

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD  
UNIVERSITY OF MALTA, MSIDA  
MATRICULATION EXAMINATION  
ADVANCED LEVEL  
MAY 2016

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<b>SUBJECT:</b>	INFORMATION TECHNOLOGY
<b>PAPER NUMBER:</b>	I
<b>DATE:</b>	10 <sup>th</sup> May 2016
<b>TIME:</b>	4.00 p.m. to 7.05 p.m.

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**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 *Computer System and Storage*.
- List any *two* differences between a *Laptop* and a *Desktop Computer*.
  - Explain what is *ASCII*.
  - Explain what is *RAM*. Briefly explain *one* defining feature of such a storage device.
  - Mention and explain any *three* disadvantages of magnetic storage when compared to optical and/or electrical storage. **[10 marks]**
- b) This part is on *Number base systems*.
- Convert  $24_{10}$  to binary.
  - Convert  $78_{10}$  to hexadecimal.
  - Add  $11110000_2$  and  $10100101_2$ .
  - Subtract  $40_{10}$  from  $70_{10}$  using an 8 bit register. **[4 marks]**
- c) This part is on *Data Security*.
- Briefly explain the difference between *authentication* and *authorization*.
  - What is the trade-off between *security* and *usability*?
  - How can the strength of a password be calculated? **[6 marks]**

Answer ANY TWO questions A2, A3 and A4.

### QUESTION A2

This question is about *Networks and Network Security*

- a) What is the difference between *wired* and *wireless* media? Give *one* example. [2 marks]
- b) What is *one* advantage of *broadband* technologies when compared to *narrowband* technologies? [2 marks]
- c) Identify *three* electronic ways to secure data over a network. [3 marks]
- d) Briefly explain the importance of *data integrity*. [2 marks]
- e) Explain with the aid of a diagram *two* common LAN topologies used in networks. [4 marks]
- f) Outline *two* potential security threats over a network. [2 marks]
- g) Mention *two* ways to counter the security threats mentioned in (f). [2 marks]
- h) Define the term *protocol*. Give *one* practical example. [3 marks]

### QUESTION A3

This question is about the *Information Systems in Organisations*.

- a) Identify and explain the *three* types of Information Systems found in Organisations. [6 marks]
- b) Outline the use of an *Optical Character Recognition (OCR)*. [2 marks]
- c) Explain the following terms:
  - i. Data Mining;
  - ii. Artificial Neural Networks. [4 marks]
- d) Briefly describe any *two* methods that can be used to train personnel on new systems. [4 marks]
- e) Briefly explain how *project reviews* can help prevent shortcomings. [4 marks]

### QUESTION A4

This question is about *Processing, Storage and Backup*.

- a) Explain using *one* simple example the term *real time processing*. [2 marks]
- b) Briefly state and explain *one* advantage of using SSD Hard Drives as opposed to conventional IDE and SATA Drives. [2 marks]
- c) Briefly distinguish between *onsite* vs *offsite backups*. [4 marks]

- d) Describe with the help of a diagram the *Grandfather-father-son* backup method. [3 marks]
- e) With the help of a practical example explain the difference between *online* and *real time transaction processing*. [3 marks]
- f) Define and explain the term *RAID* system. Give *one* example. [3 marks]
- g) Explain *one* way how *batch processing* can be used in backups. [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) *E-Learning* is supposed to support conventional learning. Briefly discuss the validity of this statement. Give *one* example of an E-learning Platform. [3 marks]
- b) Briefly explain the significance of *E-Business*. Explain the differences between *B2C* and *B2B* solutions. [3 marks]
- c) Why is the data protection legislation used to protect individual user's rights? List and explain any *two* valid reasons. [4 marks]
- d) List any *two* types of computer related crime. [2 marks]
- e) Explain any *three* consequences of change in an organisation. [3 marks]

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

### **QUESTION B2**

Discuss the importance of ICT in Science and Engineering. Give examples as required. [15 marks]

### **QUESTION B3**

ICT is becoming more and more important in modern societies. Discuss and explain. [15 marks]

### **QUESTION B4**

What is meant by *E-Government services*? Describe and give an example of the following types of e-services:

- a) Admin to Admin;
- b) Admin to Business;
- c) Admin to Citizen. [15 marks]

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<b>SUBJECT:</b>	INFORMATION TECHNOLOGY
<b>PAPER NUMBER:</b>	II
<b>DATE:</b>	11 <sup>th</sup> May 2016
<b>TIME:</b>	4.00 p.m. to 7.05 p.m.

