CERTIFIED PUBLIC ACCOUNTANT

FOUNDATION LEVEL 2 EXAMINATIONS

F2.3: INFORMATION SYSTEMS

DATE: TUESDAY, 29 MARCH 2022

MARKING GUIDE AND MODEL ANSWERS

QUESTION ONE

Marking guide	**Marks**
a) Brief answer for storage area network(interconnected) is 1mark	1
Storage area network explanation	1
Maximum Marks	**2**
b) Definition of Operating system	1
Reason why Linux is most preferred operating system	1
Maximum Marks	**2**
c) Every correct example of operating system carries 1 mark including any valid example not provided in the model answer	6
Maximum Marks	**6**
d) XBRL is a language for the electronic communication of business	1
Revolutionizing business reporting	1
Maximum Marks	**2**
e) Cost savings	1
Greater efficiency	1
Improved accuracy and reliability	1
Any other valid benefit of XBRL can be awarded 1 mark	
Maximum marks	**3**
f) Open-source software	1
Java	1
Enterprise integration software	1
Mobile Apps	1
Web services and service-oriented architecture	1
Any other valid Contemporary software platform trend can be awarded 1 mark	1
Maximum marks	**5**
Total Marks	**20**

Model Answer

a) Briefly discuss Storage area networks.

- Storage area networks are networks that provide an interconnected, economical way to consolidate data from across any and all systems within the business. Online users want instant access to data and SANs help companies provide it.

b) **Describe operating systems and give one reason why Linux is the most preferred operating system.**

- An operating system is the software that interacts with the hardware of the computer in order to manage and direct the computer's resources. Operating systems tell computers what to do, when to do it, and how. Operations such as logging on, file management, and network connectivity are controlled by the operating system.

- Linux open-source software is the operating system of choice for organizations looking to save money. Many businesses and governments across the globe adopt the Linux platform as a way to reduce IT spending and license costs.

c) Give 6 examples of operating systems.

- Windows 2000
- Windows NT
- Windows 10
- Ubuntu
- Linux
- Mac OS

d) Briefly discuss Extensible Business Reporting Language (XBRL)

- XBRL is a language for the electronic communication of business and financial data, which is revolutionizing business reporting around the world.

e) Outline the 3 major benefits of XBRL.

- cost savings
- Greater efficiency
- Improved accuracy and reliability

f) **Outline at least 5 Contemporary software platform trends.**

- Open-source software
- Java
- Enterprise integration software
- Web services and service-oriented architecture

- Apps (Mobile) and mashups
- Software outsourcing Open-Source Software
- Cloud based services

QUESTION TWO **Marking guide**	**Marks**
a) Organization Explanation	2
Information systems Explanation	2
Business Process explanation	2
Maximum marks	**6**
b) Mentioning the strategic business (1 mark) its explanation (1 mark)	2
Mentioning the globalization challenge (1 mark) its explanation (1 mark)	2
Mentioning the information systems investment (1 mark) its explanation (1 mark)	2
Mentioning the information architecture and infrastructure (1 mark) its explanation (1 mark)	2
Mentioning the responsibility and control (1 mark) its explanation (1 mark)	2
Maximum marks	**10**
c) only listing low-cost leadership (0.5) its explanation (0.5 mark)	1
only listing product differentiation (0.5) its explanation (0.5 mark)	1
only listing focus on market niche (0.5) its explanation (0.5 mark)	1
Maximum marks	**3**
d) Data definition (0.5) information definition(0.5)	1
Maximum marks	**1**
Total	**20**

Model Answer

a) Briefly discuss the relationship between organizations, information systems and business processes as used in the above text.

