CERTIFIED PUBLIC ACCOUNTANT

FOUNDATION LEVEL 2 EXAMINATIONS

F2.3: INFORMATION SYSTEMS

DATE: TUESDAY, 25 APRIL 2023

MARKING GUIDE AND MODEL ANSWERS

QUESTION ONE

Marking guide

Sub question	Marks
a) 1 mark for each discussed way	7
b) 1 mark for each major challenge	7
C i) Explained Computer literacy 1 mark(Knowledge of information system) and explained information system literacy (understanding information system) 1 mark	2
ii) Explained business perspective 2 marks and explained Technical 2 marks	4
Total	**20**

Model Answers

a) Discuss seven ways in which Information Technology and Systems Are Transforming Business today referring to the Jewe E-Commerce Business.

o Information systems and the internet have dramatically cut the cost of acquiring and distributing information.
o The availability of information has increased the decision power of operational staff.
o The use of information systems has also made it easier for managers to monitor performance of staff.
o Information technology and systems have enabled organisations to be more flexible. For example, organisations such as the computer manufacturer, Dell, can support mass customisation of products without increasing costs.
o Companies are also linked electronically to suppliers enabling automatic triggering of orders, purchasing and payment thus reducing order times and also reducing stock holding costs.
o Organisations are using real-time business intelligence and predictive analysis to enable faster decision-making and to cope with an ever-changing market place where there are both threats and great opportunities.
o Through its ease of use and countless advantages for enhancing business, the Internet has had a major impact on the globalisation of businesses.

b) Mention seven major management challenges involved in building and using information systems in organisations such as Jewe E-Commerce Business.

o The globalisation challenge facing organisations is how organisations understand the system requirements of a global economic environment.
o The information architecture and infrastructure challenge is that organisations must be able to develop an information architecture that is able to support the company goals when both the business conditions and the technologies are changing so rapidly.
o The information systems investment challenge is how organisations determine the business value of systems.
o The responsibility and control challenge is how organisations can ensure that their information systems are used in an ethical and socially responsible way.
o The strategic business challenge is how information technology can be used to design organisations so that are competitive, effective and digitally enabled.
o The challenge is how to secure their systems from hackers who may harm their systems.
o The challenge is how the users will adapt to the use of the system and how user friendly the systems will be.

c) (i) Distinguish Computer Literacy from Information Systems Literacy.

o Computer literacy focuses primarily on knowledge of information technology; i.e., on computer hardware and software. It involves understanding how computer technology works and operates; how technology is built and how it is programmed.
o Information systems literacy focuses on an understanding of information systems; i.e., how the systems operate, their capabilities, how these systems can provide solutions to business problems and create information that is useful to the business and its employees. The field of management information systems (MIS) tries to achieve this broader information systems literacy.

(ii) Discuss information system from both Business and Technical perspective.

o **A Business Perspective on Information Systems:**
Information systems enable the firm to increase its revenue or decrease its costs by providing information that helps managers make better decisions or that improves the efficiency of business processes.
The value of an information system to a business is determined by how the use of the system will lead to better management decision making, more efficient business processes and ultimately to higher profits. This business view of information systems highlights the link between the organizations (business process), management and information systems.

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o **Technical Approach**

A technical approach to information systems emphasizes the use of mathematical models to study information systems, the physical technology used to construct the systems and the capabilities of information systems. The areas of study that contribute to the technical approach are computer science, management science and operational research.

QUESTION TWO

Marking guide

Sub question	Marks
a) Management issue explanation one 2 marks	2
Management issue explanation two 2 marks	2
Management issue explanation three 2 marks	2
Maximum marks	**6**
b) Each outlined insight of big data is 1 mark	8
c) Each internet business model outlined is 0.5 marks and each explained is 0.5 mark	6
Total	**20**

Model answers

a)   Discus three management issues Gahizi Retailer will face associated with electronic business.

o   Electronic commerce and electronic business pose several management challenges, including inadequate security, given the sensitive and nature of information that people might want to communicate through the Internet.

o   Electronic commerce and electronic business require careful coordination of the firm's divisions, production sites, and sales offices.

