CERTIFIED PUBLIC ACCOUNTANT
LEVEL 2 EXAMINATIONS
F2.3: INFORMATION SYSTEMS
THURSDAY: 08 JUNE 2017

INSTRUCTIONS:

1. **Time Allowed: 3 hours 15 minutes** (15 minutes reading and 3 hours writing).

2. This examination has **seven(7)** questions and only **five(5)** questions are to be attempted.

3. Marks allocated to each question are shown at the end of the question.

4. Show all your workings.

5. All iCPAR Examination rules and regulations apply.

QUESTION ONE

Rulinda University of Science and Technology RUST), situated at the heart of Gasabo District has data storage challenges. Data storage at this University has always been done using the traditional file-based system. However, as the numbers of students increased the registrar of the University, Mr Shyaka, realised that it was becoming increasingly difficult to store and access students' information using the traditional file-based system.

He then decided to carry out research on better ways data can be stored and accessed. He found out that data can easily be stored and accessed using the Database Management Systems (DBMS). On further inquiry about DMBS, he found out that there were different types of databases which include operational, distributed, relational and end-user databases. His challenge was how to choose the one which would best serve the requirements of the University.

He realised that the cheapest way of acquiring a database for the University was to engage the computer science students at the University. He approached Mrs. Gatabi, the head of computer science department to recommend students who would design the DBMS. The selected students designed and coded the database application which was immediately installed without testing it on actual data and it is what the University is currently using.

However, the DBMS has very many bugs, the registrar has noticed that a lot of data is repeated and the naming convention keeps changing. There have been instances when the university students have hacked into the system and changed their results and other personal information. Due to these challenges, Mr. Shyaka recently invited an external programmer to help with bugs but the programmer found it difficult to remove the bugs because the students who designed it completed their courses and never left any documentation about design of the system. The registrar is in a dilemma and he had requested you as an information system consultant to advise him on how to improve the system.

REQUIRED:

(a) Explain any two advantages of using the Database Management System to Rulinda University of Science and Technology. **(2 Marks)**

(b) Discuss each of the following databases:

   (i) Operational **(2 Marks)**

   (ii) Distributed **(2 Marks)**

   (iii) Relational **(2 Marks)**

   (iv) End-user **(2 Marks)**

(c) Explain to Mr. Shyaka any five mistakes the students could have made while coming up with the database design. **(10 Marks)**

(Total 20 Marks)

QUESTION TWO

Bazarusanga Cattle keepers Organisation (BCK) is a non-government organisation (NGO) in Rwanda responsible for livestock, their disease management and food safety. This NGO set up a computerised information system two years ago. The managers of this information system have experienced security challenges in regard to its management and control; and safeguarding the information resources both externally and internally. It is possible that the managers of this information system did not put in place secure computing tools, technologies, strategies and techniques. This has led to BCK not realising the benefits of their information system.

REQUIRED:

Explain to the manager of BCK:

(a)   The necessity of protecting the information system set up for Bazarusanga Cattle keepers and its information resources.   **(6 Marks)**

(b)   The security computing tools, technologies, strategies and techniques that should have been put in place by the managers of BCK's information system before its implementation.   **(6 Marks)**

(c)   Explain four challenges posed by the computerized information system to the operations of BCK as a result of not having the strategies, techniques, tools and technologies identified in (b) above.

(8 Marks)

(Total 20 Marks)

QUESTION THREE

Changugu programmers is a group of fresh computer science graduates who teamed up and formed a systems development company. They design and develop information systems that can be used in organisations to run some of their day-to-day business processes.

Shakisha Plastic Industries Ltd (SPIL) is a leading group of manufacturers of quality plastic products and polyvinyl chloride) (PVC) pipes in Rwanda. Currently, the manufacturing process is long and slow. A plastic item goes through a number of stages during its production which include extrusion, injection moldings, blow molding and rotational molding. However, SPIL would like to improve its manufacturing process and has contacted Changugu programmers to develop for them a more efficient computerised manufacturing system.

Changugu programmers have designed the system and it is ready for use. However, the board of directors believe that some training should be done for all the employees since it is expected that SPIL will experience some changes due to the automation, rationalization, reengineering and paradigm shifts

You are one of the programmers and the board of directors of SPL has requested you together with the Chairman of Changugu programmers to make a presentation to the employees highlighting the systems development process, the impact the new system will have on their organization and the challenges experienced in designing the computerized system.

REQUIRED:

(a) Explain to the employees of SPIL the following terms:

      (i)   Automation   **(1 Mark)**

      (ii) Rationalisation   **(1 Mark)**

      (iii) Re-engineering   **(1 Mark)**

      (iv) Paradigm shifts   **(1 Mark)**

(b)   The four activities that are involved in the designing and development of the computerized manufacturing system.   **(8 Marks)**

(c)   Any four challenges Changugu programmers experienced during the designing and development of the computerized manufacturing system.   **(8 Marks)**

(Total 20 Marks)

QUESTION FOUR

Mugabo healthcare is a computerized health facility in Ruhengeri town. Nearly all its significant business relationships with customers, patients, suppliers and employees are digitally enabled and the key corporate assets are managed through digital means. The digitalization of most of activities and relations has come with a number of merits including support in decision making process, reduction in hierarchical and reporting levels between the executives and other staff leading to decentralized decision making. Communication is timely due to the internet and processing of data is faster. However digitalization is incomplete without the use of internet given that relations with all stakeholders are digitally enabled.

