UNIVERSITY COLLEGE TATI

UNIVERSITY COLLEGE TATI (UCTATI)

FINAL EXAMINATION QUESTION BOOKLET	
COURSE CODE	: BCS1013
COURSE	: PROBLEM SOLVING AND COMPUTER PROGRAMMING
SEMESTER/SESSION	: 1-2022/2023
DURATION	: 3 HOURS

Instructions:

1. This booklet contains 5 questions. Answer ALL questions.
2. All answers should be written in answer booklet.
3. Write legibly and draw sketches wherever required.
4. If in doubt, raise your hands and ask the invigilator.

DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO

THIS BOOKLET CONTAINS 9 PRINTED PAGES INCLUDING COVER PAGE

QUESTION 1

a) Consider the following C++ program in Figure 1.

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

int main()
{
    int age;
    cin>>age;
    if(age>=18)
       cout<<"Eligible to vote"<<endl;
    cout<<"General Election 15";
    return 0;
  }
```

Figure 1

i) Write the output for the program when input is 19. (2 marks)

ii) Write an algorithm (either pseudocode or flowchart) for the program in Figure 1. (4 marks)

b) The following C++ program (Figure 2) use a `switch-case` statement to input online shopping code and prints the name based on the Table 1. Rewrite the program using `if-else-if` statement. (8 marks)

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

int main (){
  char shopping_code;
  cout<<"Please enter online shopping code ";
  cin>>shopping_code;

  switch (shopping_code){
    case 'L':
      cout<<"Lazada";
      break;
    case 'S':
      cout<<"Shopee";
      break;
    case 'Z':
     cout<<"Zalora";
      break;
    default: cout<<"Invalid code";
    } //switch

  return 0;
  }
```

Figure 2

Table 1

Online Shopping Code	Online Shopping Name
L	*Lazada*
S	*Shopee*
Z	*Zalora*

QUESTION 2

a) The following Flowchart A and Flowchart B in Figure 3 is to demonstrate Pre-test loop and Post-test loop. Write a C++ code for each of the flowchart. (10 marks)

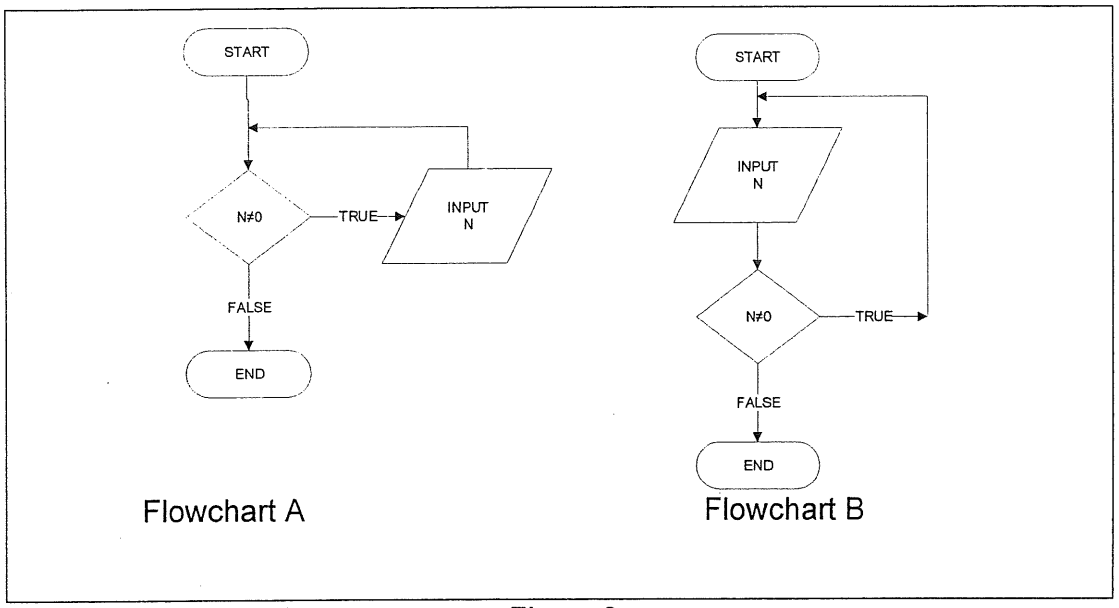

Figure 3

b) Differentiate between Pre-test loop and Post-test loop. (4 marks)

c) Write a C++ program that reads **FIVE (5)** integers and print the sum and the average. Here is output sample (Figure 4): (8 marks)

```
Please enter 5 Integers
3
2
0
5
2
The sum for the integers is 12
The average for the integers is 2
```