o   It also requires closer relationships with customers, suppliers, and other business partners in its network of value creation.

b)   Big Data can lead to a wide range of insights and benefits. Outline at least eight insights and benefits of Big Data.

o   Operational optimization

o   Actionable intelligence

o   Identification of new markets

o   Accurate predictions

o   Fault and fraud detection

o   More detailed records

o   Improved decision-making

o   Scientific discoveries

c) **Discuss at least six internet business models for electronic commerce that Gahizi Retailer can use.**

o Virtual storefront: These sell physical products directly to consumers or individual businesses. Online retail stores are also called e-tailers.

o Information broker: These provide product, pricing, and information to individuals and businesses. They generate revenue from advertising and from directing buyers to sellers.

o Transaction broker: The transaction broker processes online sale transactions for consumers and generates a fee each time.

o Online marketplace: An online marketplace provides a digital environment where buyers and sellers meet, search for and display products, and set prices for those products. It can also provide online auctions facilities to users.

o Content provider: A content provider creates revenue by providing digital content, such as digital news, music, photos, or video on the Web. Some newspapers and magazines are now pursuing this online strategy.

o Online service provider: The online service provider supplies online services for individuals and businesses and generates revenue from subscription or transaction fees and from advertising. An example of an online service provider is salesforce.com who provides a Web based Customer Relationship Management (CRM) solution for businesses.

o Virtual community: The virtual community provides an online meeting place where people with similar interests can communicate and find useful information. These include YouTube, and social networking sites such as Facebook and MySpace.

o Portal: The portal provides an initial point of entry to the Web along with specialised content and other services. Examples of portals include Google, Bing, Yahoo, MSN etc.

QUESTION THREE

Marking guide

Sub question	Marks
a) Each external source outlined is 0.5 marks and each explained is 0.5 marks one of the three caries 1 marks for both.	4
b) Each trend software platform is 0.5 marks and each explained is 0.5 marks	6
c) Each transmission media is 0.5 marks and each explained is 0.5 marks	3
d) Each outlined trend in telecommunication is 1 mark	7
Total	**20**

Model answers

a) Discuss three main external sources of software that Online Shoes Shop can choose.

o Software Packages from Software Vendor: A software package is a prewritten commercially available set of software programs that eliminates the need for the business to write its own software for certain functions such as payroll processing and order handling.

o Software as a Service (SaaS) is a model of software deployment whereby a provider licenses an application to customers for use as a service on demand. SaaS software vendors (such as SalesForce.com) may host the application on their own web servers or upload the application to the consumer device, disabling it after use or after the on- demand contract expires. The on-demand function may be handled internally to share licenses within a firm or by a third-party application service provider (ASP) sharing licenses between firms. The sharing of end-user licenses and on-demand use may also reduce investment in server hardware or the shift of server use to SaaS suppliers of applications file services. Using a SaaS can allow companies to bootstrap business necessities and reduce hiring costs (e.g. using onsip.com for a business telephone system rather than hiring an IT/systems specialist to install a phone system.)

o Application Service Provider (ASP): An ASP is a business that delivers and manages applications and computer services from remote computer centers to multiple users using the Internet or private network. Instead of buying and installing the software programs, subscribing companies can rent the same functions from the ASP. Users pay for the use of this software either on a subscription or per-transaction basis.

b) Discuss the six main trends in contemporary software platforms.

o **Open-Source Software:**

Open-source software is computer software for which the source code and certain other rights normally reserved for copyright holders are provided under a software license that meets the Open-Source definition or that is in the public domain. Open-source software is produced and maintained by a global community of programmers and is downloadable for free. Users can use, change, and improve the software, and redistribute it in modified or unmodified forms. It is very often developed in a public, collaborative manner.

o **Linux** is a powerful, resilient open-source operating system that can run on multiple hardware platforms and is used widely to run Web servers. Linux is virtually free, meaning expensive operating licenses are practically eliminated. Support is available through the open-source Linux community. Other help is increasingly becoming more available as more companies migrate towards this software.

o **Java:**

Java is a programming language that delivers only the software functionality needed for a particular task. With Java, the programmer writes small programs called applets that can run on another machine on a network. With Java, programmers write programs that can execute on a variety of operating systems and environments. Further, any program could be a series of applets that are distributed over networks as they are needed and as they are upgraded.