- Organization Information systems are part of organizations, and in some cases (such as Internet companies), they are the organization itself. Information systems will have the procedures and processes and the culture of an organization imbedded within them
- An information system is a set of interrelated parts that collect, process, store and distribute information to support decision making and control in an organization. Information systems can also be used to analyze problems and to create new products and services.
- Business processes refer to the manner in which work activities are organized, coordinated and focused to produce a specific business result. Information systems help organization to achieve great efficiencies by automating parts of these processes. Business processes also refer to the ways in which organizations co- ordinate and organize activities, information and knowledge to produce their products or services. Every firm has its own set of business processes.

b) Identify five key management challenges encountered while building, operating and maintaining information systems

- The strategic business challenge is how information technology can be used to design organizations so that are competitive, effective and digitally enabled.
- The globalization challenge facing organizations is how organizations understand the system requirements of a global economic environment.
- The information architecture and infrastructure challenge is that organizations 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.
- The information systems investment challenge is how organizations determine the business value of systems.
- The responsibility and control challenge is how organizations can ensure that their information systems are used in an ethical and socially responsible way.

c) In few words, discuss three Information System Strategies for dealing with Competitive Forces

- Low-cost leadership: Information systems can be used to achieve the lowest operational costs and the lowest prices. For example, a supply chain management system can be used to directly link customers to distribution, production and supply chains, helping lower inventory and distribution costs.
- Product differentiation: Information systems can enable new products and services, or greatly change the customer convenience in using existing products and services. For example; Dell uses mass customization, offering individually tailored computers using the

same production resources as mass production, to customize computers to individual customer needs.

- Focus on market niche: Use information systems to enable a specific market focus and serve this narrow target market better than competitors. Information systems support this strategy by producing and analyzing data for finely tuned sales and marketing techniques.

d) **What is the difference between Data and Information?**

- Data and Information Data is raw facts and figures, while information is data that has been processed or shaped into some useful forms for human use.

QUESTION THREE	**Marks**
Marking guide	
a)	
i) E-Comerce definition with these terms or other related terms buying, selling, transferring, or exchanging products, services (1 mark) Internet (1 marks)	2
ii) Digital markets definition that includes marketing that uses electronic devices and can be used by marketing specialists to convey promotional messaging(1 mark) computer, phone, tablet, or other device(1 mark)	2
iii) Social media definition with collective terms such as websites and applications (1 mark) communication, community-based input, interaction, content-sharing and collaboration(1 mark)	2
iv) Digital goods definition with these terms products, created, stored, delivered and sold(1 mark) delivered over a digital network such as the internet(1 mark)	2
Maximum marks	**8**
b) Model definition of internet technology (2 marks) Model definition of digital firm(2 marks)	4
Maximum marks	**4**
c) New products	1
Customer and supplier intimacy	1
Improved decision making	1
Competitive advantage	1
Survival	1

Low cost leadership	1
Services	1
Business models	1
Any other valid primary strategic business objective can be awarded 1 mark	
Maximum marks	**8**
Total	**20**

Model Answer

a) Define the following terms:

(i) E-commerce

- Electronic commerce (e-commerce) can be defined as the process of buying, selling, transferring, or exchanging products, services or information via computer networks including the internet

(ii) Digital markets

- Any marketing that uses electronic devices and can be used by marketing specialists to convey promotional messaging and measure its impact through your customer journey. In practice, digital marketing typically refers to marketing campaigns that appear on a computer, phone, tablet, or other device.

(iii) Social media

- Social media is a collective term for websites and applications that focus on communication, community-based input, interaction, content-sharing and collaboration.

(iv) Digital goods

- Digital Goods Digital goods are products that can be created, stored, delivered and sold as purely digital products and can be delivered over a digital network such as the internet. They include music, video, newspapers books and software. The pricing of digital goods is far more flexible and can be varied depending on demand conditions and customer profile. Digital goods are sold in digital markets.

b) **Differentiate Internet Technology and the Digital Firm**

- The Internet is an international network of networks connecting many millions of people from most countries in the world. It is the largest information superhighway in the world. The Internet provides a universal and easy-to-use set of technologies and standards that can be adopted by all organizations, no matter what computer system or information technology platform they are using. It provides a much lower cost and easier-to-use alternative for coordinating activities than proprietary networks, it reduces organizational transaction and

agency costs and increases communication, including electronic mail, online forums, and chatting. Additionally, it provides access to increased information and information retrieval from many thousands of online databases around the world and increases market potential with online offerings of information and products through the easy-to-use World Wide Web.

Digital firm means connecting each functional area and each management level to one another so they can share information. Data input to the system in manufacturing must be made available to sales, accounting and logistics. Managers in the human resources department must have access to a range of information related to employees. Integrating information from different sources is important for the digital firm.

c) Business firms invest in information systems such as the one for KFC to accomplish eight primary strategic business objectives. Outline those objectives.

