UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2015/2016

COURSE NAME	:	COMPUTER ENGINEERING
COURSE CODE	:	DAE 20103
PROGRAMME CODE	:	1 DAE
EXAMINATION DATE	:	JUNE / JULY 2016
DURATION	:	2 HOURS
INSTRUCTION	:	PART A: ANSWER ALL QUESTIONS PART B: ANSWER **ONE(1)** QUESTION ONLY

THIS QUESTION PAPER CONSISTS OF **NINE (9)** PAGES

PART A

Q1 (a) A computer can be categorized into several units. One of the unit is input/output (I/O) units.

(i) Give three (3) example of I/O unit in a computer.
(ii) Give any other two (2) units in a computer.

(5 marks)

(b) A flowchart is a schematic representation of a sequence of operations. Based on the pseudocode below, construct a flowchart.

1. Start
2.   Read the first integer, x
3.   if integer x less than 5
4.   calculate total the value, z as x is multiply by 2
5.   else
6.   calculate the total value, z as x is multiply by 3
7.   end
8.   display total value z
9. End

(7 marks)

Q2 (a) (i) Give two functions in C language that must be use to allow a written program to receive inputs and display outputs.
(ii) State the header file to enables a program to perform input and output operations.

(3 marks)

(b) Write a simple C program for the following statement.

(i) Read an integer and assign it to variable number.
(ii) Display the value of variable number with two floating point format.

(4 marks)

(c) Logic operator is useful for making comparisons for a complex decision making. What is the function of each operators below and how it can give a TRUE results:

(i) &&
(ii) ||
(iii) !

(6 marks)

2   **CONFIDENTIAL**

(d)   What is the following coding in **Programme Q2(d)** below would print?

```c
#include <stdio.h>
#include <math.h>

int main()
{
    int a = 10,b = 5,c = 0;
    int x = 4,y = 3,z;

    c+=a;
    c*=b--;
    printf("The value of c is: %d\n",c);

    ++x;
    z = x%y;
    printf("The value of z is: %d\n",z);

    if (z>c)
        printf("z is larger than c\n");
    else
        printf("z is smaller than c\n");

    return(0);

}
```

Programme Q2(d)

(5 marks)

Q3   (a)   (i)   List down **three(3)** types of looping statement in C.

           (ii)   Which looping statement will guaranteed to execute at least one time?

           (iii)   Which looping statement is the most suitable to be used if the number of iteration in known before the loop is started?

(5 marks)

(b)   Write a program to print number from 1 to 5 using *while* statement. Your output program should be same as below.

12345

(5 marks)

(c)   Show the output of the following coding in **Programme Q3(c)**.

```c
#include<stdio.h>
#include<Windows.h>

int main()
{
    int i,j;
    for(i=1;i<=5;i++)
    {
        for(j=1;j<=i;j++)
        {
            printf("*");
        }
        printf("\n");
    }

    system("pause");
}
```

Programme Q3(c)

(5 marks)

Q4   (a)   Consider these arrays:

$$int\ x[2][5];$$
$$int\ y[5] = \{5, 10, 15, 20\};$$

        (i)   How many rows does array x have?
        (ii)   How many column does array x have?
        (iii)   How does one refer to the first element of array x?
        (iv)   What is the fifth element of array y?
        (v)   What is the output of $y[2] + y[4]$?

(5 marks)

(b)   Show the output of the following coding in **Programme Q4(b)**.

```c
int a = 5,b = 10;
int *ptr1,*ptr2;

printf("Value a = %d \n",a);
printf("Value b = %d \n",b);

ptr1 = &a;
ptr2 = &b;

printf("Value a = %d \n",a);
```

```
printf("Value b = %d \n",b);

*ptr1 = 20;
*ptr2 = 5;

printf("Value a = %d \n",a);
printf("Value b = %d \n",b);

 a = b;

printf("Value a = %d \n",a);
printf("Value b = %d \n",b);

*ptr1 = a + b;

printf("Value a = %d \n",a);
printf("Value b = %d \n",b);
```
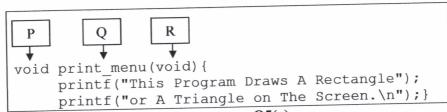
Programme Q4(b)

(5 marks)

(c)   Consider the elements and memory address of `myarray[5]` below and state the output of each of the following declaration.

myarray[5]

1	2	3	4	5
1000	1004	1008	1012	1016

(i)   What the value of `*a` if `int *a = myarray`?
(ii)   What the value of `a` if `int *a = myarray`?
(iii) What is the value of `(myarray)`?
(iv)   What is the value of `(myarray + 2)`?
(v)   What is the value of `*(myarray + 2)`?