It is not only Mugabo healthcare that has gone digital but most industries have support in decision making processes that can be accomplished by some systems generally referred to as decision support systems (DSS) in any digital firm. DSS support semi-structured and structured decisions leading to flexibility and rapid response.

REQUIRED:

(a) Explain:

  (i) Any five ways digitalization has positively impacted Mugabo healthcare.   **(5 Marks)**

  (ii) Any five ways the use of internet has enhanced that digitalization of Mugabo healthcare.   **(5 Marks)**

(b) With help of an illustration, explain the various components of the decision support systems used in Mugabo healthcare.   **(10 Marks)**

(Total 20 Marks)

QUESTION FIVE

A computer network is where two or more computers are connected so that they can communicate and share resources. When computer networks are able to communicate across long distances then we talk of telecommunications networks and this is where there is electronic transmission of information across different geographical locations. Therefore, computers and telecommunications work together to create value. This leads to value added networks which are private network providers that focus on offering network services such as secure email message encryption and management reporting. This gives an opportunity to individuals and companies that intend to do business online given the guarantee of security of communication and data transmission over long distances. In fact, the main goal of value added networks (VAN) is to facilitate electronic data interchange (EDI) among online companies, providing a convenient way for e-commerce business to securely communicate and share data. E-commerce is carried out via e-commerce platforms. Ganza-Gatanazi United traders (GGUT) is one of the companies that have seized the use of computers and telecommunications to sell their merchandise online.

REQUIRED:

(a)   Explain the following terms as used in telecommunications and e-commerce:

    (i) Secure email   **(1 Mark)**

    (ii) Electronic data interchange (EDI)   **(1 Mark)**

    (iii) Data transmission   **(1 Mark)**

    (iv) Online companies   **(1 Mark)**

    (v) E-commerce platforms   **(1 Mark)**

(b)   Describe five commonly used features on e-commerce platforms that GGUT employs to conduct its online business.   **(10 Marks)**

(c)   Explain five e-commerce approaches and types GGUT employs to deal with different categories of customers.   **(5 Marks)**

                                                                                                                        (Total 20 Marks)

QUESTION SIX

Every organization has at least three levels of management namely the operational level, the management level and the strategic level. There are information systems that support decision making at each of these levels. There are also four functional areas at each of the management levels namely sales and marketing, manufacturing and production, finance and accounting, and human resources. Each of these functional areas is also supported by a different type of information system. Ndabarinzi Motors Ltd is a car manufacturing and assembling plant in Rutsiro District in the western province of Rwanda. It uses information systems in all its operations.

REQUIRED:

(a) (i)   Define the term "**functional area**".   **(2 Marks)**

    (ii)   Explain how the information systems support the four functional areas of Ndabarinzi Motors Ltd.

                                                                                                                            (2 Marks)

(iii) Describe the relationship between the organisational information systems and the business processes in the different functional areas of Ndabarinzi Motors Ltd. **(2 Marks)**

(iv) Explain the four information systems that support each functional area in Ndabarinzi Motors Ltd with emphasis on their functions. **(8 Marks)**

(b) With the help of an illustration, explain the relationship between the management information system, decision support system, transaction processing system and executive support system in Ndabarinzi Motors Ltd which serve at its different levels and give an example from each of its functional areas.

(6 Marks)

(Total 20 Marks)

QUESTION SEVEN

Rwanda is one of the fastest growing African countries in information communications technology (ICT). On several occasions, the Minister of ICT has advocated for institutionalizing of ICT. He has emphasized that it does not really matter what type of company it is; it can be a bank, a farm or a school. On that note, Gikongoro farm (GF) would like to adopt the use of information systems. GF is one of the largest farms in Rwanda. It has Cows, Chickens, Goats and Sheep and farmland where they cultivate coffee, tea, barley and rice. The farm has been manually recoding daily sales and expenditure on paper and keeping them in files stored in cupboards. Management of payroll is also done manually.

Mrs. Mbarushimana, the farm director, has decided to take the minister's advice and adopt modern technology. She would like to install information systems on the farm and she is aware that one of the pre-requisites is to conduct a feasibility study; however, she says she will ignore this stage because it is very expensive.

She invited all the employees to a meeting where she explained to them the need to embrace ICT and that she was going to install information systems in the different operations on the farm. However, the employees are afraid and are reluctant to embrace the new change; in fact some are threatening to strike. They have also raised a concern that installing information systems is very expensive and yet they are still energetic and they can continue to perform all the duties manually. They do not see any business value of information systems.

Mrs. Mbarushimana is wondering whether there are models which she can use to explain to her employees the business value of information systems. She has requested you as an information systems expert to help her with the information she needs.

REQUIRED:

Prepare a presentation for Mrs. Mbarushimana to present to her employees:

(a) Explaining the importance of conducting a feasibility study. **(4 Marks)**

(b) Discussing any five techniques she can use so that her employees accept the change and support her during the transition. **(10 Marks)**

(c) Identifying and explaining any three models that she can use to ensure that her employees understand the business value of information systems. Ensure to indicate a formula. **(6 Marks)**

(Total 20 Marks)

End of question paper

F2.3

BLANK PAGE