MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD

UNIVERSITY OF MALTA, MSIDA

MATRICULATION EXAMINATION
ADVANCED LEVEL
SEPTEMBER 2015

SUBJECT:	INFORMATION TECHNOLOGY
PAPER NUMBER:	I
DATE:	1st September 2015
TIME:	9.00 a.m. to 12.00 noon

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) This part is on *Number Base Systems and Number Representation*.
   i. Convert 45_{10} to binary.
   ii. Convert $7D_{16}$ to decimal.
   iii. Workout 90_{10} - 40_{10} using 2's complement representation.
   iv. Convert -70_{10} to binary using 2's complement representation in an 8 bit register.

[4 marks]

b) Define and explain the following*:*
   i. *Cloud Computing*
   ii. *Master File*
   iii. *RFID*
   iv. *CLI*
   v. *Range Check*   **[10 marks]**

c) Explain how *Barcode* readers can help in reducing data input errors.   **[2 marks]**

d) What is *Data Warehousing*? Provide two examples for your answer.   **[2 marks]**

e) Define the term 'Computer *Protocol'?* Provide two examples to substantiate your answer.

[2 marks]

Answer ANY TWO questions A2, A3 and A4.

QUESTION A2
This question is about *Networking.*

a) What is the difference between *Serial Transmission* and *Parallel Transmission?* Give a real life scenario for each one. **[4 marks]**

b) List *two* types of wired communications media and *two* types of wireless communications media. For each provide a brief explanation. **[8 marks]**

c) What is the use of i) *bridges* and ii) *gateways* in Networking? **[4 marks]**

d) Which LAN topology would be appropriate for a small business firm? Justify your answer. **[4 marks]**

QUESTION A3
This question is about *Information: The tools required to handle it.*

a) Define the following and provide examples of area of use:
   i. *Mainframe*
   ii. *Tablet*
   iii. *PDA* **[6 marks]**

b) Explain what is meant by *Magnetic Storage* device. List *one* advantage and *one* disadvantage of such media. **[4 marks]**

c) Distinguish between i) short term human memory and ii) long term memory and their relevance to software design. **[4 marks]**

d) Discuss the advantages and disadvantages of a *Text based interface* compared to a *Graphic based interface.* **[4 marks]**

e) List the *two* main types of interfacing used in computer systems. **[2 marks]**

QUESTION A4
This question is about *Security*

a) What is *authorisation* and why is it important to secure data?   **[2 marks]**

b) Describe *two* authorisation methods that can be adopted for an IT lab.   **[4 marks]**

c) Users often complain that additional security measures inhibit functional use of the system and slow down operations. Suggest measures you could take to address such complaints. **[4 marks]**

d) Outline *two Security Policies* you would implement to increase security in an IT lab. **[4 marks]**

e) Describe *three* methods one can use to protect data against *electronic malicious attacks.*

[3 marks]

f) Define the term *biometrics.*   **[3 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) Mention *any four* different types of organisations.   **[4 marks]**

b) Explain the difference between i) an open system, ii) a closed system in organisations.

[4 marks]

c) List and explain *any four* functional areas in a typical organisation.   **[4 marks]**

d) Explain *any three* factors that can lead to change in an organisation.   **[3 marks]**

Please turn the page.

Answer ANY TWO questions B2, B3 and B4.

QUESTION B2

Modern organisations are subject to loads of information from different sources. A problem of 'information overload' may arise. Explain what is meant by information overload and discuss how this can be prevented. **[15 marks]**

QUESTION B3

ICT can be used to automate work procedures and facilitate work. Describe how ICT can enhance organisational procedures to improve work conditions and discuss the limits of ICT. **[15 marks]**

QUESTION B4

Describe possible security risks associated with information stored in an organisation and how these can be addressed from a managerial perspective. **[15 marks]**

SUBJECT:	INFORMATION TECHNOLOGY
PAPER NUMBER:	II
DATE:	2nd September 2015
TIME:	9.00 a.m. to 12.00 noon

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) What is the difference between an *Interpreter* and a *Compiler?* **[2 marks]**

b) What is debugging and why is it used? **[2 marks]**

c) What is a *Primary Key* field? Give an example. **[2 marks]**

d) State why Databases often contain multiple tables rather than just one table with all data.
[3 marks]

e) Define the following and give an example of each:
   i. Foreign Key
   ii. FTP Program
   iii. URL **[6 marks]**

Answer ANY TWO questions A2, A3 and A4.