(5 marks)

Q5   (a)   Lable the item in P, Q and R in **Programme Q5(a)** below with the correct C function definition.

```
   P        Q        R
   │        │        │
   ▼        ▼        ▼
void print_menu(void){
     printf("This Program Draws A Rectangle");
     printf("or A Triangle on The Screen.\n");}
```

Programme Q5(a)

(3 marks)

(b) Complete the coding (as stated in the **Line**) in **Programme Q5(b)** to check whether a number entered by user is a prime number or not by applying function with arguments and no return value.

```
#include <stdio.h>
int check(int n);
int main(){
    int num,num_check=0;
    printf("Enter positive number to check:\n");
    scanf("%d",&num);

    [                    ]        -  Line 1

    //Argument num is passed to check() function.
    if(num_check==1)
    [                    ]        -  Line 2

    else
        printf("%d is prime",num);
    [                    ]        -  Line 3

}

[                    ]        -  Line 4
{
//Integer value is returned from function check()
    int i;
    for(i=2;i<=n/2;++i){
    if(n%i==0)
        return 1;
}
    [                    ]        -  Line 5

}
```
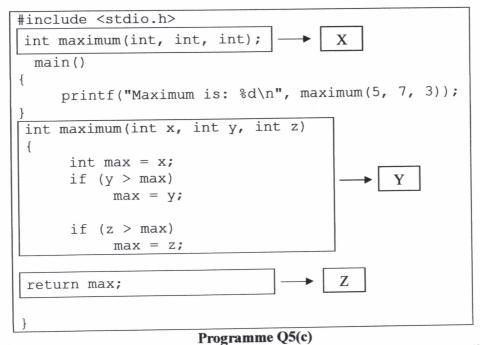
Programme Q5(b)

(5 marks)

(c) A function is independent. It is "completely" self-contained and can be called at any places of your code and can be ported to another program.

(i) Explain briefly the difference between function prototype and function definition. Support your answer with an example.

(4 marks)

(ii)   Lable the item in X, Y and Z in **Programme Q5(c)** below with the correct C
function concepts.

```c
#include <stdio.h>
int maximum(int, int, int);          ──────▶  [ X ]

  main()
{
      printf("Maximum is: %d\n", maximum(5, 7, 3));
}
int maximum(int x, int y, int z)
{
      int max = x;
      if (y > max)
            max = y;

      if (z > max)                     ──────▶  [ Y ]
            max = z;


return max;                          ──────▶  [ Z ]

}
```

Programme Q5(c)

(3 marks)

PART B

Q6   Develop a system using C programming to calculate and display the total power consumption (kW) and its costs (RM) in a house based on electrical equipments listed in **Table Q6** below.

Table Q6

Electrical Equipment	Power (Watt/hour)
Iron	1000
Rice cooker	800
Fridge	300
Television	100
Washing Machine	400

For every 1 kW used, user will be charge RM 0.26 for the first 200 kW. If the user uses more than 200kW, the remaining kW used will be charge RM 0.30 for every 1 kW. The user must enter the time consume in hour for each electrical equipments listed above. You are required to:

(a)   Draw a flowchart of a program.

(5 marks)

(b)   Write a pseudocode of the programs.

(5 marks)

(c)   Develop a C program based on the above problems.

(15 marks)

Q7   Develop a system using C programming to identify the resistance in a cable and voltage through it. Given, R = V/I (resistance = voltage / current), you must display the resistance or voltage. System design involves three functions: to return a value, did not return a value and reference. The user must enter '1' to calculate the voltage, and '2' to calculate the resistance. If the user enters other numbers, an error will be displayed. You are required to:

(a)   Draw a flowchart of a program.

(5 marks)

(b)   Write a pseudocode of the programs.

(5 marks)

(c)   Develop a C program based on the above problem.

(15 marks)

Q8   **Table Q8** shows the proportion between Grade Point Average (GPA) and subject marks.

Table Q8

Subject Marks (%)	GPA
80 - 100	4.00
60 - 79	3.00
40 - 59	2.00
20 - 39	1.00
1 - 19	0.50
0	0.00

You are need to design a simple system to calculate and display the Cumulative Grade Point Average (CGPA) of a student. Consider that there are five(5) subjects were taken on that semester and all the subjects have the same credit. The system should prompt the student to enter their mark of each subject repeatedly 5 times. The program will automatically determine their GPA for each time they enter mark and store the data into an array. If the student enter mark value other than 0 to 100, the program will prompt an error message. The CGPA can be calculate by averaging the GPA obtained by the student such that CGPA = (total GPA) / (number of subject). You are required to:

(a)   Draw a flowchart of a program.

(5 marks)

(b)   Write a pseudocode of the programs.

(5 marks)

(c)   Develop a C program based on the above problem.

(15 marks)

-END OF QUESTION-