UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2010/2011

COURSE NAME	:	COMPUTER PROGRAMMING
COURSE CODE	:	DEE 2112 / DAE 20102
PROGRAMME	:	2 DEE/DET/DAE/DAL
EXAMINATION DATE	:	APRIL/MAY 2011
DURATION	:	2 1/2 HOURS
INSTRUCTIONS	:	ANSWER **ALL** QUESTIONS IN PART A AND **ONLY ONE** QUESTION IN PART B.

THIS QUESTION PAPER CONSISTS OF SEVEN (7) PAGES

PART A: STRUCTURES (70 MARKS)
Instruction: Answer ALL questions.

Q1 (a) State and draw three (3) symbols to represent the flowchart notation.

(3 marks)

(b) Write a C statement to represent the formula: (Use the Math function).

$$\frac{h^5 - ((g + k)^2)}{d + c}$$

(3 marks)

(c) Analyze and write the values of j, k, n, and m after the execution of this segment code.

```
int j=15, k=2;
n = j / ++k;
m = j-- % --k ;
```

(4 marks)

Q2 (a) Rewrite the following program segment, using a *switch...case* statement.

```
if ((x = = '1') || (x = = '2'))
        printf ("y = x * 1000");
else if (x = = 'z')
        printf ("y = x * 2000");
else
        printf("y = x * 3000");
```

(5 marks)

(b) Complete the following *while* loop to calculate total value for all odd number between 1 and 20, and display the total value to the screen.

```
int number = 1 ;
int ___(i)___ = 0 ;
while (number < __(ii)_ ) {
        total += number;
        ___(iii)____ ;          /* Increase the value of number*/
 }
printf("The total value is __(iv)__ ", __(v)__ );
```

(5 marks)

Q3 Given a C program as follow:

```
#include <stdio.h>
int main()
{
        int i=1, n = 10;
        while (i <= n)
        {       if (i = = 5)
                        continue;
                else
                        printf("%d\t", i);
                i += 2;
        }
        return 0;
}
```

(a) What is the output of the above source code?

(4 marks)

(b) Rewrite the above program using a for loop.

(6 marks)

Q4 (a) What is the output for the following program?

```
#include<stdio.h>
void funct( )
{       int i = 1000, j = 500;
        printf("Function : i = %d, j = %d\n", i, j);
}
void main( )
{       int i=0,j=0;
        funct( );
        printf("Main : i = %d, j = %d\n", i, j);
}
```

(5 marks)

(b) Write a function definition called Average accepts two integer arguments and returns an average of that value.

(5 marks)

Q5 (a) Given an array declaration and compile time initialization:

```
double resistor[7] = { 2,4,5,10, 6};
```

Notice that the initializers are fewer than the actual array size. Does the C statement above produce syntax error? Justify your answer.

(3 marks)

(b) Answer (i) to (iii) based on the following code:

```
1.  #include <stdio.h>
2.  #include <math.h>
3.  #define SIZE 6
4.  double processNum ( double a[] );
5.
6.  void main()
7.  {       double num[]={2,4,4,8,10,10};
8.          double a;
9.
10.         a = processNum (num) /SIZE;
11.         printf("a = %.2lf \n ", a);
12. }
13.
14. double processNum ( double a[] )
15. {       int x;
16.         double s = 0;
17.         a[2] = a[2]+2 ;
18.         a[5] =a[5] +2;
19.         for(x =0; x < SIZE; x++)  {
20.             a[x] = pow(a[x],2);
21.             s += a[x];
22.          }
23.         return s;
24. }
```

(i) Illustrate how the array (refer to line 7) is stored in the memory.

(2 marks)

(ii) Analyse the changes in the content of *array num* before the execution of *for* loop in function processNum. Determine the value for *num[2]* and *num[5]* and the third element.

(3 marks)

(iii) Write the output produced by line 11.

(2 marks)

Q6 Answer (a) and (b) based on the following structures definition :

A program for keeping track of lab equipments use the following collection of structure definitions:

```
struct equipment {
  char cName[15], labID[7];
  int eqID;
  };
struct date {
  char day, month[4];
  int year;
};
```

(a) Reconstruct the structure definition for *equipment* by using *typedef* key word and include structure date as a new member (name it as dateofpurchase)

(5 marks)

(b) Based on the new definition in Q6(a), write C statements to:

(i) Declare a structure variable of type array named *eq1* with size 10.

(1.5 marks)

(ii) Assign 01021 as *cIDr* and 12 as month of *dateofpurchase for the second element of eq.*

(3.5 marks)

Q7 Answer (a) and (b) based on the following code.

```
1.   #include<stdio.h>
2    FILE *x;
3.   int n = 0;
4.
5    void main( ) {
6.     int num = 1;
7.     int *p = &num;
8.     ...../*open file number.txt for writing*/
9.     for( ; n < 5; n++) {
10       *p = *p + 2;
11.      printf("%d\t", num);          /*display to screen*/
12.        ..... /*write to file*/
13.    }
14.        ..... /*close num.txt file*/
15.  }
```

(a) (i) Give brief explanation for the C statement in line 2. What does this statement do?

(2 marks)

(ii) Referring to the comments in line 8, 12 and 14 write a proper C statement for each line to complete the program.

(5 marks)

(b) Referring to *for* statement from line 9 to 13, illustrate the graphical memory representation of *pointer p* for the first and second loop.

(3 marks)

PART B: PROBLEM SOLVING (30 MARKS)
Instruction: Answer ONE question only.

Q8 Create a flowchart / pseudocode and write a source code to calculate and display *the area of circle* and *the volume of sphere*. Use the following formulas:

Area of circle = πr^2

Volume of sphere = $\frac{4}{3}\pi r^3$

The program must have the function *calculate_area()* and *calculate_volume()* to solve this problem.

(30 marks)

Q9 Provide an algorithm and a complete C program for this following problem statement:

Write a program that accepts 10 numbers from the user. The program should save 5 of those numbers in an integer array called *a1* and the rest 5 numbers in an integer array called *a2*. The program should then do this following processes :

(i) create a third integer array called *a3*

(ii) store the sum of numbers of *a1* and *a2* into the corresponding index of *a3*.

(iii) Using a separate user define function, display all the elements in a3 to the computer screen and also save it to a text file named arraysum.txt.

(30 marks)