

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD  
UNIVERSITY OF MALTA, MSIDA

MATRICULATION EXAMINATION  
INTERMEDIATE LEVEL  
MAY 2016

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<b>SUBJECT:</b>	COMPUTING
<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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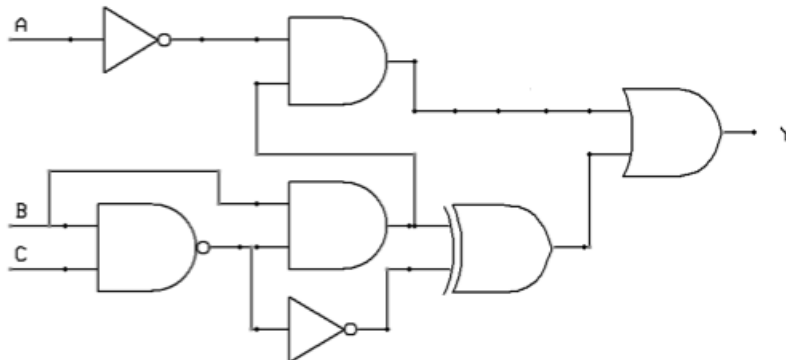
### Directions to Candidates

- Answer **ALL** questions in Section A and **ONE** question from Section B.
  - Good **English** and orderly **presentation** are important.
  - All answers are to be written on the **booklet** provided.
  - The use of **flowchart templates** is permitted but calculators may **NOT** be used.
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### Section A

(Answer **ALL** questions in this section)

A1 Study the logic circuit and answer the questions below.



- a. Draw the *truth table* for the above logic circuit. [4]
- b. Extract the *Boolean expression* for the **logic circuit**. [2]
- A2 a. Distinguish between a *pre-determined* and a *post-determined* loop. [2]
- b. Briefly describe the relevance of a looping construct in a process control. [2]
- c. Name and briefly explain **ONE** use of a computerized process control system. [2]

- A3 a. Distinguish between a *mainframe computer* and a *microcomputer*. [2]
- b. Give one application for:
- i. Microcomputers;
  - ii. Mainframe Computers. [2]
- c. Briefly explain **ONE** way in which *e-learning* may help geographically disadvantaged students. [1]
- d. Suggest **ONE** possible problem with *e-learning*. [1]

A4 Copy and complete the conversions table below. Note: All values are *unsigned*.

Decimal	Binary	Hexadecimal
72		
	1101 0011	
		AF

[6]

- A5 Two types of Operating Systems (OS) are *Batch* and *Network*.
- a. Briefly describe each Operating System and justify your answer with an appropriate application. [2]
- b. Give **ONE** advantage of using each Operating System. [2]
- c. Give **ONE** disadvantage of using each Operating System. [2]
- A6 a. Give **TWO** points that distinguish a *LAN* from a *MAN*. [2]
- b. Give **TWO** reasons why *fibre optic cables* are often preferred over *twisted-pair cables* in networking. [2]
- c. List **TWO** sources of *network noise*. [2]
- A7 a. What is a Java *method*? [1]
- b. Define the term *polymorphism* in relation to Object Oriented Programming? [1]
- c. Write a *conditional statement* in Java that outputs “Freezing” if the variable *temperature* is less than 0 and otherwise outputs “Above Freezing Point”. [2]
- d. i. Name **ONE** other *conditional statement* besides the one used in (c) above. [1]
- ii. Suggest a situation when it would be ideal to use the decision construct in question d (i). [1]

- A8 a. Give **TWO** differences between a Java *class* and a Java *object*. [2]  
 b. A Java application includes a class called Client. How would you create and instantiate an object of Client called *client1*? [1]  
 c. How should a method called *showClient()* for *client1* be called? [1]  
 d. Distinguish between *Bubble sort* and *Insertion sort*. [2]
- A9 a. Name and explain **THREE** *addressing modes* used in Assembly. [3]  
 b. Give and explain **ONE** example of each *addressing mode*. [3]
- A10. a. For each of the following statements regarding main memory, give the correct term which best describes the type of memory.  
 i. This type of memory will retain the same state until the power turns off. [1]  
 ii. This memory is typically integrated directly with the CPU, and so the microprocessor can access it more quickly. [1]  
 iii. This memory has to be refreshed. [1]  
 b. The *Read Only Memory* is a non-volatile memory.  
 i. What can be found in a ROM? [1]  
 ii. Differentiate between an EPROM and a ROM. [2]

### Section B

(Answer **ONE** question from this section)

- B1. a. i. Using Java, declare an array of type integer that can hold up to TEN *integers*. [1]  
 ii. An examination-handling application is being created. Create a Java class called 'Candidate' that has the following properties: *idNo*, *name*, *surname*, *mark*. Include also a method called *showDetails*, that outputs the details of a student passed to it, including a comment saying 'Pass' if the mark is greater than 49, and otherwise 'fail'. [4]  
 iii. Name **THREE** *looping constructs* in Java. [1]  
 iv. In this class, include a method called *readDetails* that allows the user to input the details for one candidate. The method should repeatedly ask the user for an exam mark until a valid mark from 0 to 100 is entered. [4]
- b. i. What is a *data dictionary*? [1]  
 ii. Name **TWO** items that are usually stored in a *data dictionary*. [2]  
 iii. Who can benefit from the *data dictionary*? [1]
- c. i. Which are the **TWO** main types of *database models*? [1]  
 ii. Distinguish between the **TWO** types of database models mentioned above. [2]
- d. i. Name **ONE** programming language used to interface with a *relational database*? [1]  
 ii. Give **TWO** *uses* of the programming language mentioned in part (i). [2]

- B2 a. The case study below is on a DVD rental shop with a current manual system. Study the case study and answer the questions below.

When a client wants to rent a DVD, s/he selects it from the shelf and gives her/his membership number to the salesperson at the desk. The salesperson checks the membership file to ensure that the membership number is valid.

Then the salesperson takes the DVD card from the DVD sleeve and adds the membership number to the DVD card. The salesperson places the DVD card with the membership number into the loans file.

When the client returns the DVD, the salesperson finds the DVD card in the loans file and places the card in the DVD sleeve before returning the DVD to the shelves.

The salesperson is also responsible for maintaining membership file. If a member is new or has her/his information changed, s/he is asked to fill a form with the details and the salesperson creates or amends the membership file.

- i. The shop-owner is thinking of changing the manual system to a computerized one. State the **THREE** files that should be created. [3]
  - ii. Give at least **THREE** fields necessary for each file. [3]
  - iii. For each file, list the *primary key*. [1]
  - iv. Briefly describe how the **THREE** files are *related*. [3]
- b.
- i. What is a *Data Flow Diagram*? Explain how Data Flow Diagrams (DFDs) are useful in System Development. [2]
  - ii. Draw the Level 0 Context Data Flow Diagram for this scenario.
  - iii. Differentiate between *Alpha* and *Beta* testing. [2]
  - iv. In Object Oriented Programming, define *Encapsulation*. Explain how encapsulation can help a programmer implement security features in his application. [3]
  - v. Suggest **TWO** reasons why a developed system may require *maintenance*. [2]
  - vi. Give **ONE** advantage of *bottom-up* approach in System Design. [1]