



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER II
SESSION 2016/2017**

COURSE NAME : COMPUTER PROGRAMMING

COURSE CODE : DAE 20103

PROGRAMME CODE : DAE

EXAMINATION DATE : JUNE 2017

DURATION : 2 HOURS 30 MINUTES

INSTRUCTION : PART A:
ANSWER ALL QUESTIONS

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PART B:
ANSWER ONE (1) QUESTIONS
ONLY

THIS QUESTION PAPER CONSISTS OF SEVEN (7) PAGES

PART A

Q1 Ahmad wants to promote saving culture among his children on his way. He build a program using C++ language so that his children can enter their saving for each month and calculate their reward or penalty. Every time his children save more than RM400.00 per month, he will top up another RM50 as a reward. If their saving is less than RM300.00, RM15.50 will be deducted from their saving. There are no rewards or penalties will be charged if their saving between RM 300 and RM 400. The program will show the total saving earn after the above condition execute. From the situation, answer the following questions:

- (a) Identify the input, output and relevant formula. (4 marks)
- (b) Express the pseudocode of the program. (7 marks)
- (c) Sketch the flowchart of whole programme. (8 marks)

Q2 (a) Based on **Programme Q2(a)**, there are five (5) basic components of C++ program. Identify the name of each component that has been labeled.

```

/*This is a basic structure C++ program*/ ← (1)
#include <iostream> ← (2)
using namespace std;

void main () ← (3)
{
    int miles = 26;
    int yards;
    float kilometers; } ← (4)

    kilometers = 1.609 *(miles+yards/1760.0); ← (5)
}
    
```

Programme Q2(a)

(5 marks)



- (b) Consider the following code in **Programme Q2(b)**, then predict the output of each statement after it is performed sequentially.

```

int a = 0, b = 5, c = 10;
int x, y, z;

x = ++a + b++;
cout << "Value of x: " << x << endl;

c+=a;
cout << "Value of c: " << c << endl;

b = c%b;
cout << "Value of b: " << b << endl;

y = --b/2 * c;
cout << "Value of y: " << y << endl;

z = (y / 10) / (++b * 5);
cout << "Value of z: " << z << endl;

if (z > 0)
    cout << "The sum of all variables is: "
        << x + c + b + y + z << endl;
else
    cout << "The product of all variables is: "
        << x * c * b * y * z << endl;
    
```

Programme Q2(b)

(6 marks)

Q3 Repetition structures, or loops, are used when a program needs to repeatedly process one or more instructions until some condition is met, at which time the loop ends.

- (a) Based on the following code fragment below, estimate how many loops will the for statement execute?

```
for (i = 0; i < 5; i++)
```

(1 mark)

- (b) Write a program to produce output as below using for loop.

```

*****
*****
*****
****
***
**
*
    
```



(7 marks)

(c) A function is a group of statements that together perform a task. Functions allow to structure programs in segments of code to perform individual tasks as well.

(i) Based on the **Programme Q3(c)(i)**, execute the program outputs.

```
#include <iostream>
using namespace std;

int sum(int a, int b=20) {
    int result;
    result = a + b;
    return (result);
}

int main () {
    int a = 100;
    int b = 200;
    int result;

    result = sum(a, b);
    cout << "Total value is :" << result << endl;

    result = sum(a);
    cout << "Total value is :" << result << endl;

    return 0;
}
```

Programme Q3(c)(i)

(4 marks)

(ii) Label the element of functions in the **Programme Q3(c)(ii)**.

```
#include <iostream>
int maximum(int, int, int); —————> (A)

int main()
{
    cout << "Maximum is: " << maximum(5, 7)
        << endl;
}

int maximum(int x, int y)
{
    int max = x;
    if (y > max)
        max = y;
    return max; —————> (C)
} } (B)
```

Programme Q3(c)(ii)

(3 marks)

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Q4 (a) An array is a series of elements of the same type placed in contiguous memory locations that can be individually referenced by adding an index to a unique identifier.

(i) Based on **Table Q4(a)(i)**, write a fragment code of array declaration to initialize **five (5)** marks of students and display third element of array.

mark[0]	mark[1]	mark[2]	mark[3]	mark[4]
19	10	8	17	9

Table Q4(a)(i)

(2 marks)

(ii) A two-dimensional array stores values in rows and columns. By using two-dimensional array, write a program to assign array and display output as shown below:

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20
21	22	23	24	25

(7 marks)

(b) A pointer variable (or pointer in short) is basically the same as the other variables, which can store a piece of data. Unlike normal variable which stores a value (such as an int, a double, a char), a pointer stores a memory address. Write a C++ program to accept five integer values. The five values will be stored in an array using a pointer. Then print the elements of the array on the screen as in **Figure Q4(b)** shown below.

```
Enter five numbers separated by space:5 3 6 5 3
Your numbers are:
5
3
6
5
3
Press any key to continue . . . _
```

Figure Q4(b)

(6 marks)



Q5 (a) Consider the following string declaration and initialization,

```
char str_val1[] = "abc";  
char str_val2[] = {'a', 'b', 'c'};
```

(i) Is variable `str_val1` equivalent to `str_val2`? (1 marks)

(ii) Give reasons to the answer in **Q5(a)(i)**. (2 marks)

(b) Write a complete program to copy the string constant "DAE" into the string variable `a_string` below. Then combines the string in variable `a_string` and `b_string` to become "DAE20103". Please state the suitable value of `x` for size `a_string`.

```
char a_string[x];  
char b_string[6] = "20103";
```

(6 marks)

(c) (i) Define structure in C++ and when structure is use? (2 marks)

(ii) Write a definition for a structure type consisting of student name, matric number (consider only number), section and marks. Name the structure as `StudentRecord`. (4 marks)

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PART B

- Q6** Develop a system using C++ programming to calculate and display the total cost (RM) of items purchase together with Good and Service Tax (GST). The user should be able to enter the number of item purchase and enter each price of the items. Your system must involved a user defined function to calculate the total cost. Given the formula:

$$\text{Total cost} = \text{total price} + (\text{total price} * \text{GST})$$

The rate of GST is 6%.

- (a) Draw a flowchart of the program. (10 marks)
- (b) Develop a C++ program based on the above problems. (15 marks)
- Q7** Develop a system using C++ programming to calculate and display the total cost (RM) of power consumption of electrical device used in an hour. The user should be able to enter the number of device used and each wattage per device (in watt). Your system must involve a user defined function to calculate the total cost. Given the formula:

$$\begin{aligned} \text{power} &= \text{wattage device}/1000 * \text{hour used} \\ \text{total_cost} &= \text{power} * \text{rate} \end{aligned}$$

The rate per kWh is RM0.20.

- (a) Draw a flowchart of a program. (10 marks)
- (b) Develop a C++ program based on the above problem. (15 marks)

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-END OF QUESTION-