



TECHNICAL UNIVERISTY OF MOMBASA

# Faculty of Engineering & Technology

DEPARTMENT OF COMPUTER SCIENCE & INFORMATION TECHNOLOGY

UNIVERSITY EXAMINATION FOR:  
BACHELOR OF SCIENCE IN CIVIL ENGINEERING (BSCE 13J/13M)

**SMA 2276: COMPUTER PROGRAMMING II**

SPECIAL/SUPPLEMENTARY EXAMINATION

**SERIES: MARCH 2014**

**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

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**Question One (Compulsory)**

a) Identify the errors in the following program code:

```
PROGRAM multiple
```

```
INTEGER : 2, j, k;
```

```
WRITE (*, * "Enter the number to multiply:"
```

```
READ (*, *) 2, j
```

```
K = i * j
```

```
WRITE (*, *) "Result =" k
```

```
STOP
```

```
END PROGRAM multiple
```

(4 marks)

b) Distinguish between the following:

(i) Constant and variable

(4 marks)

(ii) Function and subroutine

(4 marks)

- c) What data type should you use to represent the following items:
- (i) Number of children at school (1 mark)
  - (ii) A letter grade on an exam (1 mark)
  - (iii) Average number of school days absent each year (1 mark)
- d) Why is an array more useful than a single variable? (2 marks)
- e) Describe FOUR main steps followed when writing a computer program. (4 marks)
- f) Rewrite this code to use the DO WHILE statement.

```
DO I = 1, N = 1
SUM = SUM + 1
END DO
```

- g) The following FORTRAN 95 program inputs the speed (m/s) and mass (kg) of a body, and outputs the body's momentum.
- ```
REAL: : V, M, P
READ *, V, M
P = M * V
PRINT *, "Momentum is" P
END
```
- (i) Modify the program so that it also outputs the body's kinetic energy (half times mass times the velocity squared). Write the modified program on your answer sheet. (4 marks)
  - (ii) After your modification what is the output for the input values  
V = -4.0 and M = 3.0? (2 marks)

### Question Two

- a) Describe FOUR intrinsic (or "built in") types of data. (8 marks)
- b) Discuss program flow control approaches giving examples of the relevant control statements. (6 marks)
- c) Given the following requirements specifications, write a FORTRAN program.
- d) A University College requires a program that would assist the examination department capture the following students details. StdAdmno. (an integer), Augscore (a real) and Grade (a character). The program reads the details for each student and computer his/her grade according to the following criteria:

| <u>Average Score (%)</u> | <u>Grade</u> |
|--------------------------|--------------|
| 80% - 100 %              | A            |
| 70% or above             | B            |
| 60% or above             | C            |
| 50% or above             | D            |
| Below 50%                | E            |

### Question Three

- a) Briefly describe TWO basic types of statements. (4 marks)

- b) Program units have a statement order e.g. Header. Outline the order of writing statements in FORTRAN, starting with the header. **(8 marks)**
- e) Examine the following algorithm.
- 1) Let sum = 0
  - 2) Let X = 1
  - 3) While X is less than 199 do  
Add x to sum  
increment by 2
  - 4) Display the vale of sum
  - 5) Stop

Write a program to implement the above algorithm. **(8 marks)**

#### Question Four

- a) State the functions used in carrying out the following string operations:
- (i) Converting character to uppercase **(2 marks)**
  - (ii) Converting character to lowercase **(2 marks)**
- b) Given the following algorithm statements, develop a program that can be used to represent the algorithm. If value of hours worked is less than or equal to 30 then normal pay is calculated as hours \* rate and overtime pay is 0. If the value of hours worked is greater than 30 then:

Normally = 30 \* rate

Overtime = 9hours – 30) \* rate \* 1.5 **(8 marks)**

- c) Write a computer program that allows a user to input the radius and the height of a cylinder and computes the volume ( $V = \text{PIE} * R * R * H$ ) and surface area ( $SA = ((2 * \text{PIE} * R) * (R + H))$ ) of the cylinder. The program should display the computed results.  
(HINT: PIE = 3.14) **(8 marks)**

#### Question Five

- a) Outline the basic input/output instructions in FORTRAN. **(4 marks)**
- b) State FOUR relational operators used in FORTRAN. **(4 marks)**
- c) Briefly describe the various expressions, such as relational operations, used in FORTRAN, giving at least one example in each case . **(6 marks)**
- e) State the syntax used when declaring an array. **(2 marks)**