THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of JKUAT)
Faculty of Engineering and Technology

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

DIPLOMA IN CIVIL ENGINEERING WITH COMPUTER AIDED DESIGN
DIPLOMA IN BUILDING AND CIVIL ENGINEERING

EBC 2322: COMPUTER PROGRAMMING

END OF SEMESTER EXAMINATION

SERIES: DECEMBER 2011

TIME: 2 HOURS

Instructions to Candidates:

You should have the following for this examination

- *Answer Booklet*
- *Scientific Calculator*
- *A set of drawing instruments*

This paper consists of **FIVE** questions in two sections **A** & **B**
Answer question **ONE (COMPULSORY)** and any other **TWO** questions.
Maximum marks for each part of a question are clearly shown
This paper consists of **THREE** printed pages

SECTION A (COMPULSORY)

Question 1 (30 marks)

a) Briefly outline **SIX** characteristics of a well designed program (6 marks)

b) (i) Outline three types of programming errors and their effects (6 marks)
(ii) Write a program to evaluate the series for the first ten terms (8 marks)

$$\frac{x^3}{3!}+\frac{x^6}{6!}+\frac{x^9}{9!}+\frac{x^{12}}{12!}+....\frac{x^{3n}}{3n!}$$

c) Write out the output of the following program:

```
10    FOR I = 1 TO 3 STEP 0.5
20    FOR J = 1 TO 3
25    X = I*J
30    PRINT, I, J, X
40    NEXT I
50    NEXT J
60    END
```
(10 marks)

SECTION B (Answer any TWO questions from this section)

Question 2 (20 marks)

a) Write a program in Basic to produce a 12 row mathematical table for any given number using the "FOR……..NEXT statement (10 marks)

$$x_1 = x_0 - \frac{f(x_0)}{f'(x_0)}$$

b) The Newton-Raphson's approximation is given by where x_o is the estimate and x_1 the improved estimate. Write a program to evaluate the square root of a number from the quadratic relationship $f(x) = x^2 – c = 0$ using 10 iterations. (10 marks)

Question 3 (20 marks)

a) Write a computer program in BASIC using the "IF……THEN" statement to output prime numbers less than 10. (14 marks)

b) List **SIX** steps to be followed in problem solving by algorithms (6 marks)

Question 4 (20 marks)

$$\frac{3}{4}+\frac{5}{4^2}+\frac{7}{4^3}.....;$$

a) Write a program in BASIC to evaluate the series using the first five items. (9 marks)

b) Using the INT() function write a program to convert hours in decimal to Hours: Minutes; and seconds (5 mark)

c) Write the output of the following program

```
10      X = 2
20      FOR Y = 1 TO 3
25      X = X + 2
30      FOR J = 1 TO 4
40      Z = X*Y
50      PRINT X, Y, J, Z
60      NEXT J
70      NEXT Y
80      END
```

(6 marks)

Question 5 (20 marks)

a) Write a program to evaluate the factorial of any given number using the "FOR….NEXT" statement. (12 marks)

b) Explain the following programming terms:

Syntax
Loop
Self-replacement statement
Illegal function call (8 marks)