aiding in timely decision-making.

5. **Scalability and flexibility**

As Urumuri Inc grows, a DBMS can scale to accommodate increasing amounts of data and users. It supports various data models and can integrate with other systems, ensuring that the database evolves with the company's needs.

**b) Information Policy: Definition of key terms applied in information policy**

**i) Acquiring**

Acquiring refers to the processes and procedures an organization follows to obtain data. This includes sourcing data from internal systems, purchasing external datasets, or collecting data through surveys and other methods. Establishing clear acquisition protocols ensures that data is relevant, accurate, and obtained ethically.

**ii) Disseminating**

Disseminating involves distributing data to authorized users within the organization. This process ensures that the right individuals have access to the information they need for decision-making and operations, while also maintaining data security and compliance with privacy regulations.

**iii) Classifying**

Classifying is the act of categorizing data based on its sensitivity and importance. This classification helps in applying appropriate security measures, determining access levels, and ensuring compliance with legal and regulatory requirements.

**iv) Standardizing**

Standardizing involves establishing uniform formats, definitions, and procedures for data across the organization. This ensures consistency, reduces errors, and facilitates easier data integration and analysis, leading to more reliable insights.

**v) Sharing information**

Sharing information refers to the practice of making data accessible to authorized users within and outside the organization. Effective sharing promotes collaboration, enhances transparency, and enables informed decision-making, all while safeguarding data integrity and confidentiality.

**c) Problems Associated with the Traditional File Environment**

1. **Data redundancy**

In traditional file systems, the same data may be duplicated across multiple files, leading to increased storage costs and potential inconsistencies. For example, an employee's contact information might be stored in both the payroll and HR files, requiring manual updates in each location.

2. **Data inconsistency**

When data is replicated in various files, discrepancies can arise if updates are not applied uniformly. This inconsistency can lead to errors and confusion, especially when different departments rely on outdated or conflicting information.

3. **Data isolation**

Data stored in separate files without a central system can be isolated, making it difficult to access and integrate information across the organization. This isolation hampers comprehensive analysis and timely decision-making.

4. **Difficulty in accessing data**

Traditional file systems often lack efficient querying capabilities, making data retrieval cumbersome and time-consuming. Users may need to manually sift through files or request custom reports, delaying access to critical information.

5. **Integrity and security issues**

Without centralized control, ensuring data integrity and security is challenging. Files may be prone to unauthorized access, accidental modifications, or loss, especially if proper backup and access control measures are not in place.

**QUESTION SIX**

| Sub question | Criteria | Marks |
|---|---|---|
| a) | 0.5 mark for each outlined characteristic | 2 |
| b) | 1 mark for each explained functional perspective. Outline only is 0.5 mark | 4 |
| c) | 2 marks for each explained competitive force. Outline only is 1 mark | 8 |
| d) | 2 marks for each explained problem. Outline only is 1 mark | 6 |
| | **Total** | **20** |

**a) Four Characteristics of Functional Perspective Information Systems**

1. **Specialized functionality**

Functional perspective information systems are designed to support specific organizational functions, such as human resources, finance, or marketing. For instance, Mickey Company's employee management system focuses on HR tasks like leave management and payroll, ensuring tailored features for each department's needs.

2. **Centralized data storage**

These systems consolidate data relevant to their function into a central repository. This centralization facilitates efficient data retrieval, reduces redundancy, and ensures consistency across the organization.

3. **Process automation**

Functional systems automate routine tasks within their domain, such as calculating employee salaries or processing leave requests. This automation enhances efficiency, reduces human error, and allows staff to focus on more strategic activities.

4. **User role segmentation**

Access within functional systems is often segmented based on user roles. For example, HR officers may have administrative access to modify payroll details, while employees can view their leave balances and salary information, ensuring appropriate data access and security.

**b) Four primary types of functional perspective information systems**

Functional perspective: identifying systems by their business function. The details is as follows:

1. **Human Resource Information Systems (HRIS)**

HRIS manage employee data, payroll, recruitment, and performance evaluations. They streamline HR processes, ensuring compliance with labour laws and enhancing employee satisfaction through efficient management.

