# UNIVERSITY OF DAR ES SALAAM

**COLLEGE OF INFORMATION AND COMMUNICATION TECHNOLOGIES**

**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

**COURSE CODE & TITLE: IS 136 – PROGRAMMING IN C**

**SECOND SEMESTER FINAL EXAMINATIONS FOR THE ACADEMIC YEAR 2015/16**

**YEAR OF STUDY: 1**

**Date: 18th July 2016**

**Time: 07:55 AM – 10:55 AM**

**INSTRUCTIONS:**

1. This examination paper consists of 4 printed pages with questions divided into two sections -**Section A (30 marks) and section B (30 marks).**
2. Answer all questions in **Section A and answer ANY TWO questions from section B.**
3. Do not use this examination paper for rough work. All rough must be done in the answer book (at the back) and crossed through.
4. This examination paper must be handed in together with your answer book.
5. Unauthorized materials and gadgets such as: All types of mobile Phones and accessories as well as other relevant unauthorized materials Are Not Allowed in the Examination Venues.

# SECTION A

**Q1.** Define the following terms **(2 marks)**

a) Dereferencing a pointer
b) Variable scope

Q2. Convert the following program into using a "while loop" in place of the "for loop". **(3 marks)**

```
#include <stdio.h>
main(){
int i, sum = 0;
for(i=0; i<10; i++){
if(i%2 != 0) continue;
sum = sum + i;
}
printf(" The sum is %d\n", sum);
}
```

Q3. Differentiate between the following; **(8 marks)**

a) A structure and a union
b) Passing by values and passing by reference
c) Global variables and local variables
d) A text file and a binary file

Q4. Write down the output for the following programs **(10 marks)**

a)
```
#include<stdio.h>
main() {
    int x;
    for(x=-4; x<8; x++) {
            if(x%3!=0) continue;
    printf("\t%d", x);
    }
}
```

b)
```
#include <stdio.h>
main(){
char letters[] = "Easter1";
isdigit(letters[0])?printf("Dig-Doug\n"):
isupper(letters[0])?printf("Holiday\n"):printf("Viroja\n");
}
```

c)
```
#include <stdio.h>
main (){
int zet = 4; int x = 2; (x>5)?printf("There is a Problem"):
printf(" %d", 2+zet);
}
```

d)
```
#include <stdio.h>
main(){
int k, *ptr, myarray[] = {2,3,5,6,7,8}; ptr = myarray;
for(k=0; k<6;k++){ if(*(ptr+k)%2==0) printf("\t%d",*(ptr+k)); }
}
```

Q5. Identify Syntax errors in the following program **(7 marks)**

```
#include <stdio>
#include <stdlib.h>
main(){
int my_array[9] = {2 5 7 11 7 15};
int i, pos, elem;
printf(“Enter the New Element);
scanf(“%t”,&elem);
printf(“Enter the Position”);
scanf(“%d”,&pos);
for(i=9, i>=pos, i--)
my_array[k+1] = my_array[i];
my_array[pos] = elem;
}
}
```

# SECTION B

**Qn 1**

a) Define a structure named student with the following attributes; student name of type string, student year of birth of type integer and registration number of type string. **(3 marks)**
b) Define another structure called fystudent which nests the structure you defined in (i) above. More attributes to this structure should be gpa of type float and project title of type string. **(3 marks)**
c) Declare an array variable of size 100 whose data type is the structure fystudent in (ii) above. **(1 mark)**
d) Write a program that will allow user to enter data to their fystudent record. **(8 marks)**

**Qn2**

a) Describe three advantages of using functions in C-programming **(2 marks)**
b) Define a function that takes in two integer numbers and return the greater number. It should return zero if numbers are equal. **(4 marks)**
c) Define a function that takes in an address of an integer array of a specified number of elements and multiply each element of this array by two. The function should then return an address of the resulting array **(5 marks)**
d) Write a program that accept integer value 'n' and find the sum of the series 1 + ½ + 1/3 + .. 1/n **(4 marks)**

**Qn3**

a) Write a program that accepts from users an email address. The program should check whether the address contains the character '@' within it. If the email has the character the program should print the email address in capital letters, and if it does not, the program should print "WRONG EMAIL". **(7 marks)**
b) With examples, differentiate between reading strings using scanf function and reading strings using the gets function. **(3 marks)**
c) Pay As You Earn (PAYE) in Tanzania is a tax collected from salaries personnel earn in the country. It is computed as shown in table 1

**Table 1: PAYE Computation**

| Income Bracket | PAYE |
|---|---|
| 0 – 170,000/= | No Tax |
| 170,000/= - 360,000/= | 9% |
| 360,001 /= 540,000/= | 20% |
| 540,001/= - 720,000/= | 25% |
| Over 720,000/= | 30% |

Write a program in which a user enters his/her sallay and the system prints out their tax deductions **(5 marks)**