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**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) Briefly explain, whilst providing practical examples, the terms *Monitoring* and *Communication Software*. **[4 marks]**
- b) Clearly explain the differences in the following pairs of terms:
- Internet Structure* and *Internet Registers*;
  - Multitasking* and *Multiprogramming*;
  - Primary Key* and *Foreign Key*. **[6 marks]**
- c) Why is the *TCP/IP* important in networking? **[3 marks]**
- d) What is the purpose of *normalisation*? **[2 marks]**

Answer ANY TWO questions A2, A3 and A4.

### QUESTION A2

This question is about the *Software*.

- a) Briefly explain any **two** advantages of using *Generic purpose application software*. [4 marks]
- b) Explain the following terms using a practical example of a scenario where they are most likely to be preferred over the others.
  - i. *Compiler*;
  - ii. *Interpreter*;
  - iii. *Assembler*. [6 marks]
- c) What is *OLE*? [2 marks]
- d) Mention **three** criteria which can be used to evaluate software. [3 marks]

### QUESTION A3

This question is about *Database Design*.

- a) List and explain any **four** advantages of *Relational Databases* have over traditional filing systems. [4 marks]
- b) What is the problem of *data duplication*? [3 marks]
- c) Explain the *three level schema*. [3 marks]
- d) List **three** problems associated with *Relational Databases*. [3 marks]
- e) Mention and explain **one** type of relationship. [2 marks]

### QUESTION A4

This question is about *Internet*.

- a) Explain the term *CSS* and why it is used in web design. Provide a simple example to substantiate your answer. [4 marks]
- b) What is *form validation*? Why is helpful? [4 marks]
- c) Mention **three** services commonly offered by *Internet Service Providers (ISPs)*. [3 marks]
- d) What is a *sitemap* and why is it useful to develop a website? [4 marks]

