CERTIFIED PUBLIC ACCOUNTANT

FOUNDATION LEVEL 2 EXAMINATIONS

F2.3: INFORMATION SYSTEMS

DATE: TUESDAY 26, NOVEMBER 2024

MARKING GUIDE AND MODEL ANSWERS

QUESTION ONE

Marking guide

Sub question	Criteria	Marks
(a)	1 mark for each four key infrastructure components maximum 4 marks. Award any other valid point which has not indicated from the model answers	**4**
(b)	2 marks each six Hardware platforms explanation, Maximum 12 Marks Award any other valid point which has not indicated from the model answers	**12**
(c)	1 mark for each four Hardware platform trends recommended, Maximum 4 Marks Award any other valid point which has not indicated from the model answers	**4**
Total for Question 1		**20**

Model Answers

(**a) Four Key Infrastructure Components Suitable for Deng Ltd**

1. **Servers:**

Servers are powerful computers that provide data, services, and applications to other computers or devices on a network. They handle tasks such as processing requests, managing resources, and storing data. Components**:** High-performance CPUs, large amounts of RAM, extensive storage (often-using RAID arrays for redundancy), network interfaces, and advanced cooling systems.

2. **Networking and telecommunications** platforms include Windows server operating systems; Novell, Linux, and UNIX. Nearly all LAN and many wide area networks (WANs) use the TCP/IP standards for networking.

3. **Storage Systems:**

Storage systems are designed to store and manage large amounts of data. They can be local (on-premises) or remote (cloud-based) and vary in terms of speed, capacity, and redundancy. Types**:** Hard Disk Drives (HDDs), Solid State Drives (SSDs), Network Attached Storage (NAS), and Storage Area Networks (SAN).

4. **Data Centers:**

Data centers are facilities that house critical IT infrastructure, including servers, storage systems, and networking equipment. They provide a controlled environment for hardware, ensuring optimal

performance and security. Components**:** Power supply systems (including backup generators and UPS), cooling systems (HVAC), physical security (access control, surveillance), and network infrastructure.

5**. Operating system platforms** include Windows operating systems for client computers, and UNIX or Linux operating system for servers. Operating systems are the software that manage the hardware resources and activities of the computer and act as an interface for the user.

6. **Enterprise** and other software applications include SAP and Oracle, and middleware software that are used to link a firm's existing application systems.

7. **Data management and storage** is handled by database management software and storage devices including traditional storage methods, such as disk arrays and tape libraries, and newer network-based storage technologies such as storage area networks (SANs). SANs connect multiple storage devices over dedicated high-speed networks.

8. **Internet platforms** overlap with, and must interconnect with the firm's general networking infrastructure, hardware and software platforms. Internet-related infrastructure includes the hardware, software and services to maintain corporate Web sites, intranets and extranets, including Web hosting services. A Web hosting service maintains large Web servers and provides fee-paying customers with space to maintain their Web sites.

9. **Consulting and system integration services** are employed to integrate a firm's legacy systems with new technology and infrastructure and providing expertise in implementing new infrastructure along with relevant changes in business processes, training and software integration

(b) **Six Hardware Platforms for Deng Ltd**

1. **Personal Computers (PCs):**

Personal computers include desktops and laptops designed for individual use. They are versatile and used for a wide range of applications, from office productivity to gaming.

2. **Mainframes:**

Mainframes are large, powerful, and reliable computers used primarily by large organizations for critical applications, bulk data processing, and large-scale transaction processing. Key Components**:** Multiple high-performance CPUs, extensive memory, vast storage arrays, and robust I/O systems.

3. **Mobile Devices:**

Mobile devices include smartphones and tablets, which provide portable computing power and connectivity. They are designed for communication, entertainment, and productivity on the go.

4. **Internet of Things (IoT) Devices:**

IoT devices are interconnected devices that collect and exchange data over the internet. They are used in smart homes, industrial automation, healthcare, and more.

5. **Embedded Systems:**

Embedded systems are specialized computing systems that perform dedicated functions within larger systems. They are designed for specific control tasks and are often real-time systems. Key Components**:** Microcontrollers or microprocessors, memory, input/output interfaces, and application-specific integrated circuits (ASICs).

6. Serves

Servers are powerful computers that provide data, services, and applications to other computers or devices on a network. They handle tasks such as processing requests, managing resources, and storing data. Components**:** High-performance CPUs, large amounts of RAM, extensive storage (often-using RAID arrays for redundancy), network interfaces, and advanced cooling systems

7. Storage devices

For example, Hard Disk Drives (HDDs), Solid State Drives (SSDs), Network Attached Storage (NAS), and Storage Area Networks (SAN).

(c) **Four Hardware Platform Trends Recommended for Deng Ltd**

1. **Edge Computing:**

Edge computing involves processing data closer to where it is generated (i.e., at the "edge" of the network) rather than in a centralized data center. Example**:** Industrial IoT devices that analyze data on-site to make real-time decisions for equipment maintenance and process optimization.