Java is important because of the dramatic growth of Web applications. Java is an operating system that can run on multiple hardware platforms and is used widely to run Web servers. It provides a standard format for data exchange and for Web page descriptions.

o **Web services** refer to a set of loosely coupled software components that exchange information with each other using standard Web communication standards and languages.

o **Apps-Mobile Apps** are small pieces of software that run on the Internet, on your computer, or on your cell phone. The most popular apps are available for the iPhone, BlackBerry, Android and Windows smartphones and tablet computers. They are generally delivered over the Internet.

o **Software Outsourcing**. Today most business firms continue to operate their legacy systems that continue to meet a business need that would be very costly to replace. However, they will purchase most of their new software applications from external sources.

c) Briefly discuss three types of physical transmission media used to carry messages from one device to another.

o Twisted pairs: Twisted pairs of copper wires are used mostly for analogue voice signals but also for data.

o Coaxial cable: Coaxial cable consists of a single, thickly insulated and shielded copper wire, which can transmit a large volume data than twisted pair.

o Fiber optic cable and Optical networks: Fiber optic cable is made up of strands of glass fiber, each about the thickness of a human hair. The data is transformed into pulses of light which are sent through the fiber optic cable at very high speed using a laser light.

d) Outline seven major trends in telecommunications

o Rapid technological innovation has resulted in many new forms of business communications, ranging from cell phones with Internet access to Wi-Fi wireless local area networks.

o Continuing regularization of telecommunications has driven into lowered prices for telephone services, and an expansion of alternative phone services such as wireless, cable, and Internet telephones.

o The line between telephone, cable television and Internet, has blurred as each different type of network operator (fixed line, mobile and cable TV operator) tries to provide video, voice, and data connectivity on a single network.

o Growing importance of Internet technologies in voice, video, and data communications.

o Increase in speed of broadband connections to homes and businesses.

o Rapid growth in wireless telephones, wireless computer networks, and mobile Internet devices such as smartphones and tablet computers.

o Growth in communication-based services and products such as Internet telephone and video and TV over.

QUESTION FOUR

Marking guide

Sub question	Marks
a) Each kind of organizational change discussed is 2 marks	8
b) Each discussed activity is 1 mark	7
c) Each discussed challenge and solution carry 1 mark	5
Total	**20**

Model answers

a) **Discuss four kinds of organizational changes building and implementing a new information system for Agahozo Inc. can bring.**

o Automation: this involves using computers to speed up the performance of existing tasks by eliminating the need for manual activity. This approach to organisational change may release staff to other jobs, reduce the number of employees needed, or enable the organisation to process more transactions.

o Rationalisation of procedures refers to the streamlining of standard operating procedures and eliminating some tasks in a process removing any blockages.

o Business process reengineering refers to the radical redesign of business processes. It can involve combining tasks in a process to cut waste and eliminating repetitive, labour intensive tasks in order to improve cost and quality and to maximise the benefits of information technology.

o A paradigm shift is a radical change in the business and the organisation. The strategy of the business can be changed.

b) **Discuss seven activities involved in system development after developing a database for Agahozo Inc..**

o **System Investigation (including feasibility study)**

The study considers whether the proposed system will be cost-effective from a business point of view and whether it can be developed within existing budgetary constants. A flexibility study should be relatively cheap and quick. The result should inform the decision of whether to go ahead with a more detailed analysis. Systems analysis. This is the process of deriving the system requirements through observation of existing systems, discussions with potential users and procurers, task analysis and so on. This may involve the development of one or more system models and prototypes. These help the analyst understand the system to be specified what the system should do to meet information requirements analyze the current situation to determine the real cause of the problem

- **Systems design**

Process of translating the abstract logical model into the specific technical design for the new system. It produces the actual specifications for hardware, software physical database, input/output media and manual procedures.

