



TECHNICAL UNIVERISTY OF MOMBASA

Faculty of Engineering & Technology

DEPARTMENT OF COMPUTER SCIENCE & INFORMATION TECHNOLOGY

UNIVERSITY EXAMINATION FOR:
BACHELOR OF SCIENCE IN MATHEMATICS & COMPUTER SCIENCE
(BSMC)

SMA 2272/SMA 2276: COMPUTER PROGRAMMING II - FORTRAN

END OF SEMESTER EXAMINATION

SERIES: DECEMBER 2013

TIME: 2 HOURS

Instructions to Candidates:

You should have the following for this examination

- *Answer Booklet*

This paper consists of **FIVE** questions. Attempt question **ONE** and any other **TWO** questions

Maximum marks for each part of a question are as shown

This paper consists of **THREE** printed pages

Question One (Compulsory)

- a) Define and state the full meaning of the term: FORTRAN. **(4 marks)**
- b) Discuss how FORTRAN differ from other programming language and its preference in scientific and engineering solutions. **(6 marks)**
- c) Explain the meaning and importance of each of the following FORTRAN program statements:
- PROGRAM Convert
 - IMPLICIT NONE
 - INTEGER: Shillings, cents, total
 - CHARACTER :: name * 10
 - WRITE (*, *) : what is your name?
 - READ (*, *) name
 - WRITE (*, *) 'Hi!', name, "Enter number shillings and cents:'

```
READ (*, *) shillings, cents
Total = (100 * shillings) + cents
WRITE (*, *) 'The total money in cents is':, total
END PROGRAM CONVERT
```

(10 marks)

- d) Briefly explain any TWO benefits of using FORTRAN language in Engineering Processing. **(4 marks)**
- e) Write a FORTRAN program which reads in two numbers, num1 and num2. The program swaps the values so that the value stored in num1 is now stored in num2, and vice versa. The program should display the old and new values. **(6 marks)**

Question Two

- a) Explain the importance of loop constructs in programming. Give examples. **(4 marks)**
- b) With illustrative examples, briefly explain the differences of the following types of loops:
- (i) Iterator-loops
 - (ii) Vectorized loops
- (8 marks)**
- c) Write a FORTRAN program that initializes the do-loop, such that when the program is executed it prints out the odd numbers and their sum between [0 – 50] **(8 marks)**

Question Three

- a) Differentiate between:
- (i) Simple Array
 - (ii) Multi Dimensional Array
- (4 marks)**
- b) Briefly discuss the following concepts:
- (i) Integer specification
 - (ii) Floating point specification
 - (iii) Exponential specification
 - (iv) Character specification
- (8 marks)**
- c) Write a program that asks the user how many numbers they want to enter, say imax. Allocated imax elements to two array, a and b. Read in imax numbers to a and do the same for b. Print out the arrays a and b and the sum of the arrays (a + b) **(8 marks)**

Question Four

- a) “Subroutines and functions help to make your code more efficient and easier to read”. Explain the meaning of the statement **(6 marks)**
- b) By using an example, explain the importance of flowcharting in program development. **(6 marks)**
- c) PROGRAM bug

```
This is full of errors
REAL :: a, b;
a = b + c
READ (*, *) C
WRITE (*, *) a;
END program Mombasa
```

The above program has a number of errors, debug (identify the errors and correct them) it.

(8 marks)

Question Five

- a) (i) What is a Pseudo-code? **(2 marks)**
(ii) State SIX rules for using pseudocodes. **(6 marks)**
- b) Differentiate between pseudo code and a flowchart **(4 marks)**
- c) Write a FORTRAN program to calculate and display the squares and cubes of all even numbers between [0 – 100] **(8 marks)**