**SECTION B: PROGRAMMING TECHNIQUES AND SYSTEM DEVELOPMENT**

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

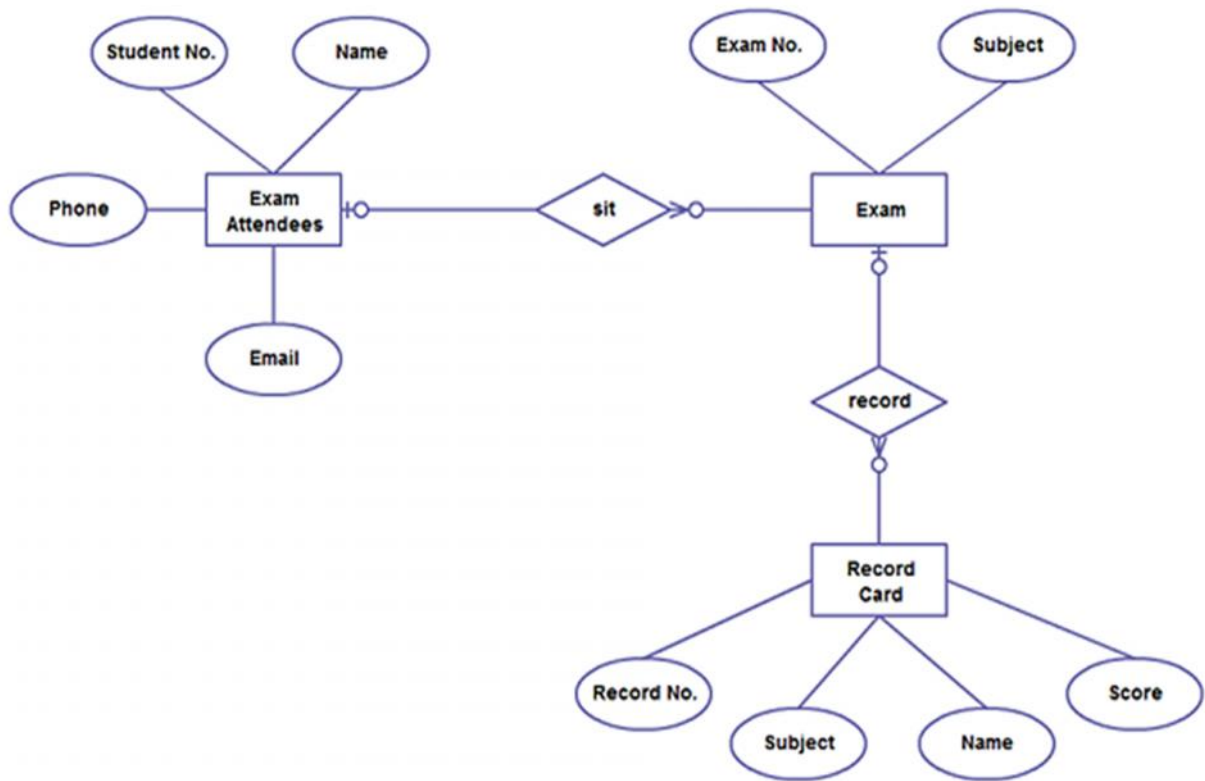
**QUESTION B1**

**This question is compulsory. Answer all parts.**

The following is an incomplete program

```
1 public class SDemo {
2     public static void main(String[] args) {
3         int month = 6;
4         month = month+2;
5         String monthString;
6         switch (month)
7         {
8             case 1: monthString = "January";
9                 break;
10            case 2: monthString = "February";
11                break;
12            case 3: monthString = "March";
13                break;
14            case 4: monthString = "April";
15                break;
16            case 5: monthString = "May";
17                break;
18            case 6: monthString = "June";
19                break;
20            case 7: monthString = "July";
21                break;
22            case 8: monthString = "August";
23                break;
24            case 9: monthString = "September";
25                break;
```

- a) Continue the code for the months of October, November and December and include code to prevent that invalid values are entered. [4 marks]
- b) What would the value of *monthString* be upon execution of this code snippet? [4 marks]
- c) Why is it important to use *inline documentation* when programming. [2 marks]



- d) Identify any *three* primary keys in the above E-R diagram. [3 marks]
- e) Explain a possible validation rule for the *Phone* value. [2 marks]
- f) Consider the following snippet:

```

1 | <head>
2 |   <style>
3 |     h1 {
4 |       color: orange;
5 |     }
6 |   </style>
7 |   <link rel="stylesheet" type="text/css" href="mystyle.css">
8 | </head>

```

Explain line by line what the above code snippet does. [5 marks]

Answer ANY TWO questions B2, B3 and B4.

### QUESTION B2

This question is about *Programming Techniques*.

- a) Outline *three* advantages of building programs using *Structured Techniques*. [3 marks]
- b) Give a practical example using the “this” keyword. [3 marks]
- c) Define the following:
  - i. *Class*;
  - ii. *Object*;
  - iii. *Method*. [6 marks]
- d) Differentiate between *Machine Language* and *4GL*? [4 marks]
- e) Write down a *sorting algorithm*. [4 marks]

### QUESTION B3

This question is about *Programming*.

- a) What is *Polymorphism*? Write down how you would explain this OOP Concept. Use diagrams where possible. [4 marks]
- b) Define the following (provide examples where necessary):
  - i. Variables;
  - ii. Constants;
  - iii. Reserved Words. [6 marks]
- c) Explain the importance of *validation checks*. [4 marks]
- d) What is the difference between *syntax* and *logical* errors? Provide *one* example of each. [6 marks]

### QUESTION B4

This question is about *System Development*.

- a) Explain the following terms:
  - i. HCI;
  - ii. TELOS. [4 marks]
- b) How can *good technical documentation* and *modularity* have a positive impact on a system? [4 marks]
- c) Differentiate between UML *Use Case Diagrams* and UML *Class Diagrams*. Draw a simple diagram for each to substantiate your answer. [8 marks]
- d) Provide *two* examples where *technical documentation* could prove beneficial. [4 marks]