L-Università
ta' Malta

SUBJECT:	**Information Technology**
DATE:	11th December 2020
TIME:	9:00 a.m. to 12:05 p.m.

Directions to Candidates

Workings are considered as part of the answer and must be shown.

SECTION A: COMPUTING PRINCIPLES

Answer Question 1 and any other FOUR questions from this section.

This question is compulsory.

1. a. A local council has just set up a small library and is in the process of creating a digital inventory of book records and registered members. Figures 1 and 2 are snapshots from the Books and Members tables respectively.

LibraryCode ▾	Title ▾	Author ▾	Genre ▾	ISBN ▾	OnLoanTo ▾
1	Animal Farm	George Orwell	Satire	978-3-598-21500-1	25101L
2	The Lord of the Rings	J R R Tolkien	Classical Fantasy	978-1-5369-1884-7	15794L
3	Tarzan	Edgar Rice Burroughs	Science Fantasy	978-5-0238-1655-5	
4	James Bond	Ian Fleming	Novel	978-2-0309-4704-3	25101L
5	The Twilight Saga	Stephenie Meyer	Romance	978-2-7371-2397-9	

Figure 1 – Books table

	IDCard ▾	Name ▾	Surname ▾	Phone ▾
⊞	15794L	Carl	Abela	27256504
⊞	25101L	Sarah	Pelicano	21210024
⊞	72287M	Denise	Saliba	27215621

Figure 2 – Members table

   i. The LibraryCode is the primary key of the Books table. Is it possible for different books to have the same LibraryCode? Explain why in some detail. (2)
   ii. Which field in the Books table is the foreign key? Explain **ONE** advantage for the librarian to have this foreign key included in the database. (2)
   iii. Which **ONE** of the following constitutes a record? Write the correct answer on your script.
      a. ISBN
      b. LibraryCode and IDCard
      c. Sarah - Carl - Denise
      d. 72287M - Denise - Saliba - 27215621 (1)

This question continues on next page.

iv. Based on the relationship that exists between tables, as shown in Figure 3, determine which **ONE** of the following statements is true. Write the correct answer on your script.
   a. All books must be borrowed by members having the same IDCard number.
   b. Members can borrow multiple books having a different LibraryCode at any given time.
   c. Members can only borrow one single book at any given time.
   d. Different members can borrow the same book having the same LibraryCode at the same time.
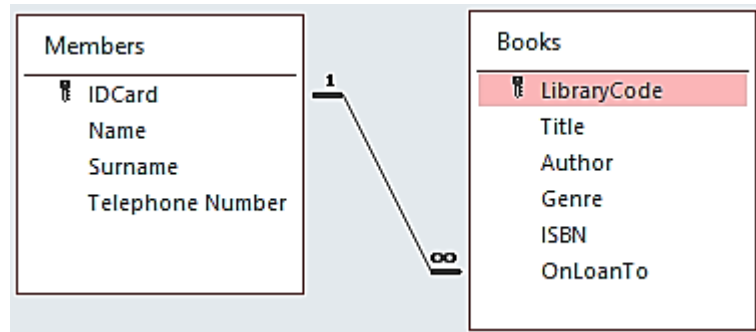

Figure 3 – Relationship between tables   (1)

v. Outline the importance of using forms when designing databases.   (1)
vi. Explain how a data validation rule could be implemented on any **ONE** field in the Members table shown in Figure 2 on page 1.   (2)

b. In an effort to promote reading, the local council would like to create more awareness of the new library services by launching a new website.
   i. Outline **TWO** common principles that should be taken into consideration when drafting the design of a website.   (2)
   ii. Define meta tags and explain why it is useful to include them in web pages.   (2)
   iii. Outline the use of anchors when creating a web page.   (2)
   iv. Explain the purpose of alternate text when inserting images in web pages.   (2)
   v. State **ONE** reason for considering cross-browser compatibility when planning a website.
                                                                          (1)
   (Total: 18 marks)

Answer any FOUR questions from questions 2, 3, 4, 5, 6 and 7.

2. This question is about the role of ICT in modern society.

   a. While working on a research project, a student suggested using Wikipedia as the main source of data. Explain why using Wikipedia could be problematic.   (2)

   b. Many people claim that nowadays, they are facing information overload, particularly because of the Internet. Explain information overload.   (2)

   c. Define plagiarism and provide **ONE** example of such practice.   (2)

   d. Outline **ONE** advantage and **ONE** disadvantage of e-learning.   (2)
                                                                  (Total: 8 marks)

3. This question is about the tools required to handle information.

   a. Aeroplane manufacturers have been increasingly relying on modern flight control systems whilst seeking to ensure the safety of all passengers and crew onboard. Explain why a real-time processing system is required for this purpose. (2)

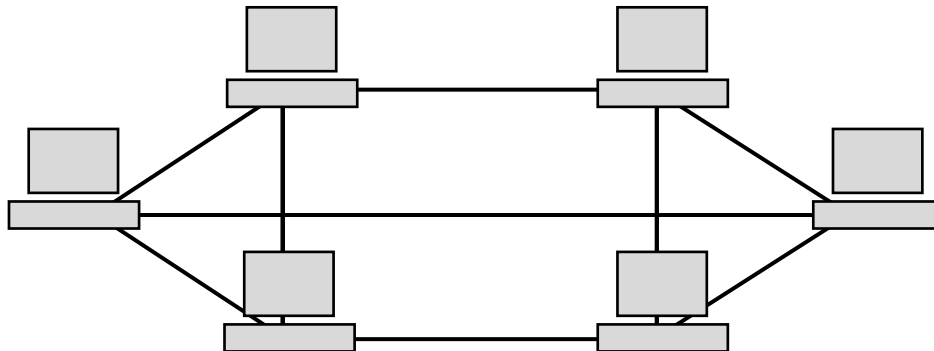   b. i. Name the LAN topology used in Figure 4. (1)