- New products
- Customer and supplier intimacy
- Improved decision making
- Competitive advantage
- Survival
- Low-cost leadership
- Services
- Business models

QUESTION FOUR

Marking Guide	**Marks**
a) Definition for access control	1
Maximum marks	**1**
b) Identify the assets	1
Identify the threats	1
Any other valid element of risk analysis can be awarded 1 mark	
Maximum marks	**2**
c) Hardware (0.5 marks) examples (0.5 marks) such as keyboards, terminals, workstations, personal computers, laptops, printers, disk drives, communication lines, servers, routers, hubs etc	1
Software (0.5 marks) examples (0.5 marks) such as source programs, object programs, utilities, diagnostic programs, operating systems, communication programs.	1
Data (0.5 marks) examples (0.5 marks) such as during execution, stored online, archived off-line, backups, audit logs, databases, and in-transit over communication links.	1

People (0.5 marks) examples (0.5 marks) such as users, internal IT professionals, external support organizations. (1 Marks)	1
Documentation (0.5 marks) examples (0.5 marks) such as programs, hardware, systems and local administrative procedures.	1
Supplies (0.5 marks) examples (0.5 marks) such as paper and digital storage media. The end result of risk assessment is plans to implement controls that minimize overall cost while maximize defenses	1
Any other valid category of assets can be awarded 1 mark	
Maximum marks	**6**
d) Listing 6 reasons for computer-based systems vulnerability (each is 1 mark)	6
Maximum marks	**6**
e) Each of the 5 principals general controls will carry (1 mark)	5
Maximum marks	**5**
Total	**20**

Model Answer

a) Define Access control

- Access control is all the policies and procedures that a company uses to prevent access to systems by unauthorized insiders and outsiders. To gain access a user must be authorized and authenticated.

b) Outline two important elements of risk analysis.

- Identify the assets
- Identify the threats

c) Discuss 6 categories of assets that may need to be assessed in Kira hospital.

- Hardware: keyboards, terminals, workstations, personal computers, laptops, printers, disk drives, communication lines, servers, routers, hubs etc
- Software: source programs, object programs, utilities, diagnostic programs, operating systems, communication programs.
- Data: during execution, stored online, archived off-line, backups, audit logs, databases, and in-transit over communication links.
- People: users, internal IT professionals, external support organizations.
- Documentation: on programs, hardware, systems and local administrative procedures.
- Supplies: paper and digital storage media. The end result of risk assessment is a plan to implement controls that minimize overall cost while maximize defenses.

d) Explain 6 reasons why Computer based systems tend to be more vulnerable to damage, error, and fraud than manual systems following what Kira hospital is using as information system to manage their patients.

- Data are stored in electronic format and are therefore not visible or easily auditable.
- 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 organization's entire record-keeping system could be destroyed.
- 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.
- 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 unauthorized changes to working systems.
- Many information systems can be accessed through telecommunications, and telecommunications can produce errors in data transmission.
- 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.
- Hardware equipment can be stolen – this is a growing problem because of the growth in mobile computing.

e) Explain at least principal general controls for safeguarding information resources in Kira.

- 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.
- Computer hardware security 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.
- 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.
- 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.

- 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.
- Administrative controls are formalized standards, rules, procedures and control disciplines to en sure the organizations general and application controls are properly executed and enforced.

QUESTION FIVE

Marking Guide	**Marks**
a) Each of the four kinds of organizational change explanation will carry (1 mark)	4
Maximum marks	**4**
b) Each outlined set of activities will carry (1 mark)	4
Maximum marks	**4**
c)Traditional Systems Life Cycle (I marks) its explanations (1 mark)	2
Prototyping Information system (I marks) its explanations (1 mark)	2
End-User Development End-user (I marks) its explanations (1 mark)	2
Application Software Packages (I marks) its explanations (1 mark)	2
Outsourcing (I marks) its explanations (1 mark)	2
Maximum marks	**10**
d) Each outlined step is (0.5 marks)	2
Maximum marks	**2**
Total	**20**

Model Answer

a) Building new systems on organization can enable four kinds of organizational change. Briefly discuss the four kinds of organizational change.