QUESTION A2
This question is about the *Internet.*

a) Provide *two* real life scenarios of how *Phishing* and/or *Social Engineering* may be used to acquire personal information. **[4 marks]**

b) "Internet based fraud is more likely to occur because of user inexperience rather than due to system security faults". Do you agree with such a statement? Justify your answer. **[5 marks]**

c) Describe the purpose and features of an *FTP* application. **[3 marks]**

d) What are *Internet Registries?* Provide any *two* examples to substantiate your answer. **[3 marks]**

QUESTION A3
This question is about *Databases*.

a) Explain the following terms:
    i.   E-R Diagram
    ii. Form
    iii. Data Type
    iv. Index   **[4 marks]**

b) What is the Role of a *Database Administrator (DBA)*?   **[2 marks]**

c) Define the major characteristics of the *Hierarchical* data model.   **[3 marks]**

d) Mention and describe *two* ways how data can be inputted in a database.   **[3 marks]**

e) What is the difference between a *Centralised Database System* compared to a *Distributed Database System?*   **[3 marks]**

QUESTION A4
This question is about *Software*.

a) List and describe *two* types of *Operating System.*   **[2 marks]**

b) What is the difference between *Linked* and *Embedded objects?*   **[2 marks]**

c) *Ease of use* is one of the most important criteria to choose a program. How can developers achieve *ease of use*? Discuss.   **[4 marks]**

d) Define *two Utility Programs.* Provide an example of each.   **[4 marks]**

e) Mention *one* advantage and *one* disadvantage of *General Purpose Application Software.*
    [3 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.

```
1  class ws3ex5
2  {
3      public static void main (String args[])
4      {
5          System.out.println("Enter a mark: (between 0 and 100) ");
6          int mark = Keyboard.readInt();
7
8          --
9
10         if (mark >= 90) System.out.println("Distinction");
11         else if (mark >= 70 & mark <=89)  System.out.println("Merit");
12         else if (mark >= 50 & mark <=69) System.out.println("Pass");
13         else if (mark <= 49) System.out.println("Fail");
14     }
15 }
```

a) Re-write the code shown at the bottom of Page 2 (Question B1) with the following amendments:
   i. Insert a validation rule in line 8 to check whether the mark inputted (between 0 and 100 inclusive) is valid or not.
   ii. The program will ask the user to enter the mark again if the entered mark is not valid.

   [6 marks]

b) Identify the following from the code above:
   i. a *method*;
   ii. a *class* declaration;
   iii. a *variable* declaration;
   iv. a *variable*. **[4 marks]**

c) A flower shop database has the following schema:
   CLIENT (Client_ID, Name, Surname, Tel, Mob)

   Write a simple SQL statement to output the name and surname of all those clients with surname 'Abela'. Sort the output by surname. **[3 marks]**

d) From the schema above, which field would you use as your primary key? Why? **[2 marks]**

e) Consider the HTML coding below

   ```
   <ul style="list-style-type:disc">
    <li>Coffee</li>
    <li>Tea</li>
    <li>Milk</li>
   </ul>
   ```

   i. What is the code generating when translated by the browser?
   ii. Re-write the code to display a numbered list with the same items . **[5 marks]**

Answer ANY TWO questions B2, B3 and B4.

QUESTION B2
This question is about *Programming Concepts*.

a) Define the following:
   i. *Syntax Error*;
   ii. *Identifier Evaluation*;
   iii. *Compiler*. **[6 marks]**

b) State *three* advantages of High Level Languages in comparison to Assembly Language.

   [3 marks]

c) Explain the following terms:
   i. *Abstraction*;
   ii. *Inheritance*. **[4 marks]**

d) Develop an algorithm to output the highest mark in an array of 10 numerical values. **[3 marks]**

e) Differentiate between the following terms:
   i. *Imperative* and *Functional* Programming;
   ii. *Standard Identifiers* and *User-defined identifiers*. **[4 marks]**

QUESTION B3
This question is about *System Development* and *Programming*.

a) What are the advantages of *Alpha Testing*? **[3 marks]**

b) Outline measures which a System Analyst may adopt to ensure that the problems of the current system are well understood. **[3 marks]**

c) Differentiate between a *Batch* and *Real-Time* system type. **[2 marks]**

d) Define *Feasibility Study*. **[2 marks]**

e) Draw a flowchart to add all even numbers from 1 to 20. **[5 marks]**

f) Convert the algorithm in part (e) to JAVA. **[5 marks]**

QUESTION B4
This question is about *Programming Concepts and System Development*.

a) Explain the following terms:
   i. *Top-down design approach*
   ii. *DFD*
   iii. *Human Communication Interface*
   iv. *Syntax Error* **[8 marks]**

b) Identify *three* different types of file organisation. **[3 marks]**

c) Outline *three* operations commonly carried out on files. **[3 marks]**

d) What is the role of the *System Analyst*? **[2 marks]**

e) Mention and describe the advantages and disadvantages of a *Parallel Changeover*. **[4 marks]**