- **Programming**

System specifications that were prepared during the design stage are translated into program code

- **Testing**

Removing errors from the program. Programmers carry out some program testing to discover faults in the program and remove these faults in the debugging process.

- **Implementation**

Translate the structure into an executable program.

The activities of design and implementation are closely related and may be inter- leaved.

- **Production**

System is produced and after production it is installed at the customer's premises.

- **Maintenance**

System is periodically reviewed by both users and technical specialists to determine how well it has met its original objectives and to decide whether any revisions or modifications are in order.

c) **Explain Agahozo Inc. information system development management challenges and possible solutions.**

- Challenges

Businesses today are required to build applications very quickly if they are to remain competitive. This is particularly true in relation to e-commerce and e-business applications. The new systems are more likely to be integrated with systems belonging to suppliers, customers and business partners.

- Possible Solutions

Companies are turning to rapid application design, joint application design (JAD), and reusable software components to improve the systems development processes. Rapid application development (RAD) uses object-oriented software, prototyping, and fourth- generation tools for quick creation of systems. Component-based development speeds up application development by providing software components that can be combined (and reused) to create large business applications.

QUESTION FIVE

Marking guide

Sub question	Marks
a) Explained step in the process is 1 mark	5
b) Explanation of customer relationship management system is 2 marks	2
c) Each outlined way is 1 mark.	4
d) Enterprise resource planning definition is 1 mark	1
e) Each outlined benefit 1 mark	8
Total	**20**

Model answers

a) **Briefly explain five supply chain processes that Mr. Chips's products undergo.**

- Plan: This consists of processes that balance supply and demand with the objective of meeting sourcing, production and delivery requirements.
- Source: This consists of processes that procure goods and services needed to create the particular product or service.
- Make: This consists of processes that create the finished product in quantities sufficient to meet demand.
- Deliver: This consists of processes that distribute the finished goods and services to the point of consumption.
- Return: This consists of processes associated with handling returned products.

b) **Briefly discuss the customer relationship management systems.**

- Customer relationship management involves the use of information systems to coordinate all of the business processes surrounding the firm's interaction with its customers in sales, marketing, service and finance.

c) **Mobile Customer Relationship Management applications provide additional support for sales and service activities at the point of customer interaction. Outline four ways in which Wireless Customer Relationship Management help sales and field service professionals.**

- Access customer account records and information at any time or location
- Update customer accounts and deal information to update customer database instantaneously
- Receive alerts to important events
- Enter, perform and update transactions and product information

d) **Define Enterprise Resource Planning.**

- Enterprise resource planning systems are large complex systems that integrate the planning, management and use of all resources within an organization.

e) **Briefly outline eight benefits organisations can gain from implementing ERP systems.**
  o Improved access to data for management reporting and decision making
  o Helping to create a more disciplined organisational culture where decisions are based on accurate timely information
  o Helping to provide management with a single organisational wide view
  o Removal of inflexible legacy systems than can be expensive to change
  o Improvement of work processes and making cross functional processes possible
  o Enabling sharing of information across business functions
  o Improvement of the technology infrastructure of the organisation
  o The possibility to help an organisation become more customer focused

QUESTION SIX

Marking guide

Sub question	Marks
a) Each explained control principal is 1 mark	6
b) Each outlined and explained mitigation risk is 2 marks	6
c) Each explained reason is 1 mark.	8
Total	**20**

Model answers

a) **There are six principal general controls you can initiate at Ihozo Company to prevent hackers from hacking their systems. Discuss fully each of the principals.**
  o Computer software security can be promoted by program security controls to prevent unauthorised changes to programs in production systems. Software security is also promoted by system software controls that prevent unauthorised access to system software and log all system activities.
  o Computer hardware security can be promoted by locating hardware in restricted rooms where only authorised individuals can access it. Special safeguards against fire, high temperature, and electric power disruptions can be implemented.
  o 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.
  o Data security controls prevent unauthorised 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 unauthorised personnel.

