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## **CERTIFIED PUBLIC ACCOUNTANT (CPA)**

### **LEVEL 2 EXAMINATIONS**

#### **F2.3: INFORMATION SYSTEMS**

**THURSDAY: 7 JUNE 2018**

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#### **INSTRUCTIONS:**

1. **Time Allowed: 3 hours 15 minutes** (15 minutes reading and 3 hours writing).
2. This examination has **seven** questions and only **five** questions are to be attempted.
3. Marks allocated to each question are shown at the end of the question.
4. Show all your workings.

## QUESTION ONE

Many employers are challenged with verifying the authenticity of academic transcripts from universities in Rwanda. Since it is a public concern the government of Rwanda has contracted Aptune Technologies Limited (ATL) to come up with a system that captures records of every student who registers in a university. Every semester, ATL should be working with universities to capture students' marks and upon graduation, ATL should also add the transcripts and certificates to each individual's account. In effect all employers will access the individual transcripts by entering student's registration number. The government of Rwanda will be responsible for paying ATL for designing and maintaining the system.

ATL would like to come up with strategies to protect the information system since information of the individuals is a vital asset to any organisation.

ATL has come up with a managerial framework for security control of her information systems as much as there could be many other security measures put in place as most information systems are prone to risks.

In fact, Rwanda National Cyber Security Policy of March 2015 provides that "*there is no such a thing as absolute cyber security*". Therefore, most organizations have to come up with risk management strategies. Consequently ATL would like to come up with a risk management strategy and a disaster recovery plan since disaster recovery is typically driven by risk management. This will ensure business continuity in the event that the Information System is hit by any risk. In essence, all the above security measures, if put in place; will provide value for ATL business.

### REQUIRED:

- (a) Discuss **four** steps ATL will follow to come up with a disaster recovery plan. (8 Marks)
- (b) Describe how ATL can use any **four** components of organisation and management framework for security control to ensure its business continuity. (8 Marks)
- (c) Describe any **two** types of security controls that ATL can employ to make their system more secure and assess how they provide business value. (4 Marks)

(Total: 20 Marks)

## QUESTION TWO

World Wide Doctors (WWD) is a Non-Government Organization whose headquarters are located in Washington D.C., USA. Their main objective is to provide modern health care to rural Africa. WWD have recently constructed a state-of-the-art referral hospital called Muhanga Referral Hospital with modern medical equipment in Muhanga district.

Aware that health care technology is changing and evolving, WWD wants to make sure that Muhanga Referral Hospital stays on top with the latest technology trends incorporating patients' treatment and all other departments of the hospital supported by this technology.

Whereas ethical issues arise in the use of technology in hospitals, WWD needs employees of the hospital to be aware of such issues so that they can handle patients who show concern.

Nevertheless, WWD recently purchased a Hospital Information System (HIS) that manages data related to clinic, finance, laboratory, nursing, pharmacy, radiology, records, human resource, house-keeping and information technology departments.

Additionally, WWD ensured that the entire hospital is connected to the Internet so that communication can be made easily most especially between the hospital, her suppliers and all other stakeholders. This is so because stakeholders appreciate timely response despite the difference in time zones.

### REQUIRED:

- (a) Giving **five** reasons, justify why Muhanga Referral Hospital needed a Hospital Information System (HIS).  
**(10.Marks)**
- (b) Describe how any **three** technological trends that are likely to raise ethical issues in Muhanga Referral Hospital.  
**(6 Marks)**
- (c) Given that Muhanga Referral Hospital as a customer is going to heavily rely on the Internet to communicate and work with her suppliers; explain any **two** ways in which the Internet is likely to change her relationship as a customer with her suppliers.

**(4 Marks)**

**(Total: 20 Marks)**

### QUESTION THREE

Quick Pack Supermarket is one of the largest supermarkets in Rwanda with branches in Burera, Rusizi, Ngoma, Gisagara, Kayanza and Muhanga districts.

In December 2016, Quick Pack Supermarket realized that they were facing a lot of challenges in information management since all the branches used simple excel sheets to manage all their data.