- Automation: this involves using computers to speed up the performance of existing tasks by eliminating the need for manual activity. This approach to organizational change may release staff to other jobs, reduce the number of employees needed, or enable the organization to process more transactions.
- Rationalization of procedures refers to the streamlining of standard operating procedures and eliminating some tasks in a process removing any blockages.
- 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, labor-intensive tasks in order to improve cost and quality and to maximize the benefits of information technology.

- A paradigm shift is a radical change in the business and the organization. The strategy of the business can be changed and sometimes even the business the company is in.

b) **Outline at least four set of activities that are involved in producing an information system**

- System Investigation (including feasibility study)
- Systems analysis
- Systems design
- Programming
- Testing
- Implementation (including conversion or changeover)
- Production and maintenance.

c) **Discuss 5 alternative methods for building information systems**

- Traditional Systems Life Cycle The traditional systems life cycle (also referred to as the system development lifecycle (SDLC)) is a formal methodology for managing the development of systems and is still the primary methodology for medium and large projects. The overall development process is divided into distinct stages or phases. The stages are usually gone through sequentially with formal "sign-off" agreements among end users and the system specialists at the end of each stage. The systems life cycle consists of systems analysis, systems design, programming, testing, conversion, and production and maintenance.
- Prototyping Information system prototyping is an interactive system design methodology that builds a model prototype of a system as a means of determining information requirements. Prototyping involves defining an initial set of user requirements and building a prototype system; then improving upon the system in a series of iterations based on feedback from the end users. An initial model of a system or important parts of the system is built rapidly for users to experiment with. The prototype is modified and refined until it conforms precisely to what users want.
- End-User Development End-user development refers to the development of information systems by end users without involvement of systems analysts or programmers. End user can utilise a number of user- friendly software tools to create basic but functional systems..
- Application Software Packages An application software package is a set of prewritten, pre-coded application software programs that are available for sale or lease. Packages range from very simple programs to very large and complex systems such as ERP systems. Packages are normally used when functions are common to many companies and when resources for in-house development are not available. Examples of application packages include payroll packages, accounting packages, inventory control applications and supply chain applications.

- Outsourcing Outsourcing of information systems is the process of subcontracting the development and sometimes the operation of information systems to a third-party company who provide these services. The work is done by the vendor rather than the organization's internal information systems staff. Outsourcing is an option often considered when the cost of information systems technology has risen too high. Outsourcing is seen as a way to control costs or to develop applications when the firm lacks its own technology resources to do this work.

d) Outline four steps involved in prototyping process

- Step 1: Identify the user's basic requirements.
- Step 2: Develop an initial prototype.
- Step 3 Use the prototype.
- Step 4: Revise and enhance the prototype.

QUESTION SIX

Marking Guide	**Marks**
a) Each outlined limitation of e-commerce will carry (1 marks)	6
Maximum marks	**6**
b) Each moral dimension will carry (1 mark) and its explanation will carry (1 mark)	10
Maximum marks	**10**
c) Model explanation of Information Rights Privacy will carry (2 mark)	2
Maximum marks	**2**
d) Brief explanation of how laws and privacy legislation help to protect the privacy of Internet users. (2 marks)	2
Maximum marks	**2**
Total	**20**

Model Answer

a) **Outline 6 limitations of e-commerce**
   - Lack of universally accepted standards for quality, security and reliability
   - Difficulty in integrating e-commerce software with some existing applications and databases
   - Unresolved legal issues related to fraud and buyer and seller protection
   - Customer resistance to changing from real to virtual stores
   - Perception that e-Commerce is expensive and unsecured
   - Increasing incidence of internet fraud and other crimes

b) **Management information systems have ethical and social concerns. Discuss the five moral dimensions of these issues.**
   - Information Rights: What information rights do individuals and organizations have with respect to information about themselves? There are also moral obligations for those dealing with this information.
   - Property Rights: How will intellectual property rights be protected in a digital society, where traditional measures that protect property are no longer applicable?
   - Accountability and Control: Who can be held responsible for damage caused to individual information and property?
   - System Quality: Data quality and system errors - No software program is perfect, errors will be made, even if the errors have a low probability of occurring
   - Quality of Life: What values should be retained in an information society? Which cultural values and practices are supported by the new information technology?

c) Briefly discuss the Information Rights Privacy as Ururabyo Telecom will be dealing with more information which also involves money transfer.
   - Information Rights Privacy is defined as a state in which an individual is not being observed or disturbed by other people or organizations. Claims to privacy involve the workplace as well as the home. Information technology threatens the individual's claims to privacy by making the invasion of privacy cheap, profitable and effective. An example of Information technology affecting the individual's claims to privacy is the controversy related to Google Street view where pictures of people's homes and individual were displayed on the internet without their consent.

d) How can Laws and privacy legislation help to protect the privacy of Internet users?

