

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD
UNIVERSITY OF MALTA, MSIDA
MATRICULATION EXAMINATION
ADVANCED LEVEL
MAY 2017

SUBJECT:	INFORMATION TECHNOLOGY
PAPER NUMBER:	I
DATE:	15 th May 2017
TIME:	9.00 a.m. to 12.05 p.m.

Directions to Candidates

A total of **SIX** questions must be attempted; **THREE** from Section A and another **THREE** from Section B.

SECTION A: INFORMATION SYSTEMS

Answer the first question in this section and any other TWO questions.

Question A1

This question is compulsory. Answer all parts.

- a) Briefly define and explain the following:
- i. CRC;
 - ii. WLAN;
 - iii. IP;
 - iv. Parallel Transmission. (8)
- b) i. Convert 68_{10} to binary using an 8-bit register and two's complement.
ii. List and describe any **THREE** methods that can be used to prevent data loss. (6)
- c) Describe **ONE** advantage and **ONE** disadvantage of using graphics over text when designing a user interface. (4)
- d) List and briefly describe any **TWO** business related issues caused by spyware. (2)

(Total: 20 marks)

Answer any TWO questions A2, A3 and A4.

Question A2

This question is about Information Systems

- a) What is the difference between a strategic and an operational information system? Give **ONE** example of each. (2)
- b) What is the systems life cycle? Give an example of **ONE** model used for the systems life cycle. (3)
- c) Identify any **THREE** stages of a typical systems life cycle. (3)
- d) List and explain any **TWO** features of successful system implementation and any **TWO** features of unsuccessful implementation. (4)
- e) List and explain any **TWO** purposes of drill down techniques. (2)
- f) Define and explain the term data warehouse. (2)
- g) A business organisation requires to process its data and analyse the business trends for the past three years. What system can be used for this task? Explain. (2)
- h) A system is required to identify fingerprint patterns. Which type of expert system do you suggest? Explain and give **ONE** valid reason. (2)

(Total: 20 marks)

Question A3

This question is about Data Security

- a) What is the difference between logging onto a computer system with a valid user ID and having suitable user rights to access a computer application. (4)
- b) A user receives an email from an unknown sender. What security risks are possible from this email? (4)
- c) Several human characteristics can be used for security identification. What is this type of data called? List any **FOUR** types of these control measures. (4)
- d) Explain any **TWO** differences between physical and electronic forms of security that can be used to prevent malicious attacks. (2)
- e) Explain the difference between a complex password and a simple one. Why is a complex password more secure? (4)
- f) Explain any **TWO** reasons why security must be balanced with usability. (2)

(Total: 20 marks)

Question A4

This question is about Computer Systems.

- a) Briefly compare the use of an internal hard drive for storage with that of optical devices. Give any **FOUR** advantages of optical devices. (5)
- b) A computer user requires to have the functionality of a normal hard drive but requires fast information access and speed. He is ready to pay for this technology. What type of new hardware technology can be used for this? Explain. (2)
- c) List and briefly explain any **FOUR** advantages of a netbook when compared to a typical laptop. (4)
- d) List and briefly outline any **TWO** modern emerging technologies that can be used for automated computer input. (2)
- e) List and briefly explain any **THREE** types of processing modes. (3)
- f) A company requires a cheap form of disk backup using a mirroring technique. What type of technology could be used for this? (3)
- g) List **ONE** common representation or standard, used for character representation in computer systems. (1)

(Total: 20 marks)

SECTION B: HUMAN COMMUNICATIONS & BUSINESS ORGANISATION

Answer the first question in this section and any other TWO questions.

Question B1

This question is compulsory. Answer all parts.

- a) Give **ONE** advantage of electronic communication and **ONE** advantage of written communication. (2)
- b) List any **FOUR** examples of written communication. (4)
- c) Briefly explain what is information overload. When does it occur? (4)
- d) Briefly explain the term 'computer related crime'. Give any **TWO** examples. (3)
- e) List any **TWO** roles of the Data Protection Registrar/ Commissioner. (2)

(Total: 15 marks)

Questions continue on next page

Answer ANY TWO questions B2, B3 and B4.

Question B2

In modern times, ICT has gained importance and is widely used. Discuss the use of ICT in modern society and the changes it has enabled. Give **FIVE** examples of these changes and their importance.

(Total: 15 marks)

Question B3

E-business is supposed to deliver new services to customers. Explain what E-business is with reference to **TWO** different models of E-business. Explain any **FIVE** advantages of adopting a CRM system.

(Total: 15 marks)

Question B4

Explain what is meant by E-learning. Give **TWO** advantages and **TWO** disadvantages of this approach. Explain what is a learning management system and name **ONE** example of such a system.

(Total: 15 marks)

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SUBJECT:	INFORMATION TECHNOLOGY
PAPER NUMBER:	II
DATE:	16 th May 2017
TIME:	9.00 a.m. to 12.05 p.m.

Directions to Candidates

A total of **SIX** questions must be attempted; **THREE** from Section A and another **THREE** from Section B.