The Marketing Manager suggested that Quick Pack Supermarket needed an information system to link all their branches to help them better manage their business processes and support the functional areas of their business.

The Director of the supermarket contracted Mwiza Consult to carry out a feasibility study in order to establish the type of information system the supermarket needed and findings indicated that the supermarket needed a Transaction Processing System (TPS).

Mwiza Consult further advised Quick Pack Supermarket that if they need full realization of their objectives and have the Transaction Processing System successfully implemented and owned by the users of the system, the users needed to be trained so that they fully appreciate and understand the transaction processing cycle.

Mwiza Consult also advised that they needed to fully understand the two types of TPS i.e. Batch Processing System and Real Time Processing System so that they are able to make a choice.

#### REQUIRED:

As an Information Systems student, use the above scenario to answer the following questions.

- (a) Illustrate the transaction processing cycle that the users of the Quick Pack Supermarket information system will be taken through.  
(6 Marks)
- (b) Given that the director of Quick Pack Supermarket preferred the Real Time Processing System to the Batch Processing System; explain any **three** reasons to support the director's choice.  
(6 Marks)
- (c) Discuss how the Transaction Processing System will support the **four** functional areas of sales and marketing; production and operations; human resources and accounting in Quick Pack Supermarket business.  
(8 Marks)

(Total: 20 Marks)

## QUESTION FOUR

Rwanda University of Technology and Management (RUTM) is located in Cyangugu Town. RUTM is known for using the most recent technologies while being ethical.

RUTM has about 300 computers which are housed in three state-of-the-art computer laboratories which all run a commercial operating system.

RUTM has 10 more computers which are found in other places; some of these computers have batch operating systems and network operating systems and distributed operating systems.

Mr. Ntuyaga Jean Claude who is the Head of the Information Technology Technical Department (HIT-Technical) would like to change the operating system installed on the computers in the laboratories to an open source operating system and then update the rest of the computers to most recent commercial operating systems.

HIT-Technical's preference for open source operating system has been triggered by the fact that the computer industry and its products continue to undergo dynamic change. As a result, lots of trends are occurring to software and hardware. In fact, there are five major contemporary software platform trends. The operating system being software has not escaped some of these trends.

Before changing the operating systems, the HIT-Technical would like to conduct a workshop to help all the employees get a better understanding of the issues related to operating systems.

You have been hired as an operating systems consultant to make a presentation to educate the employees of RUTM about the following operating system concepts.

### REQUIRED:

- (a) Explain, to the employees of RUTM, **three** ways in which operating systems are beneficial to RUTM.  
(6 Marks)
  - (b) Differentiate between commercial operating system and open source operating system as used in the scenario above  
(2 Marks)
  - (c) Explain to the employees of RUTM why Mr. Ntuyaga would like to shift from commercial operating system to open source operating systems.  
(4 Marks)
  - (d) Describe to the employees of RUTM any **four** contemporary software platform trends.  
(8 Marks)
- (Total: 20 Marks)**

## QUESTION FIVE

Bukindi Secondary School has been trying to change from the way students' examination results have always been handled, by coming up with a records management information system.

At first, the teachers of the school were using standalone computers to process students' results for each subject which they would later submit to heads of department on printed sheets. The students' results from individual teachers were entered into another standalone computer for processing individual performance in different subjects.

When Bukindi Secondary School adopted a records management information system, the many standalone computers the teachers were using had to be networked to a central computer manned by the director of studies. The students' results started being submitted directly and electronically leading to the compilation of individual student's performance being automatically processed.

The records management information system was developed three years back but it did not work for long despite the high costs incurred to have it in place. There is now a plan to review it and fix it so that it can be put to use again. With this plan, the school has emphasised that the developers of the system have to comprehensively address the socio-technical issues that arise from changing from the way students' results were previously handled before the records management information system.

The Board of Directors for Bukindi Secondary School would like to evaluate the investment put into the records management information system to find out if it produces sufficient returns to justify its cost.