Figure 4 – LAN Topology

     ii. Justify a situation in which an organisation might consider using this topology. (2)

   c. Identify the type of data transmission (simplex, half-duplex, or full-duplex) used in each of the following situations:

   situation 1: A computer network card is configured to only transmit or receive data at any point in time using the same port, but not simultaneously; (1)

   situation 2: A computer application is used to broadcast a video stream to other computer devices without the possibility of multi-directional communication. (1)

   d. Explain **ONE** reason why DVDs are **not** ideal for data backup in large organisations. (1)

(Total: 8 marks)

4. This question is about categories of software.

   a. Explain why a drive defragmentation utility software (defragmenter) needs to be used. (2)

   b. Describe in some detail the function of the following components of an Operating System:
     i. memory manager; (2)
     ii. security. (2)

   c. Outline **ONE** advantage and **ONE** disadvantage of General-Purpose Application software.

(2)
(Total: 8 marks)

Please turn the page.

5. As per today's standards a local startup company has all of its data stored in a database.

   a. Explain **TWO** advantages that are provided when using databases. (2)

   b. During the next expansion the company is planning to hire a DBA.
      i. What is a DBA? (1)
      ii. Name **TWO** roles of the DBA. (2)

   c. Mostly due to GDPR, the company is worried about the security of their data. Describe **TWO** security procedures that can be implemented in a relational database management system (DBMS). (2)

   d. Provide a valid example where a one-to-one cardinality can be used. (1)
   (Total: 8 marks)

6. This question is about Internet related software.

   a. Define what the acronyms POP and IMAP stand for. Explain the difference between their purpose. (4)

   b. Describe key logger and state why it poses an Internet security risk. (2)

   c. Explain how encryption can be used as a solution to Internet hacking. (2)
   (Total: 8 marks)

7. Tekinia Ltd have been operating for the past 9 years in the hospitality industry and have contacted a software development company with regards to the development of a new computerised system for one of their hotels. The new system is intended to handle the bookings of their 500 rooms on several channels.

   During an initial meeting it was explained to Tekinia Ltd that software development is much more defined than the actual coding and testing of the coding being developed. In fact the management of Tekinia Ltd do not have clear objectives for their new software at this stage.

   a. The analysis of the problem being tackled should be well understood before any coding can take place. Explain **FOUR** techniques that can be used, in order to collect information from Tekinia Ltd to help define software objectives. (4)

   b. Following the analysis investigaton, a feasibility study should be drawn up. Explain **FOUR** aspects that should be considered at this stage of the system development. (2)

   c. During the initial meeting, Tekinia Ltd have proposed that they do not want to invest in technical documentation. Explain **TWO** issues that can arise when technical documentation is missing. (2)
   (Total: 8 marks)

SECTION B: HUMAN COMMUNICATION AND BUSINESS ORGANISATION

Answer Question 1 and any ONE other question from this section.

This question is compulsory.

1. Peter is the leader of his division at a local gaming company. As the mentor and superior to the employees in his division, Peter is constantly reviewing and checking the work being done by his subordinates.

   a. What gives the right to Peter to give orders to subordinates? (1)

   b. Explain **TWO** reasons why Peter might find it difficult to delegate work to his employees. (2)

   c. Name **TWO** of Peter's responsibilities as the leader of his division. (2)

   d. In a recent case there was a reluctance from a subordinate to accept Peter's instructions. Give **TWO** reasons for such reluctance. (2)

   e. Peter tends to rely on the grapevine in order to disseminate internal communication. He has been reading about downward communication as an alternative.
      i. Explain how downward communication differs from the grapevine. (1)
      ii. Mention **TWO** practical examples that Peter can use in order to implement downward communication. (2)

   (Total: 10 marks)

Answer ONE question from 2 and 3.

2. Josh Bernoff famously said that bad writing costs businesses billions, which has actually been quantified to be $400 billion every year. From poorly written emails, to unstructured reports that go unread, and marketing material which do not convey any message at all.

   a. Suggest **FIVE** recommendations to improve written communication. (5)

   b. The efficiency of written communication has decreased in recent years, as people are constantly reading on their smart devices and hence have less time and attention span to read other material.
      i. Identify **ONE** other form of communication which can be used in order to grab the attention of the audience. (1)
      ii. Provide **FOUR** examples in order to explain why this form of communication is important. (4)

   (Total: 10 marks)

Please turn the page.

3. When an organisation is operating at an international level, the organisation is bound to operate within different types of economies such as mixed economies and free markets. Mixed economies are historically regarded to be less efficient than free markets.

    a. What is a mixed economy? (2)

    b. How does a mixed economy differ from a free market economy? (2)

    c. List and explain **ONE** other type of economy. (2)

    d. In which scenario would a mixed economy be recommended? Substantiate your answer with the use of **TWO** examples. (4)

(Total: 10 marks)