- o 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.
- o Administrative controls are formalised standards, rules, procedures and control disciplines to ensure the organisations general and application controls are properly executed and enforced.

b) Explain three risk mitigation strategies that Ihozo Company can adopt.

- o Risk acceptance - continuing without controls and accept any loss that occurs
- o Risk limitation - implement some controls to reduce the risk
- o Risk transference - use other means to compensate for possible loss like purchasing insurance

c) Explain briefly eight reasons why Computer based systems tend to be more vulnerable to damage, error, and fraud than manual systems.

- o Data are stored in electronic format and are therefore not visible or easily auditable.
- o Data are concentrated in electronic files and databases. A disaster such as a hardware or software fault, power failure or fire can be more far-reaching. An organisation's entire record-keeping system could be destroyed.
- o There may not be a visible trail to indicate what occurred for every computer process so errors entered in data can be very difficult to detect.
- o Computer programs are also vulnerable as errors can be accidentally introduced when updates to the programs are installed. It can also be possible for programmers to make unauthorised changes to working systems.
- o Many information systems can be accessed through telecommunications, and telecommunications can produce errors in data transmission.
- o Data in files or databases can be accessed and manipulated directly in online systems. The data can be stolen, corrupted or damaged by hackers and computer viruses.
- o Hardware equipment can be stolen – this is a growing problem because of the growth in mobile computing.
- o Computer programs need users with enough skills to handle them. If handled badly this can lead to damage which might be hard to reverse.

QUESTION SEVEN

Marking guide

Sub question

a)	Knowledge definition carries 1 mark	1
b)	Each outlined category carries 1 mark	3
c)	Each outlined role of knowledge worker caries 1 marks	5
d)	Each outlined difficulty is 0.5 marks	2
e)	Each step used by business for knowledge management system	5
f)	Expert System caries 2 marks and Neural Networks caries 2 marks	4
Total		**20**

Model answers

a) Definition of Knowledge management.

Knowledge management is the set of processes developed in an organisation to create, gather, store, maintain, disseminate and apply the firm's knowledge. Knowledge management promotes organisational learning as it defines and makes explicit the organisation's knowledge base. Knowledge management enables the organisation to learn from its environment and incorporate this new knowledge into its business processes.

b) Three main categories of knowledge management systems
o Enterprise knowledge management systems
o Knowledge work systems
o Intelligent systems and techniques.

c) Knowledge workers perform five key roles in an organization. Briefly explain the roles they perform.

o They keep the organisation up to date in knowledge as it develops in the external world; in technology, science and the arts.
o They monitor the changes taking place
o They identify opportunities and threats.
o They serve as internal consultants in the areas appropriate to their knowledge.
o They act as change agents; appraising, initiating, and promoting change projects

d) **Four difficulties of implementing knowledge management systems.**
o Insufficient resources available to structure and update the stored content
o Poor quality and high variability of content because of insufficient validation
o Document and content stores lack context, making documents difficult to understand • Individual employees are not rewarded for contributing knowledge, and many are resistant to sharing knowledge with others
o Search engines return too much information, reflecting lack of knowledge structure or mechanism for tagging documents.

e) **Five steps used for businesses to obtain value for knowledge management systems.**
o Develop in stages
o Choose a high-value business process
o Choose the right audience
o Measure return on investment during initial implementation
o Use the result of the measurements to establish the organisational wide values.

f) **How the Expert system is different from Neural Networks.**

An expert system is a computer program that simulates the judgement and behaviour of a human or an organisation that has expert knowledge and experience in a particular field. Typically, such a system consists of a knowledge base containing the accumulated experience and a set of rules for applying the knowledge base to each particular situation that is described to the program. Sophisticated expert systems can be enhanced with additions to the knowledge base or to the set of rules while Neural networks are systems of programs and data structures that attempt to model the capabilities of the human brain. Neural Networks are an array of interconnected processors operating in parallel in which knowledge is represented by the pattern of interconnections among them and by adjustable weights of these connections. They have good pattern recognition techniques and can identify hidden patterns in data and can also deal with incomplete input. They also have an ability to learn new information and behavior.

END OF MARKING GUIDE AND MODEL ANSWERS