### REQUIRED:

- (a) Explain any **three** issues that could have led to the failure of the records management information system for handling the students' results of Bukindi Secondary School.  
(6 Marks)
  - (b) Using **two** examples, justify why the developers of the records management information system for the school must address the socio-technical issues that arise as a result of changing from the way students' results were previously handled.  
(4 Marks)
  - (c) Discuss **three** financial models which Bukindi Secondary School can use to evaluate the system.  
(6 Marks)
  - (d) Describe **two** types of organisational change in Bukindi Secondary School that have been brought about by the use of a records management information system.  
(4 Marks)
- (Total: 20 Marks)**

## QUESTION SIX

According to the Millennium Development Goals-Rwanda Final Progress Report 2013, “The government of Rwanda recognizes Millennium Development Goals (MDGs) as benchmarks of progress the country makes towards sustainable development”. One of the MDGs is ensuring that all boys and girls complete a full course of primary school. This is not enough for sustainable development in Rwanda given that the boys and girls are not equipped with any practical skills at that level. They are only able to read and write.

The vision of the Ministry of Education for Rwanda is to provide the citizens of Rwanda with equal opportunities to high quality education through world-class learning facilities and renowned learning institutions. This can be achieved by building electronic learning (e-learning) platforms. With the introduction of one laptop per child (OLPC) program, the computer literacy levels of most students in Rwanda have significantly increased. As a result of the above, the e-learning platforms can easily be used by each learning institution in Rwanda.

E-learning stems from the incorporation of technology; this specifically relates to computer systems and mobile devices introduced into learning and education environments. Unlike the traditional way of learning where delivery of content and information is from teachers to students, e-learning incorporates more interactive and multi-directional tools.

The e-learning platforms in Rwanda have recorded educational videos and audios, slideshows, documents in word and portable document formats (PDF), online examination, grading systems and help features. However, these newly introduced platforms will come with a number of benefits as well as challenges.

### REQUIRED:

- (a) Define the following terms as used in the scenario above:
    - (i) Electronic learning. (1 Mark)
    - (ii) Electronic learning platforms (1 Mark)
  - (b) Briefly explain the steps that will be followed by the different learning institutions in Rwanda to come up with successful e-learning platforms. (10 Marks)
  - (c) Explain **four** benefits that will be derived from using e-learning platforms in the Rwanda education sector. (4 Marks)
  - (d) Explain any **four** challenges likely to be faced by the key stakeholders majorly, the students and the learning institutions in Rwanda as a result of using e-learning platforms. (4 Marks)
- (Total: 20 Marks)**

## QUESTION SEVEN

Networking telecommunications platforms are typically provided by telecommunications companies that offer voice and data connectivity, wide area networking, wireless services and internet access. Through the telecommunications platforms, social networking is promoted tremendously. To date, there are many social networking platforms globally.

Ganza-Rwanda Telecom Company Limited (GRTCL) is a leading service provider of fixed network and mobile communication services in Rwanda. The mobile communications have different pricing plans including voice-only plans, voice and data bundled plans, data only plans, unlimited call packages, voice per minute rates and group mobile-to-mobile plans. All these provide a world of value via telecommunications platforms to most organizations in Rwanda.

Ntarugera Group of Companies with branches in all the five provinces of Rwanda is one of the biggest clients of GRTCL. They fully utilize the telecommunications platforms supported by GRTCL. With time, the employees of Ntarugera Group of Companies started using the telecommunications platforms as though they were in a private or personal world painting unethical picture before the globe. A one day workshop was held to address the telecommunication platform ethics; the acceptable behaviour for using telecommunications platforms.

### REQUIRED:

- (a) Explain the following terms, giving an example for each, as used in the scenario above.
    - (i) Telecommunications platforms. **(2 Marks)**
    - (ii) Mobile communications services. **(2 Marks)**
    - (iii) Social networking. **(2 Marks)**
  - (b) Discuss, giving **four** examples, the importance of the various telecommunications platforms to Ntarugera Group of Companies which are supported by GRTCL. **(8 Marks)**
  - (c) Explain **three** acceptable behavioural practices for using telecommunications platforms discussed in the one-day workshop of the Ntarugera Group of Companies. **(6 Marks)**
- (Total: 20 Marks)**

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**END OF QUESTION PAPER**