TECHNICAL UNIVERISTY OF MOMBASA

Faculty of Engineering & Technology

DEPARTMENT OF COMPUTER SCIENCE & INFORMATION TECHNOLOGY

UNIVERSITY EXAMINATION FOR BACHELOR OF COMPUTER SCIENCE ENGINEERING
(BCSE 12SE/12S)

SMA 2276: COMPUTER PROGRAMMING II

END OF SEMESTER EXAMINATION
SERIES: APRIL 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) Briefly describe the history of FORTRAN programming language. **(4 marks)**

b) Write a simple FORTRAN program that calculates the area of a circle. **(4 marks)**

c) Integer variables PQRS have values 2, 4, 1, 7 respectively. What is the result of evaluating:
(i) P**Q**R
(ii) Q**REAL (1/P) **(4 marks)**

d) Using examples explain the meaning of each of the following data types:
(i) Character
(ii) Integer
(iii) Logical
(iv) Double precision. **(8 marks)**

e) Giving examples, explain how one dimensional and two dimensional arrays are declared. **(4 marks)**

f) Differentiate between each of the following as used in FORTRAN programming:

(i) PRINT and READ
(ii) STOP and END
(iii) Statement and Comment **(6 marks)**

Question Two

a) Write a simple FORTRAN program to compute the squares of the integers from 1 to 10 and print them out. **(5 marks)**

b) Write a FORTRAN program to print out the factorial of n from n = 1 to 20 **(5 marks)**

c) Write a program that reads a one-dimensional array of 10 elements and prints the element that appears maximum number of times. (If more than one element, it prints first one only) **(10 marks)**

Question Three

a) Explain what the following segment would do PRINT*,(K, K = 100, 87, -1) **(4 marks)**

b) Write a FORTRAN program to read positive integers and compute their average; negative integers are ignored while zero terminates the program. **(10 marks)**

c) Write a FORTRAN program that evaluates the following services to the 7^{th} term.

$$\sum_{i=1}^{N} 3^i$$

(summation of base 3 to the powers from 1 to N, Assume N has the value 7) **(6 marks)**

Question Four

a) Write a program to read in a and b the sides of a rectangle and print out the perimeter and area. **(5 marks)**

b) (i) Evaluate the following arithmetic expression 14.0/5*(2*(7-4)/4)**2. **(3 marks)**

(ii) Convert the following mathematical expression into FORTRAN expression. Use minimum number of parenthesis.

$$\frac{\sqrt{a+b}}{a^2-b^2}$$

(3 marks)

c) Given that x has a value of 3.0, Y has a value of 5.0, Z has a value of 10.0 and FLAG is a logical with FALSE value, evaluate the following FORTRAN expression,

$$NOT \bullet FLAG \bullet AND \bullet X * Y \bullet GT \bullet Z \bullet OR \bullet X + Y \bullet GT \bullet Z$$

(4 marks)

d) Write a FORTRAN program to calculate the area of a triangle of sides a, b, c from the formula.

$$Area = \sqrt{(s(s-a)(s-b)(s-c))}$$

The input values of a, b, c should be checked by the program and correspond to a valid triangle, ie. They are all non negative. **(5 marks)**

Question Five

a) Write a FORTRAN assignment statements to:

(i) Store the real number 3.25 into variable x_1 and 7.0 into the variable y_1 **(2 marks)**

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

(ii) Solve the quadratic equation **(3 marks)**

b) Write a FORTRAN program that corrects a quantity expressed in seconds to a corresponding quantity expressed in hours, minutes and seconds. **(7 marks)**

c) Explain the meaning of the following program assume the input the program is 40 35 and 20. **(4 marks)**

```
LOGICAL A, B
INTEGER EX1, EX2, EX3
READ* EX1, EX2, EX3

A = EX1 • LE • EX2 • OR • EX2 • LE • EX3
B = EX2 + 2 • GT • EX3 * 2

IF (B) THEN
A = • NOT • B
AND IF
PRINT*, A, B
NOP
END
```

What will be printed out? **(2 marks)**

If an error is generated which statement causes the error? **(2 marks)**