2. **Quantum Computing:**

Quantum computing uses the principles of quantum mechanics to perform complex computations at unprecedented speeds, which are impossible for classical computers. Example**:** Companies like IBM, Google, and D-Wave are developing quantum computers, with applications ranging from optimizing supply chains to developing new drugs.

3. **AI and Machine Learning Accelerators:**

Specialized hardware accelerators, such as GPUs, TPUs (Tensor Processing Units), and AI-specific chips, are designed to handle the intensive computational requirements of AI and machine learning tasks. Example**:** NVIDIA GPUs and Google TPUs are widely used in data centers to accelerate AI training and inference tasks.

4. **5G and Beyond:**

The rollout of 5G networks and the development of future wireless technologies (like 6G) are transforming connectivity with higher speeds, lower latency, and increased capacity. Example**:** 5G-enabled devices and infrastructure are being deployed globally, with companies like Ericsson, Qualcomm, and Huawei leading the development of 5G technology and standards.

5. **Cloud (On-demand computing):** The term for cloud computing, provides necessary infrastructure from centralized sources. Cloud computing enables firms to off-load the demand for computing power to remote, large-scale data processing centers.
6. **Grid computing** involves connecting geographically remote computers into a single network to create a computational grid that combines the computing power of all the computers on the network to create a large computing platform.
7. **Autonomic computing**: As companies rely more and more on IT to meet the demands of employees, customers, suppliers, and business partners, they can't afford to have any system downtime at all. Autonomic computing is a step towards creating an IT infrastructure that is able to diagnose and fix problems with very little human intervention.
8. **Virtualization and Multi-Core Processors:** As companies deploy more and more servers, many have discovered that they are spending more on electricity to power and cool their systems than they did on acquiring the hardware. Power consumption can be lowered through virtualization and multi-core processors.
9. **Green computing:** Energy-efficient servers/systems have implications in power usage and sustainability. Green Computing. This is an approach to reduce the impact on the environment and reduce resources consumption by using more efficient hardware and better software
10. **Hyper-Converged Infrastructure (HCI):** Combines storage, networking, and computing in a single box so as to manage and scale easily.

QUESTION TWO

Marking guide

Sub question	Criteria	Marks
(a)	2 marks for each type of ERP module explained, Maximum 10 Marks. Award any other valid point which has not indicated from the model answers	**10**
(b)	1 mark for each three benefits and 1 mark for each three challenges explained, Maximum 6 Marks. Award any other valid point which has not indicated from the model answers	**6**
(c)	1 mark for each four ERP benefits explained, Maximum 4 Marks. Award any other valid point which has not indicated from the model answers	**4**
Total for Question 2		**20**

Model answers

(a) **Five Types of Enterprise Resource Planning (ERP) Modules**

1. **Financial Management module:**

These systems handle financial transactions and accounting within an organization. They provide tools for managing financial assets, tracking expenses, generating financial reports, and ensuring regulatory compliance.

Key Features: General ledger, accounts payable and receivable, budgeting and forecasting, financial reporting, and auditing.

2. **Human Resource Management module (HRMS):**

HRMS solutions manage employee information and HR processes. They streamline tasks such as recruitment, payroll, performance evaluation, and employee development.

Key Features: Employee records management, payroll processing.

3. **Supply Chain Management (SCM) module:**

SCM systems optimize and manage the flow of goods, information, and finances related to the production and delivery of products. They help in coordinating supply chain activities, from raw material procurement to product delivery.

Key Features: Inventory management, order processing, supplier management, demand forecasting, and logistics coordination.

4. **Customer Relationship Management (CRM) module:**

CRM systems focus on managing interactions with current and potential customers. They provide tools for sales, marketing, and customer service, helping organizations improve customer satisfaction and loyalty.

Key Features: Contact management, sales force automation, marketing campaign management, customer service and support, and analytics.

5. **Manufacturing Resource Planning (MRP) module:**

MRP systems are designed for manufacturing organizations to manage production planning, scheduling, and inventory control. They ensure that materials and resources are available for production processes and help in managing manufacturing operations efficiently.

Key Features: Bill of materials (BOM) management, production scheduling, capacity planning, inventory control, and shop floor management.

6. Information technology module: This module deals with software and hardware related issues, installations, server management and network connectivity with in the firm, it does also deal with infrastructure maintenance**.**

(b) Three Benefits and Challenges of Group Decision Support System (GDSS)

1. Improved Decision Quality:

GDSS enhances the quality of decisions by combining the knowledge, expertise, and perspectives of multiple participants. This collective intelligence often leads to more informed and well-rounded decisions. Explanation**:** The collaborative nature of GDSS allows for thorough discussion and analysis of various viewpoints, reducing the likelihood of oversight and bias.

2. Efficient Information Sharing:

GDSS facilitates the efficient sharing and processing of information among group members, which can speed up the decision-making process. Explanation**:** Tools like shared databases, collaborative software, and real-time communication platforms ensure that all participants have access to the same information, enabling faster consensus building.