   - Laws and privacy legislation can help regulate the collection, usage, and disclosure of information.

QUESTION SEVEN

Marking Guide	**Marks**
a) Each main step of the knowledge management cycle will carry (1 mark) its explanation will carry (1 mark)	8
Maximum marks	**8**
b) Explanation of why knowledge from external sources is important to organizations will be given (2 marks)	2
Maximum marks	**2**
c)	
i) A clear explanation of a knowledge-based system will be given (2 marks)	2
ii) A clear explanation of remote working will be given (2 marks)	2
iii) A clear explanation of hot desking will be given (2 marks)	2
Maximum marks	**6**
d) Identifying the problem	1
Preparing for change	1
Creating the team	1
Mapping out the knowledge	1
Any other valid way of managing knowledge can be awarded 1 mark	
Maximum marks	**4**
Total	**20**

Model Answer

a) The knowledge management cycle includes four main steps that transform data and information. Discuss the four steps in details.

- **Acquisition** Knowledge comes from a variety of sources. Companies are using more sophisticated technologies to gather information and knowledge from emails, transaction-processing systems, and outside sources such as news reports and government statistical data. It's important to remember that while there are many internal sources of knowledge some knowledge should come from external sources. This is important as it brings new knowledge into the company and helps inform the organization of the changes that are happening in its external environment.
- **Storage** As knowledge is created and captured it must be stored efficiently and effectively and in a way that allows it to be accessed by others. Document management systems are an easy way to digitize, index and tag documents so that employees can retrieve them without too much difficulty. For a knowledge system to be effective employees and management need to support and contribute and not feel threatened by it. All the people in the organization need to realize how important a resource a knowledge management system is.

- **Dissemination** Once the system has acquired and stored the knowledge, it must be made straightforward and efficient for employees to access the knowledge. People often complain nowadays of having too much information. The organization needs to make knowledge available in a useful format for whoever needs it, when the need it and wherever it is needed. If not, it will be ignored or underutilized.
- **Application** If the organization is to gain business benefit from its investment in knowledge management, then employees and managers needs to apply the knowledge. The more people that apply the knowledge to solve organizational problems the greater the benefit that accrues.

b) Why is knowledge from external sources important to organizations?

- It's important to remember that while there are many internal sources of knowledge some knowledge should come from external sources. This is important as it brings new knowledge into the company and helps inform the organization of the changes that are happening in its external environment. Storage As knowledge is created and captured it must be stored efficiently and effectively and in a way that allows it to be accessed by others.

c) Briefly define the below terms used in information systems:

(i) Knowledge Based Systems.

- A knowledge-based system is a form of artificial intelligence (AI) that aims to capture the knowledge of human experts to support decision-making. Examples of knowledge-based systems include expert systems, which are so called because of their reliance on human expertise.

(ii) Remote working

- Remote work (also known as work from home or telecommuting) is a type of flexible working arrangement that allows an employee to work from remote location outside of corporate offices. For employees who can complete work offsite, this arrangement can help ensure work-life balance, access to career opportunities or reduced commutation costs.

(iii) Hot desking

- Hot-desking is an organizational workspace system in which desks are used by different people at different times, on an ad hoc basis. Typically, the aim is to maximize space efficiency and lessen real estate risk by reducing redundant office space

d) List down at least 4 ways of managing knowledge.

- Identifying the problem
- Preparing for change
- Creating the team
- Mapping out the knowledge
- Creating a feedback mechanism
- Defining the building blocks for a knowledge management system
- Integrating existing information systems to contribute and capture knowledge in an appropriate format

END OF MARKING GUIDE AND MODEL ANSWERS