EGERTON UNIVERSITY

UNIVERSITY EXAMINATIONS
NJORO CAMPUS

2012/2013 ACADEMIC YEAR

FOURTH YEAR EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN ELECTRICAL AND CONTROL ENGINEERING AND B.A. (ECONOMICS)

COMP 313: COMPUTING I

STREAM: B.Sc. B.A., ECON **TIME:** 2HOURS

DAY: TUESDAY, 3.00 – 5.00 P.M. **DATE:** 15/01/2013

INSTRUCTIONS:

a) QUESTIONN IS COMPULSORY
b) ANSWER ANY OTHER TWO TO MAKE THREE
c) BEGIN EACH QUESTION ON SEPARATE PAGE.

QUESTION ONE (COMPULSORY) [30 MARKS]

a) Give the structure of a C program. [3 marks]
b) What is the purpose of #include <stdio.h> in a C program? [2 marks]
c) What is a variable? [1 marks]
d) Explain the purpose of declaring variables before being used by a program. [3 marks]
e) How would you declare the following
   a. Character
   b. Real number
   c. Integer [1 marks@= 3marks]

f) What is the output of the following code? Explain your answer.

```
int value =1;
for (int j=1; j <5; j=j+2)
{
value = value * j;
printf(" %d \n",value);
}
```

[3marks]

g) What would be printed if the code below is executed?

```
float a,b,c;
int x,y,z;
a=10;
b=a*2-1;
c=a*2+b/2+3*a-1;
x= 10+5*5-50/10*2;
y=100*4/10/5/2-(1+2)*2;
z=x+y+c;
printf(" a = %.2f \n b = %.2f \n c = %.2f \n",a,b,c);
printf(" x = %d \n y = %d \n z = %d \n",x,y,z);
```

[5 marks]

h) Write a function in C which adds the numbers in an array of integers and returns the sum.

[5 marks]

i) What do you understand by a pointer variable? [1 mark]

j) Consider the following declarations int i = 6; int *a; a=&i. Give a pictorial explanations of the meanings of such declarations and assignments. [4 marks]

QUESTION TWO [20 MARKS]

a) Declare a structure "Employee" with the fields "StaffNumber, name, salary, DateOfBirth". [3 marks]

b) Declare an array that would hold data of 100 employees of the type declared in (a) above.. [4 marks]

c) Write a function that can be used to count the number of employees who earn salary of more then 100,000.00. [7 marks]

d) Rewrite (a) above using a typedef definition. [6 marks]

QUESTION THREE [20 MARKS]

a) What do you understand by a repetition program control structure? [2 marks]

b) Write a C program that uses a while loop to display the integers from 75 to 190, including 75 and 190. The value of the numbers should be displayed one value per line. [6 marks]

c) Rewrite 3(a) using a for loop [6 marks]

d) Rewrite 3 (a) using a do while loop. [6 marks]

QUESTION FOUR [20 MARKS]

a) What is an array? [2 marks]

b) Declare an array with three rows and two columns. [2 marks]

c) Supposing the array declared in 4 (b) is to store the values

1 2

3 4

5 6, and that some computation requires the transpose of this matrix be computed. Write a program that outputs the transpose of a matrix. [8 marks]

d) Write a function that will be invoked each time a matrix transpose is needed to be computed. Show clearly how the function is invoked and how the function will receive values from the calling environment. [8 marks]

QUESTION FIVE [20 MARKS]

a) The program that follows was used by someone and now wants you to indicate what the output could be. Write down what the expected output would be? Support your answers with one line explanation. [10 marks]

```
#include <stdio.h>
main()
{
  int a = 3;   int b = 8;   int c = 12;   int *ap;   int *bp;  int *cp;   ap = &a;   bp = &b;   cp = &c;
  ap = bp;
  *bp = *cp;
  if ( b == c ) {
    printf ("b equals c\n");
  } else {
    printf ("b does not equal c\n");
  }
  if ( bp == cp ) {
    printf("pointers same\n");
  } else {
    printf("pointers not the same\n");
  }
  if ( (*ap) == c ) {
    printf("equal\n");
  } else {
    printf("not equal\n");
  }
  return(0);
}
```

b) Imagine that you have a program written by someone and you have been asked to review it. Supposing one of the segments is as shown below.

How many '*' will be displayed on the screen. Explain your answer.

```
int n = 4, i, j;
for (i = 1; i <= n; ++i)
{
        printf(" * ");
for (j = 1; j <= i - 1; j++)
{
        printf(" *\n");
        break;
}
}
```

[10 marks]

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