3. Enhanced Collaboration and Participation:

GDSS encourages active participation and collaboration from all group members, including those who might be less vocal in traditional face-to-face meetings. Explanation**:** Features such as anonymous input and structured communication processes can help to mitigate the influence of dominant individuals and ensure that all opinions are considered.

4. Rewards, it promotes rewards to staff who perfume better in an organization.

5. Timely decision making: due to availability of data decisions are made easy and faster.

7. A GDSS can support idea generation, complex problem analysis and large groups.

8. **Minimized Bias**: By balancing participant contributions, GDSS reduces individual dominance, ensuring equitable input and robust outcomes.

Challenges of Group Decision Support Systems

1. **Technical Complexity and Costs:**

Implementing and maintaining a GDSS can be technically complex and costly. Explanation**:** Organizations need to invest in hardware, software, and training. Additionally, technical issues or system failures can disrupt the decision-making process, potentially leading to delays.

2. **Resistance to Change:**

Employees and decision-makers may resist adopting GDSS due to a preference for traditional decision-making processes or a lack of familiarity with the technology. Explanation**:** Overcoming resistance requires change management efforts, including training, demonstrating the benefits of GDSS, and gradually integrating it into existing workflows.

3. **Potential for Groupthink:**

Despite its collaborative nature, GDSS can still be susceptible to groupthink, where the desire for consensus overrides the consideration of alternative ideas and critical thinking.

4. **Lack of coordinated data.** Missing information leads to un informed status of wrong decisions
5. **Lack of proper data infrastructure.** To manage the data well and avoid losing and stilling of data.
6. **Overemphasis on Consensus**: Efforts to reach unanimous agreement can dilute decision quality or prolong the process unnecessarily.

(c) **Four benefits of Enterprise Resource Planning (ERP) System**

1. **Improved Efficiency and Productivity:**

ERP systems streamline and automate business processes, which reduces manual effort and minimizes repetitive tasks.

Explanation: By integrating various functions (such as finance, HR, supply chain, and manufacturing) into a single system, ERP systems eliminate data silos and enable smoother workflows. This leads to faster processing of tasks, fewer errors, and more efficient use of resources, ultimately boosting overall productivity.

2. **Enhanced Data Accuracy and Reporting:**

ERP systems provide a centralized database that ensures data consistency and accuracy across the organization.

Explanation: With a single source of truth, data entered in one module (such as sales) is immediately available to other modules (like inventory or finance), reducing discrepancies and errors.

3, Improved Financial Management and Cost Control:

ERP systems provide comprehensive financial management tools that help organizations better control costs and manage budgets.

Explanation: Features such as budgeting, forecasting, expense tracking, and financial reporting allow for more effective financial planning and analysis. Organizations can monitor and manage their finances more closely, identify cost-saving opportunities, and ensure compliance with financial regulations.

4, Better Customer Service and Satisfaction:
ERP systems enhance customer relationship management (CRM) and service delivery.

Explanation: By integrating CRM functions with other business processes, ERP systems ensure that customer information is up-to-date and accessible to relevant departments. This integration allows for quicker response times, personalized service, and more efficient handling of customer inquiries and orders, leading to higher customer satisfaction and loyalty.

5. **Resource sharing across the organization.** Make procurement of goods and services become very automated so no wastage of resources at moment in the organization.

7. **Proper management planning**, proper planning based on the ERP information provided so managers use the correct available data to plan for the firm.
8. **Regulatory Compliance**: ERP systems simplify adherence to legal and regulatory requirements by automating compliance checks and generating accurate reports.

QUESTION THREE

Marking guide

Sub question	Criteria	Marks
(a)	2 marks for recommending three security controls, 2marks each, Maximum 6 Marks. Award any other valid point which has not indicated from the model answers	**6**
(b)	2 marks for each of four security management challenges discussed, Maximum 8 Marks. Award any other valid point which has not indicated from the model answers	**8**
(c)	2 marks for of three mitigations to the security management challenges discussed, Maximum 6 marks Award any other valid point which has not indicated from the model answers	**6**
Total for Question 3		**20**

Model answers

(a) Three Security Control Mechanisms for Ganza Ltd.

1. Access Control:

Access control mechanisms manage who can access and use resources within an information system. They ensure that only authorized users have access to specific data and system functionalities.

- Authentication**:** Verifies the identity of a user or system. Common methods include passwords, biometrics, and multi-factor authentication (MFA).
- Authorization**:** Determines what authenticated users are allowed to do. Role-based access control (RBAC) and attribute-based access control (ABAC) are common approaches.
- Accounting**:** Tracks user activities and access to resources, often through logging and monitoring.

2. **Encryption:**

Encryption protects data by converting it into a coded format that can only be read by someone who has the correct decryption key. It ensures confidentiality and integrity of data both at rest and in transit.

- Symmetric Encryption**:** Uses the same key for both encryption and decryption. Examples include AES and DES.
- Asymmetric Encryption**:** Uses a pair of keys (public and private) for encryption and decryption. Examples include RSA and ECC.