SECTION A: SOFTWARE

Answer the first question in this section and any other TWO questions.

Question A1

This question is compulsory. Answer all parts.

- a) Explain the following terms and give **ONE** applied use for each of them.
- i. Error Handling;
 - ii. RSS;
 - iii. Software Portability;
 - iv. System Software;
 - v. Archiver. (10)
- b) What does the acronym *OLE* stand for? (1)
- c) Mention and describe any **TWO** advantages that tailor made software has over generic purpose software for modern organisations. (4)
- (Total: 15 marks)**

Answer any TWO questions A2, A3 and A4.

Question A2

This question is about the Software.

- a) List and explain any **TWO** categories of software excluding translators and utilities. Give **ONE** example of each. (4)
- b) List any **TWO** advantages of application generators and any **TWO** advantages of application suites. (4)
- c) List **THREE** Internet client applications and explain an advantage of each. (4)
- d) List **THREE** important features which must be included in a software evaluation report. (3)
- (Total: 15 marks)**

Question A3

This question is about Database Design.

- a) List and explain any **FOUR** problems related with a flat-file storage approach as compared to a proper database system. (4)
- b) Explain the term DDL and give **THREE** examples of commands used in this language. (4)
- c) List any **THREE** differences between a centralised and distributed database. (3)
- d) What does an E-R diagram show? List the **THREE** types of possible relationships in an E-R diagram. (4)

(Total: 15 marks)

Question A4

This question is about Internet.

- a) Give **FOUR** possible uses for Javascript in a website. (4)
- b) A company that is developing its website requires to check the website forms. List and explain how this can be carried out. (4)
- c) Define the terms SMTP and POP3. Give **ONE** practical example of each. (4)
- d) List and briefly explain any **THREE** solutions for Internet related security problems. (3)

(Total: 15 marks)

SECTION B: PROGRAMMING TECHNIQUES AND SYSTEM DEVELOPMENT

Answer the first question in this section and any other TWO questions.

Question B1

This question is compulsory. Answer all parts.

- a) The following is a Java Code Snippet.

```
1 import java.util.Scanner;
2 public class JavaProgram
3 {
4     public static void main(String args[])
5     {
6         int mark[] = new int[5];
7         int i;
8         float sum=0;
9         float avg;
10        Scanner scan = new Scanner(System.in);
11        System.out.print("Enter marks Obtained in 5 Subjects : ");
12        for(i=0; i<5; i++)
13        {
14            mark[i] = scan.nextInt();
15            sum = sum + mark[i];
16        }
17        avg = sum/5;
18        System.out.print("Average Mark = " +avg);
19    }
20 }
```

- i) Explain the code snippet between line 12 and line 16. (3)
 - ii) Modify the given code snippet to be able to enter 10 numbers. (5)
 - iii) Can this program produce the same output without using an array? Justify your answer. (2)
- b) Draw a simple ERM model for the following scenario: A local bookstore supplies books to customers. A customer places an order for a book. Each book has a unique book code and belongs to a particular category. (5)
- c) Consider the following snippet:
- ```

Beagle
Terrier
Chihuahua


```
- Explain line by line what the code snippet illustrated above does. (5)

**(Total: 20 marks)**

**Answer any TWO questions B2, B3 and B4.**

Question B2

This question is about Programming Techniques.

- a) Outline **THREE** reasons why modularity is important in systems development. (3)
- b) Using pseudocode or another notation, write down a binary search algorithm. (5)
- c) List and explain any **FOUR** programming related common operations normally carried out on files. (4)
- d) Why are breakpoints used in programming? (4)
- e) Clearly explain what is nullifying an object and overloading a method . (4)

**(Total: 20 marks)**

*Questions continue on next page*

Question B3

This question is about Programming Techniques and System Development.

- a) List and explain any **TWO** major differences between assembly language and machine code language. (2)
- b) Briefly outline the use of the following String functions:
- i. `substring()`
  - ii. `charAt()`
  - iii. `compareTo()`
  - iv. `concat()`
  - v. `length()`
  - vi. `replace()` (6)
- c) List and explain any **FOUR** differences between functional and imperative programming paradigms. (4)
- d) List and explain any **FOUR** common data types used in a programming language of your choice. (4)
- e) List and explain any **FOUR** types of testing strategies employed to test individual system components. (4)

**(Total: 20 marks)**

Question B4

This question is about System Development.

- a) Draw a simple DFD for the returning of a book by a borrower. The process is as follows:
- i) the book is returned;
  - ii) the barcode is scanned;
  - iii) a calculation is made to determine if the borrower has to pay a fine for late return. This is done by checking the date due back in the library database;
  - iv) if there is a fine, the borrower is notified. (6)
- b) Construct a simple class diagram for the library system mentioned in part (a). You are allowed to make assumptions. (6)
- c) Explain any **TWO** ways how a system's storage requirements can be estimated. (4)
- d) Explain any **FOUR** methods that can be used to capture the client's requirements when developing a new system. (4)

**(Total: 20 marks)**