2. **Accounting Information Systems (AIS)**

AIS handle financial transactions, budgeting, and reporting. They ensure accurate financial records, support decision-making, and maintain compliance with financial regulations.

3. **Marketing Information Systems (MkIS)**

MkIS collect and analyse data related to market trends, customer behaviour, and campaign performance. They support marketing strategies by providing insights into customer needs and market dynamics.

4. **Supply Chain Management Systems (SCMS)**

SCMS oversee the flow of goods and services from suppliers to customers. They optimize inventory levels, manage supplier relationships, and ensure timely delivery of products, enhancing operational efficiency.

**c) Four Competitive Forces That Shape the Fate of the Firm**

1. **Intensity of Rivalry between competitors:** Generally, the strongest of the five forces. Rivalry can be focused on such factors as; price, performance features, new product innovation, quality, durability, warranties, after-sale service and brand image.
2. **Threat of new market entrants:** New companies have certain advantages, such as not being locked into old equipment, as well as disadvantages, such as less expertise and little brand recognition. Barriers to entry can include; economies of scale, capital costs, and access to supplier, distributors, expertise and customer loyalty.
3. **Threat of Substitute products and services:** These are substitutes that customers might use if prices become too high. For example, Internet telephone services can substitute for traditional telephone services. The more substitute products and services available in an industry, the harder it is to control price and the lower profit margins will be as a result.
4. **Bargaining power of Customers:** The power of customers grows if they can easily switch to a competitor's products and services, or if they can force a business and its competitors to compete on price alone where there is little product differentiation and all prices are known instantly (such as on the Internet).
5. **Bargaining power of Supplier's:** The more different suppliers that are available to a firm, the greater control the firm can exercise over suppliers in terms of price, quality and delivery.

**d) Three common problems faced in Management Information Systems (MIS)**

1. **Integration challenges**

Integrating MIS with existing systems can be complex due to compatibility issues, leading to data silos and inefficiencies. Businesses must invest in middleware solutions and ensure proper planning during integration.

2. **Data quality issues**

Inaccurate or inconsistent data can undermine the effectiveness of MIS, leading to poor decision-making. Implementing data governance practices and regular audits are crucial to maintain data integrity.

3. **User resistance**

Employees may resist adopting new MIS due to unfamiliarity or perceived complexity, hindering the system's potential. Providing comprehensive training and demonstrating the system's benefits can facilitate smoother adoption.

**QUESTION SEVEN**

| Sub question | Criteria | Marks |
|---|---|---|
| a) | Each outlined element is 1 mark | 5 |
| b) | 1 mark for each explained main type of system. Outline only is 0.5 mark | 4 |
| c) | 1 mark for definition | 1 |
| d) | Each outlined capability is 1 mark | 4 |
| e) | Each outlined benefit of executive support system is 0.5 mark | 1 |
| f) | Each outlined benefit of group decision support system | 5 |
| | **Total** | **20** |

**a) Five Elements Comprising the Business Intelligence Environment**

1. **Data sources**

These are the origins of raw data, including internal systems like transactional databases and external sources such as market research. Accurate and diverse data sources are crucial for comprehensive analysis.

2. **Data warehouse**

A central repository that consolidates data from various sources, ensuring consistency and accessibility. It supports complex queries and analytics, enabling informed decision-making.

3. **Business analytics tools**

Software applications that analyse data to provide insights. These tools include statistical analysis, predictive modelling, and data mining techniques to uncover patterns and trends.

4. **Business performance management**

Processes and metrics that monitor and manage performance against objectives. It involves setting KPIs, dashboards, and scorecards to align operations with strategic goals.

5. **User interface**

The platform through which users interact with the BI system. It includes dashboards, reports, and visualization tools that present data in an understandable and actionable format.