3. **Intrusion Detection and Prevention Systems (IDPS):**

IDPS monitors network and system activities for malicious actions or policy violations and can respond to potential threats.

Example: a company must deploy firewalls to monitor and control incoming/outgoing network traffic and ID's to detect and alert on suspicious activities.

4. **Electronic Evidence**: An increasing amount of the evidence presented in legal cases today is in electronic form. This includes information in hard disks, CDs and digital media as well as e-mail and records of e-commerce transactions. E-mail is currently the most common type of electronic evidence.

5. **Computer software security**: can be promoted by program security controls to prevent unauthorized changes to programs in production systems. Software security is also promoted by system software controls that prevent unauthorized access to system software and log all system activities.

6. **Computer hardware security:** this can be promoted by locating hardware in restricted rooms where only authorized individuals can access it. Special safeguards against fire, high temperature, and electric power disruptions can be implemented.

7. **Computer operations controls** oversee the work of the computer department, ensuring that procedures for storage and processing of data are followed. Computer operations controls include the setup of computer processing jobs, computer operations and computer backup and restore procedures.

8. **Data security controls prevent unauthorized changes**, deletion or access to data while the data is in use or in storage. Data security software can be configured to restrict access to individual files, data fields or groups of records. Data security software often features logs that record users who access or update files. Data storage media can be physically secured to prevent access by unauthorized personnel.

9. **System implementation controls** ensure that the systems development process is properly controlled and managed. A system development audit checks that formal reviews and signoff were done by users and management at the various stages of the development process. The audit should look for the use of controls and quality assurance techniques for program development, conversion and testing and for complete system documentation

(b) **Four security management challenges faced by Ganza Ltd.**

1. **Increasing Cyber Security Threats:**

Cyber threats are constantly evolving, with new vulnerabilities, attack methods, and malware emerging regularly.

Challenge: Keeping up with the latest threats and ensuring that security measures are updated and capable of defending against new types of attacks requires continuous monitoring, research, and investment in advanced security technologies.

2. **Complexity of Security Systems:**

Modern IT environments are increasingly complex, often comprising a mix of on-premises systems, cloud services, mobile devices, and IoT devices.

Challenge: Managing security across such diverse and interconnected environments can be difficult. Ensuring consistent security policies and practices, integrating various security tools, and maintaining visibility and control across all systems is a significant challenge.

3. **Insider Threats:**

Insider threats arise from employees, contractors, or partners who have access to the organization's systems and data.

Challenge: Detecting and preventing insider threats is particularly challenging because these individuals often have legitimate access to sensitive information and systems. Balancing security measures with employee privacy and productivity adds to the complexity.

4, **Regulatory Compliance:**
Organizations must comply with a variety of regulatory requirements and industry standards related to data security and privacy.
Challenge: Ensuring compliance with regulations such as GDPR, HIPAA, and PCI-DSS involves implementing specific security controls, maintaining detailed records, and regularly auditing security practices. Non-compliance can result in severe penalties and reputational damage.

5. **Cloud Security Risks**: Using cloud platforms introduces risks such as misconfigured settings, unauthorized access, and insufficient data control.

6. **Increase in Third-Party Risks**: Collaborating with vendors and partner's increases exposure to supply chain vulnerabilities and potential breaches.

7. **Limited resources available to invest in security systems**: Limited financial or human resources make it difficult to implement advanced security measures or hire skilled cybersecurity personnel.

(c) Four Mitigations to the Challenges Faced by Ganza Ltd.

1. **Regular Security Assessments and Updates:**

Conduct regular security assessments, including vulnerability scans, penetration testing, and security audits, to identify and address potential security gaps.

Implementation: Establish a routine schedule for security assessments, ensure that all software and systems are up-to-date with the latest patches and security updates, and conduct thorough risk assessments.

2. **Robust Access Control and Monitoring:**

Implement robust access control mechanisms and continuous monitoring to manage and track who has access to systems and data.

Implementation: Use multi-factor authentication (MFA), role-based access control (RBAC), and least privilege principles to limit access to only what is necessary for users to perform their duties. Deploy monitoring tools to track access and activities across systems.

3. **Comprehensive Security Awareness and Training Programs:**

Develop and implement comprehensive security awareness and training programs for all employees.

Implementation: Conduct regular training sessions on security best practices, phishing awareness, and the importance of following security policies. Use simulations and real-life scenarios to reinforce learning.

4. **Ensure Regulatory Compliance**: Comply with the policy and regulatory framework in place relating to cyber security

5. **Implement Vendor Risk Management**: Conduct thorough risk assessments of third-party vendors and enforce stringent security requirements in contracts.