Figure 4

QUESTION 3

a) Determine the value for the following expressions. (1 mark)

```
abs(-5)
```

b) Write the output for the following C++ program. (2 marks)

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

void FunctionA(){
    cout<<" Teluk Kalong ";
}

void FunctionB(){
    cout<<" UCTATI ";
    FunctionA();
}

int main()
{
    FunctionB();
    cout<<" 2022 ";
    return 0;
}
```

c) Find and correct **ONE (1)** error in the following function definition. (2 marks)

```
// This function has an error!
void sayHello();
{
   cout<<("Hello");
}
```

d) Find and correct **ONE (1)** error in the following function definition. (2 marks)

```
// This function has an error!
double average(string N1, int N2){
    return ((N1+N2)/2.0);
}
```

e) Find and correct **ONE (1)** error in the following C++ program. (2 marks)

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

int main (void) {
    ucap("Abu");
```

```
    return 0;
}

void ucap(string userName){
    cout<<" Hello "<<userName<<endl;
}
```

f) Write a function prototype (not the bodies) for a function that receives an integer and returns true if the integer is odd. (2 marks)

g) Write a function prototype (not the bodies) for a function that receives a height and length of a rectangle and returns a parameter. (2 marks)

h) Write a function named `isValid` that accepts a final exam score and returns `true` if the score is in range of 0 to 100, otherwise return `false`. (8 marks)

i) Consider the following program with a function overloading (Figure 5).

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

double myFunction(double N1){
    return N1*2;
    }

double myFunction (int N1){
    return N1*N1;
    }

int main()
{
    cout<<myFunction(5.0);
    return 0;
}
```

Figure 5

i) Write the output for the program. (2 marks)

ii) Write the output for the program if the statement (2 marks)
`cout<<myFunction(5.0);` is replaced with
`cout<<myFfunction(5);`

iii) Identify wheter the following function call is valid. (2 marks)

```
cout<<myFunction(2.0,3.3);
```

iv) Identify whether the following function call is valid. (2 marks)

```
cout<<myFunction(2.0+1);
```

QUESTION 4

a) Write a computer program to input **TWO (2)** integers ***M*** and ***N*** and get the absolute difference between ***M*** and ***N***. (7 marks)

Expected Output:

```
Please enter two integer:
2  <enter>
5  <enter>
The difference between your 2 and 5 is 3
```

b) Tenaga Malaysia Berhad (TMB) is an electricity utility company that provides electricity across the country. TMB charges user based on kilowatt-hour (kWh) as in Table 2. Write a C++ Program that input kWh and print the net payment. The flowchart for the problem is given as follows (Figure 6). (8 marks)

Table 2

kWh	Rate (RM)
For the first 200 kWh (1-200)	0.218
For the next 100 kWh (201-300)	0.334
For the next kWh (301 onwards)	0.516

Here is sample output (Figure 7).