**b) Four main types of systems that support decision-making**

1. **Data-driven DSS:** Most data-driven DSSs are targeted at managers, staff and also product/service suppliers. It is used to query a database or data warehouse to seek specific answers for specific purposes. It is deployed via a main frame system, client/server link, or via the web. Examples: computer-based databases that have a query system to check (including the incorporation of data to add value to existing databases.
2. **Document-driven DSS:** Document-driven DSSs are more common, targeted at a broad base of user groups. The purpose of such a DSS is to search web pages and find documents on a specific set of keywords or search terms. The usual technology used to set up such DSSs are via the web or a client/server system. Examples:
3. **Knowledge-driven DSS:** Knowledge-driven DSSs or 'knowledgebase' are they are known, are a catch-all category covering a broad range of systems covering users within the organization setting it up, but may also include others interacting with the organization - for example, consumers of a business. It is essentially used to provide management advice or to choose products/services. The typical deployment technology used to set up such systems could be client/server systems, the web, or software running on stand-alone PCs.
4. **Model-driven DSS:** Model-driven DSSs are complex systems that help analyze decisions or choose between different options. These are used by managers and staff members of a business, or people who interact with the organization, for a number of purposes depending on how the model is set up - scheduling, decision analyses etc. These DSSs can be deployed via software/hardware in stand-alone PCs, client/server systems, or the web.

**c) Customer Decision-Support System**

A Customer Decision-Support System (CDSS) is a specialized type of Decision Support System (DSS) that helps customers make better informed purchasing decisions. It provides tools and information to analyse options, consider alternatives, and evaluate outcomes. CDSS can be used for various purchasing decisions, such as choosing a product, selecting a service, or making a financial investment

**d) Four Capabilities of Executive Support Systems**

1. **Real-time reporting**

ESS provide up-to-date information, allowing executives to make timely decisions based on the latest data.

2. **Drill-down analysis**

Executives can explore data at granular levels, identifying root causes and understanding underlying trends.

3. **Trend analysis**

ESS highlight patterns over time, aiding in forecasting and strategic planning.

4. **Customizable dashboards**

Users can tailor the interface to display metrics and KPIs relevant to their specific roles and objectives.

**e) Two Benefits of Executive Support Systems**

1. **Improved Decision-Making:** ESSs provide executives with a comprehensive view of their organization's performance, allowing them to make more informed strategic decisions.
2. **Enhanced Information Access:** ESSs offer quick and easy access to both internal and external data, including financial market information and competitor activity.
3. **Timely Information Delivery:** The systems provide executives with prompt access to information, enabling them to make quick decisions and react to changing circumstances.
4. **Improved Business Performance Monitoring:** ESSs help executives track organizational performance, identify trends, and spot potential problems or opportunities.
5. **Enhanced Efficiency:** ESSs streamline the process of information gathering and analysis, allowing executives to focus on strategic thinking rather than data retrieval.
6. **Better Data Analysis:** ESSs often include advanced analytical tools, such as "what-if" analysis, allowing executives to explore different scenarios and make more informed decisions.
7. **Improved Communication:** ESSs can facilitate communication and consensus-building among executives by providing a shared understanding of business performance.
8. **Reduced Information Overload:** While potentially overwhelming, ESSs can be configured to present information in a clear and concise manner, minimizing information overload.
9. **Enhanced Strategic Focus:** By automating routine tasks and providing quick access to critical information, ESSs allow executives to devote more time to strategic planning and execution.

**f) Five benefits of Group Decision Support Systems**

1. **Enhanced collaboration**

GDSS provide a platform for group members to share ideas and perspectives, fostering collaborative decision-making.

2. **Improved decision quality**

By aggregating diverse inputs, GDSS help in making well-rounded decisions that consider various viewpoints.

3. **Time efficiency**

GDSS streamline the decision-making process, reducing the time spent on discussions and reaching consensus.

4. **Anonymity**

Some GDSS tools offer anonymity features, encouraging honest and unbiased contributions from all participants.

5. **Documentation and accountability**

GDSS automatically record decisions and discussions, providing a clear audit trail for accountability and future reference.

## End of Marking Guide and model Answers