QUESTION FOUR

Marking guide

Sub question	Criteria	Marks
(a)	2 marks for each of five benefits of using databases for business performance, Maximum 10 marks. Award any other valid point which has not indicated from the model answers	**10**
(b)	1 mark for o f four different ways e-commerce benefits any society, Maximum 4 Marks. Award any other valid point which has not indicated from the model answers	**4**
(c)	2 marks for of three types of electronic commerce discussed, Maximum 6 Marks. Award any other valid point which has not indicated from the model answers	**6**
Total for Question 4		**20**

Model answers

(a) **Five benefits of using databases for business performance.**

1. **Improved Data Management and Accessibility:**

Databases centralize data storage, making it easier to manage and access information across the organization.

Explanation: With a well-structured database, businesses can store large volumes of data in an organized manner, allowing employees to quickly retrieve and update information as needed. This improves operational efficiency and ensures that everyone has access to the latest data.

2, Enhanced Data Accuracy and Consistency:

Databases enforce data integrity and reduce redundancy, ensuring that the information is accurate and consistent.

Explanation: Databases use constraints and validation rules to prevent incorrect data entry and maintain data consistency. This minimizes errors and discrepancies, leading to more reliable data for analysis and reporting.

3, Efficient Data Analysis and Reporting:

Databases support powerful querying and reporting capabilities, enabling detailed data analysis and insightful reporting.

Explanation: Businesses can use database management systems (DBMS) to perform complex queries, generate reports, and visualize data. This helps in identifying trends, making data-driven decisions, and monitoring key performance indicators (KPIs).

4, Scalability and Flexibility:
Databases can scale to accommodate growing amounts of data and evolving business needs.

Explanation: Modern databases are designed to handle large datasets and can be scaled vertically (by adding more resources to a single server) or horizontally (by adding more servers). They can also be customized to support different data types and applications.

5, Improved Data Security and Compliance:
Databases offer advanced security features to protect sensitive information and ensure compliance with regulatory requirements.

Explanation: Database security mechanisms include encryption, access controls, and audit logs, which help protect data from unauthorized access and breaches. Additionally, databases can help businesses comply with data protection regulations by providing tools for data management and reporting.

6. **Data Warehousing:** A data warehouse is a centralized data repository (storage for data), which can be queried for business benefit. A data warehouse is a database that stores current and historical data that is of interest to the organization. This data originates in many different information systems and from external sources, each with different data models. The data from the diverse applications are copied into the warehouse database as often as needed (hourly, daily, weekly etc.)
7. **Business Intelligence**: Data Analysis and Data Mining Business intelligence refers to a series of analytical tools which works with data stored in databases to find patterns and insights for helping managers and employees make better decisions and improve organizational performance. Business intelligence provides organization with the capability to collect and store information, develop knowledge about operations, and change decision-making behavior, so as to achieve business objectives. Technologies such as data mining can be used to obtain knowledge and insight from analyzing large quantities of data which is stored in databases
8. **Data Analysis Data warehouses**: support multidimensional data analysis, also known as online analytical processing (OLAP). OLAP represents relationships among data as a multidimensional structure, which can be visualized as cubes of data, enabling more sophisticated data analysis.
9. **Data mining** is the analysis of data for hidden relationships. For example, the sales data for a particular brand of beer, is analyzed and related to other market data.
10. **Recognition of patterns** and the creation of new organization of data - for example analyzing purchases to create customer profiles.
11. **Forecasting future trends** as a result of finding patterns in the data. Text Mining and Web Mining Text mining and Web mining differ from conventional data mining in that the data is

unstructured and comes from a variety of sources, whereas conventional data mining focuses on structured data in databases and files.

(b) Deliberate on at least four different ways e-commerce benefits any organization.

1, **Increased Accessibility and Convenience:**

E-commerce enables consumers to shop anytime and anywhere, providing unparalleled convenience and accessibility to a wide range of products and services.

Explanation: Through online platforms and mobile apps, consumers can browse catalogs, compare prices, read reviews, and make purchases without the constraints of physical store hours or geographical boundaries. This convenience is particularly valuable for individuals with mobility challenges, busy schedules, or living in remote areas.

2. **Global Market Reach for Businesses:**

E-commerce allows businesses of all sizes to reach a global audience and expand their market beyond local boundaries.

Explanation: Small businesses and startups can establish an online presence with relatively low overhead costs compared to traditional brick-and-mortar stores. This opens up opportunities for niche markets and specialized products to find customers worldwide. Additionally, e-commerce platforms facilitate direct-to-consumer sales, reducing the need for intermediaries and increasing profit margins.

3. **Job Creation and Economic Growth:**

E-commerce contributes to job creation and economic growth by stimulating demand for digital skills, logistics services, and online marketing expertise.

Explanation: The growth of e-commerce has led to new job opportunities in fields such as web development, digital marketing, logistics and supply chain management, customer support, and online retail operations. Moreover, businesses involved in e-commerce contribute to economic activity through increased sales, tax revenues, and investments in infrastructure.

4, Environmental Benefits and Sustainability:

E-commerce can contribute to environmental sustainability by reducing the need for physical travel and optimizing supply chain efficiencies.

Explanation: Online shopping reduces the carbon footprint associated with traditional retail activities, such as commuting to stores and maintaining large inventories in multiple locations. Furthermore, e-commerce logistics can leverage advanced routing algorithms and delivery optimization strategies to minimize fuel consumption and greenhouse gas emissions.