```
Please enter kWh : 300
Net Payment is RM 77
```

Figure 7

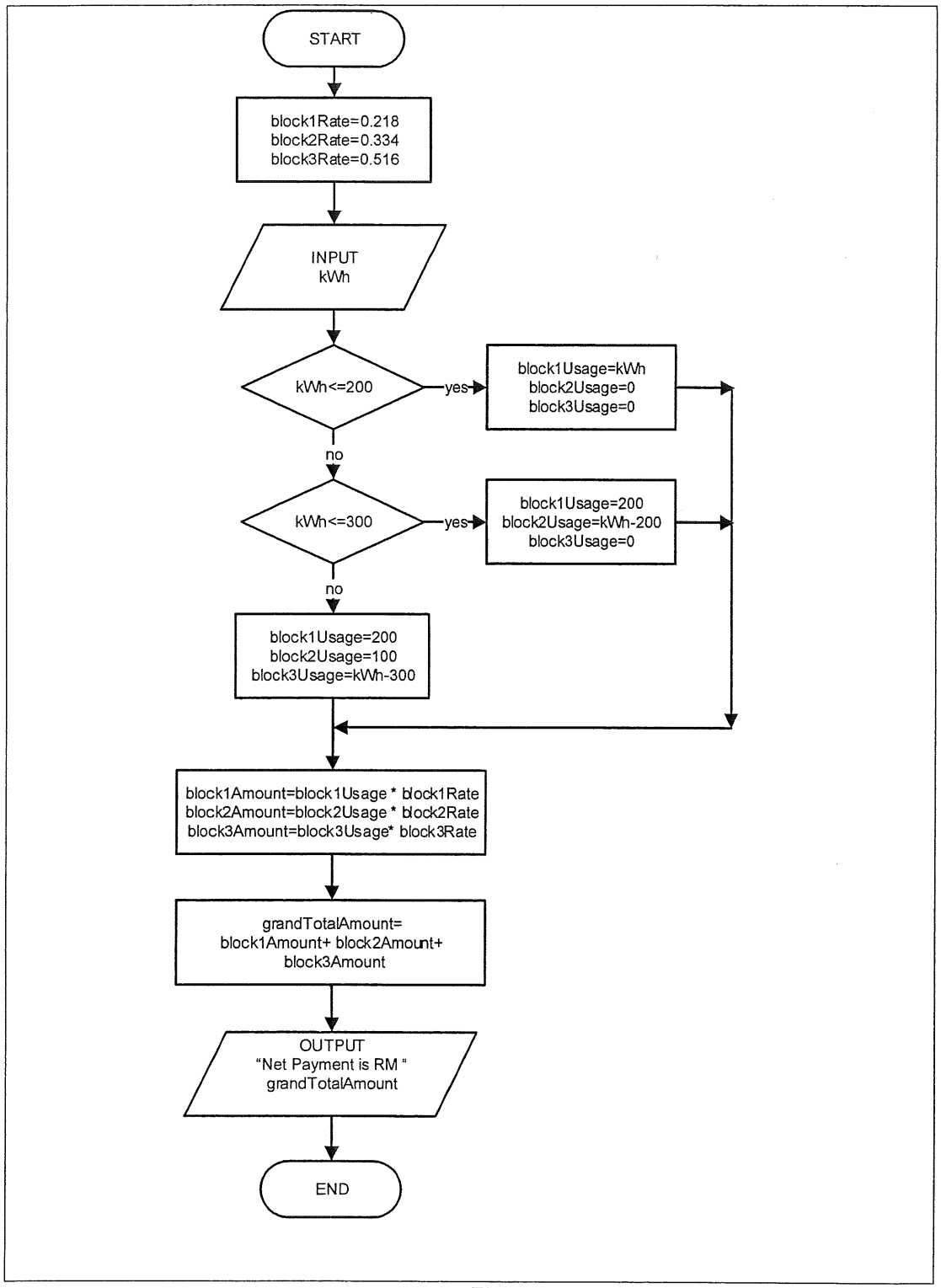
START
block1Rate=0.218
block2Rate=0.334
block3Rate=0.516
INPUT
kWh
kWh<=200
yes
block1Usage=kWh
block2Usage=0
block3Usage=0
no
kWh<=300
yes
block1Usage=200
block2Usage=kWh-200
block3Usage=0
no
block1Usage=200
block2Usage=100
block3Usage=kWh-300
block1Amount=block1Usage * block1Rate
block2Amount=block2Usage * block2Rate
block3Amount=block3Usage* block3Rate
grandTotalAmount=
block1Amount+ block2Amount+
block3Amount
OUTPUT
"Net Payment is RM "
grandTotalAmount
END

Figure 6

QUESTION 5

a) Write a program that prompts the user to enter the number of students and each student's score, and finally displays the lowest score. Here is sample output (Figure 8).

```
Please enter the number of students 5
Please enter student's score 80
Please enter student's score 85
Please enter student's score 96
Please enter student's score 66
Please enter student's score 75
The lowest score is 66
```

Figure 8

i) Write an algorithm (pseudocode or flowchart) (10 marks)

ii) Write a C++ program based on algorithm in i) (10 marks)

----------**End of question**----------