5. **Information asymmetry,** access of information is easy and accessed at global platform and at any time
6. **Increased market competition:** since competition is open world wide
7. **Removes geographical boundaries**, since the marked is done online. Using a website

(c)

1. **Business-to-Consumer (B2C) E-commerce:**

B2C e-commerce involves transactions between businesses and individual consumers. Characteristics**:** Businesses sell products or services directly to end-users through online platforms, websites, or mobile apps. Consumers browse product catalogs, place orders, and make payments electronically. B2C e-commerce typically targets mass consumer markets, offering convenience, accessibility, and a wide range of products.

2. **Business-to-Business (B2B) E-commerce:**

B2B e-commerce involves transactions between businesses, where one business sells products or services to another business. Characteristics**:** Businesses engage in online procurement, supply chain management, and partnership activities. Transactions often involve bulk purchases, ongoing supply agreements, and complex negotiations.

3. **Consumer-to-Consumer (C2C) E-commerce:** C2C e-commerce involves transactions between individual consumers, facilitated by online platforms. Characteristics**:** Individuals buy and sell products or services directly to each other without intermediaries. Online marketplaces and auction sites provide platforms for C2C transactions, allowing users to create listings, negotiate prices, and arrange payments.
4. **Business to Government (B2G),** type of e-commerce where government does make business transaction with a business entity**.**

QUESTION FIVE

Marking guide

Sub question	Criteria	Marks
(a)	2 marks for each of five discussed change management challenges, Maximum 10 Marks Award any other valid point which has not indicated from the model answers	**10**
(b)	2 marks for each of five mitigations to the change management challenges discussed, Maximum 10 Marks please give a mark to any relevant answer. Award any other valid point which has not indicated from the model answers	**10**
Total for Question 5		**20**

Model answers

(a) Discuss at least five business information system challenges.

1. **Resistance to Change:**

Resistance from employees, stakeholders, or organizational culture can hinder the adoption of new processes, technologies, or strategies. Explanation**:** People may resist change due to fear of the unknown, loss of job security, or skepticism about the benefits of the change. Overcoming resistance requires effective communication, stakeholder engagement, and addressing concerns through transparent dialogue and involvement in decision-making.

2. **Lack of Leadership Support and Alignment:** Insufficient leadership support or alignment can undermine change initiatives, leading to confusion, mixed messages, and inconsistent implementation. Explanation**:** Successful change requires visible and committed leadership that sets clear goals, communicates the vision for change, and actively supports the implementation process. When leaders are not aligned or fail to prioritize change efforts, it can create ambiguity and resistance among employees.

3. **Inadequate Communication and Engagement:**

Poor communication and insufficient stakeholder engagement can result in misunderstandings, rumors, and lack of buy-in from key stakeholders. Explanation**:** Effective change management relies on clear, timely, and targeted communication to inform employees about the reasons for change, expected outcomes, and their roles in the process. Engaging stakeholders through forums, feedback mechanisms, and involving them in decision-making builds trust and ownership.

4. **Resource Constraints and Capacity Limitations:**

Limited resources, including budget, time, and expertise, can constrain the organization's ability to implement and sustain change effectively. Explanation**:** Change initiatives often require investments in technology, training, infrastructure upgrades, and dedicated change management resources. Without adequate resources, organizations may struggle to execute plans, address unforeseen challenges, or support employees through the transition.

5. **Organizational Culture and Legacy Systems:**

Organizational culture, entrenched habits, and legacy systems can impede change efforts, particularly in traditional or long-established organizations. Explanation**:** Cultural norms, resistance to change ingrained in long-standing practices, and outdated technology systems may resist change, making it difficult to implement new processes or innovations.

(b) Elaborate at least five different challenges on change value management system.

1. **Lack of Effective Communication Strategy:**

Mitigation: Develop a comprehensive communication plan that addresses the why, what, and how of the change initiative.

Implementation: Clearly communicate the rationale behind the change, including its benefits and expected outcomes. Use multiple channels (such as town hall meetings, emails, intranet, and one-on-one discussions) to reach different stakeholder groups.

2. **Work without Stakeholder Engagement and Involvement:**

Mitigation: Involve key stakeholders early and throughout the change process to gain their support and insights.

Implementation: Identify and engage stakeholders from different levels and departments who will be affected by the change. Seek their input on decision-making, solicit feedback on concerns and potential challenges, and involve them in planning and implementation teams.

3. **Changing Leadership and Sponsorship often: changing leaders often creates a gap and inconsistence in vision.**
Mitigation: Ensure strong leadership support and visible sponsorship throughout the change process.
Implementation: Appoint change champions or sponsors who are senior leaders or influential figures within the organization. Empower sponsors to advocate for the change, communicate its importance, and align it with organizational goals.

4. **Lack of Training and Development Programs: staff who are not trained will resist any change because of luck of exposure and fear for their job security.**

Mitigation: Invest in training and development to equip employees with the skills and knowledge needed to adapt to the change.

Implementation: Assess training needs based on the requirements of the change initiative and the competencies of employees. Design and deliver targeted training programs, workshops, and resources that address new processes, tools, or technologies introduced by the change.

5. **Lack of proper impact assessment and Risk Management:**

Mitigation: Conduct a thorough assessment of the potential impacts and risks associated with the change initiative.

Implementation: Identify stakeholders, processes, systems, and organizational areas that will be affected by the change. Analyze potential risks, barriers, and dependencies that could hinder the success of the change initiative.

QUESTION SIX

Marking guide

Sub question	Criteria	Marks
(a) (i), (ii)&(1ii)	1 mark for each of the three differences between Metropolitan Area Network and Wide Area Network explained, Maximum 3 Marks Award any other valid point which has not indicated from the model answers	**3**
(b)	1 mark for each of three network terminologies explained, Maximum 3 Marks	**3**
(c)	2 marks for each of four Wireless technologies discussed, Maximum 8 Marks	**8**
(d)	1 mark for each of six different internet protocols discussed Maximum 6 Marks	**6**
Total for Question 6		**20**

Model answers

(a) Distinguish with three differences between Metropolitan Area Network and Wide Area Network.

Feature	**Metropolitan Area Network (MAN)**	**Wide Area Network (WAN)**
Geographical Coverage	Covers a city or a large campus, typically within a radius of 30 miles.	Covers large geographical areas, potentially spanning countries or continents.
Ownership	Often owned by a single organization or municipality; can also be shared among multiple users.	Typically owned by multiple organizations or service providers; often involves leased lines.
Data Transfer Speed	Generally, offers higher data transfer speeds due to shorter distances and less congestion.	Usually has lower data transfer speeds compared to MANs due to longer distances and more potential points of failure.
Technology Used	Commonly uses fiber optics, Ethernet, and wireless technologies for connectivity.	Utilizes various technologies including leased lines, satellite links, and MPLS (Multiprotocol Label Switching).
Cost of Implementation	Generally lower cost for setup and maintenance compared to WANs due to smaller scale and infrastructure requirements.	Higher costs associated with setup, maintenance, and operation due to the extensive infrastructure needed over larger distances.

(b) Write short notes on the following network terminologies

i) Asynchronous Transfer Mode (ATM): ATM connects all the different parts of a network into what will appear to the user as one network. It parcels data into uniform cells for high-speed transmission. It can transmit data, video, and audio over the same network. ATM equipment is expensive and as a result its popularity is declining.

ii) Integrated Services Digital Network (ISDN), an international communications standard for sending voice, video, and data over digital telephone lines. ISDN supports data transfer rates of 64 kbps (64,000 bits per second).

iii) Digital Subscriber Line (DSL) Broadband: DSL technologies use sophisticated modulation schemes to send data at high speeds over standard copper telephone wires. DSL can be used to provide high-speed connection to the Internet. The term Broadband is used to refer to a high-speed, high-capacity transmission mechanism that can be used to carry voice, data or video

b) Deliberate on any four Wireless technology

1. **Wi-Fi (Wireless Fidelity)**

Wi-Fi is a popular wireless networking technology that uses radio waves to provide high-speed internet and network connections. Standards**:** Governed by the IEEE 802.11 family of standards. Frequency Bands**:** Operates primarily in the 2.4 GHz and 5 GHz frequency bands, with newer standards utilizing the 6 GHz band.

2. **Bluetooth**

Bluetooth is a short-range wireless technology designed for exchanging data between devices over short distances. Standards**:** Governed by the Bluetooth Special Interest Group (SIG). Frequency Bands**:** Operates in the 2.4 GHz ISM band.

3. **Cellular Networks**

Cellular networks provide wide-area wireless communication for mobile devices. Generations**:** Includes technologies like 3G, 4G LTE, and 5G. Frequency Bands**:** Operates across various frequency bands allocated by regulatory bodies.

4. **Infrared (IR)**

Infrared technology uses infrared light waves to transmit data over short distances. Standards**:** Governed by the Infrared Data Association (IrDA).

5. **Zigbee**

Zigbee is a low power, low-data-rate wireless communication technology designed for IoT applications. Standards**:** Governed by the Zigbee Alliance. Frequency Bands**:** Operates in the 2.4 GHz ISM band.

6. **NFC (Near Field Communication):** NFC is a set of communication protocols that enables two electronic devices to establish communication by bringing them close together, usually within a few centimeters. It is widely used for contactless payments and data sharing.
7. **Satellite Communication:** Satellite communication involves transmitting signals from ground stations to satellites orbiting Earth, which then relay the signals back down to other locations. This technology provides global coverage for telecommunications, broadcasting, and internet services.

(d) Write short notes on the usage of the following internet protocols.

(i) TCP/IP (Transmission Control Protocol/Internet Protocol)

TCP/IP is a suite of communication protocols used to interconnect network devices on the internet. It defines how data is packetized, addressed, transmitted, routed, and received at the destination. TCP **(**Transmission Control Protocol**):** Ensures reliable, ordered, and error-checked delivery of a stream of data between applications. It manages the connection and ensures that data packets are delivered in sequence and without errors.

(ii) MTP (Message Transfer Protocol)

MTP is a protocol used for the transfer of electronic mail between servers. However, this term is not commonly used in modern contexts; it is often confused with protocols like SMTP (Simple Mail Transfer Protocol) or can refer to Mobile Transfer Protocol in some contexts.

(iii) IMAP (Internet Message Access Protocol)

IMAP is a protocol used by email clients to retrieve messages from a mail server. It allows users to view and manage their email on multiple devices, as the emails are stored on the server.

(iv) POP (Post Office Protocol)

POP is another protocol used by email clients to retrieve messages from a mail server. Unlike IMAP, POP typically downloads the emails to the client device and may remove them from the server.

(v) SMTP (Simple Mail Transfer Protocol)

SMTP is a protocol used for sending email messages between servers. It is used by email clients to send messages to a mail server and by servers to relay messages to the destination server.

(vi) ARP (Address Resolution Protocol)

ARP is a protocol used for mapping an IP address to a physical machine (MAC) address in a local network. Translates IP addresses into MAC addresses so that data can be correctly routed within a local network.

QUESTION SEVEN

Marking guide

Sub question	Criteria	Marks
(a)	2 marks for each five types of systems that support decision making, Maximum 10 Marks. Award any other valid point	**10**
(b)	2 marks for each of three types Decision Making Processes discussed, Maximum 6 Marks Award any other valid point	**6**
(c)	2 marks for each of two components of DSS, Maximum 4 Marks Award any other valid point	**4**
Total for Question 7		**20**

Model answers

(a) Discuss any five types of systems that support decision making in firms.

1. Executive Information Systems (EIS):

EIS are designed to support senior executives and strategic decision-makers by providing easy access to summarized data and key performance indicators (KPIs) relevant to the organization's strategic goals. Example: An EIS dashboard displaying real-time sales figures, profitability metrics, and market share trends for senior management to monitor and evaluate strategic initiatives

2. Decision Support Systems (DSS):

DSS assist managers at various levels by providing analytical tools and models to analyze complex data, evaluate alternatives, and make decisions based on quantitative analysis. Example**:** A financial DSS analyzing investment opportunities by simulating different market scenarios and assessing their impact on returns and risks.

3. Marketing Decision Support Systems (MDSS):

MDSS assist marketing managers in analyzing market trends, consumer behavior, and competitive intelligence to develop effective marketing strategies and campaigns. Example**:** An MDSS analyzing customer purchase patterns and sentiment analysis from social media to tailor marketing messages and promotions

4. Group Decision Support Systems (GDSS):

GDSS facilitate collaborative decision-making among groups of individuals by providing communication tools, decision-making models, and shared information spaces. Example: GDSS used by project teams to collaborate on project planning, allocate resources, and prioritize tasks based on collective input and consensus.

5. Knowledge Management Systems (KMS):

KMS support knowledge sharing, creation, and retrieval within organizations to facilitate informed decision-making and improve organizational learning. Example: A KMS used by a research and development team to access past research findings, collaborate on new ideas, and advantage subject matter expertise to inform product development decisions.

6. **Transaction processing system** (**TPS**)

this one is used at a lower-level management by operation al officers it deals with raw big values of data, process them into summarized format used my middle managers.

(b) Three Decision Making Processes

1. **Intelligence:** This stage involves identifying and understanding the problems that are present in the organization and their root cause and effect. MIS systems that provide a wide range of detailed reports and information can help in identifying problems. MISs that provide exception reports are particularly useful for identifying problems.

2, Design: This stage involves identifying and investigating a number of possible approaches and solutions to the problem. DSSs are ideal in this stage for exploring alternatives because they include tools for analyzing and modelling data, thus enabling users to explore various options quickly.

3, Choice: This stage involves choosing from alternative solutions. DSSs can support managers in choosing the optimal solution. These DSSs can use complex analytic models to look at the various potential outcomes

4, **Implementation**: This stage involves implementing the chosen solution and monitoring to establish if the solution works. An MIS can be used to provide managers with routine reports on the progress of the solution.

(c) Two Components of DSS

1. **Database Management System (DBMS):**

The Database Management System is a fundamental component of DSS those stores and manages large volumes of structured data. Example**:** In a financial DSS, the DBMS stores historical financial data, customer transactions, market data, and economic indicators, enabling analysts to access and analyze data for financial forecasting and investment decisions.

2. **Modeling and Analysis Tools:**

Modeling and Analysis Tools are used within DSS to perform analytical tasks, develop decision models, and evaluate different scenarios. Example**:** A marketing DSS might use modeling and analysis tools to develop customer segmentation models, predict campaign effectiveness, and optimize marketing strategies based on ROI analysis and customer behavior simulations.

End of marking guide and model answers