UNIVERSITI TEKNOLOGI MALAYSIA

MID-TERM TEST (THEORY COMPONENT)

SEMESTER I 2015/2016

SUBJECT CODE	**: SCSJ1013**
SUBJECT NAME	**: PROGRAMMING TECHNIQUE I**
YEAR/COURSE	**: 1 (SCSJ / SCSV / SCSB / SCSR)**
TIME	**: 2 HOURS (2:00 – 4:00p.m.)**
DATE	**: 3 NOVEMBER 2015**
VENUE	**: BK1-BK5**

INSTRUCTIONS TO THE STUDENTS:

This test book consists of 12 questions.

ANSWER ALL QUESTIONS IN THIS BOOKLET IN THE SPACES PROVIDED. Additional answer sheets will be given upon request.

Name	
I/C No.	
Year/Course	
Section	
Lecturer's Name	

This question booklet consists of **13 pages** inclusive of the cover page.

1. There are five operators shown in the expression as in the given figure. Label the order of execution for each operator in the boxes as stated in the expression. The operator that will be executed first should be labeled as 1, the second operator to be executed should be labeled as 2, and so on. Finally give the result of the expression according to this sequence of executions.

[3 marks]

z	=	(	12	+	4	)	/	4	+	30	/	3	-	3

Answer: _____

2. What is the output for the following statements marked (a) to (e). Write your answer in the space provided according to the sequence required.

[5 marks]

```
double val = 10.34567;

cout << setprecision(6) << val << endl;                  // (a)
cout << static_cast<int>(val)/2 << endl;                 // (b)
cout << "\t" << setprecision(3) << val << ", " ;         // (c)
cout << setw(6) << val*5 << endl << endl;                // (d)
cout << showpoint << fixed << setw(9) << val << endl;    // (e)
```

Answer:

3. Refer to **Program A.1** below which is incomplete. As a result of the prompt on line **9**, assume that the input string entered is "ABCDEFG HIJKL". Write the corresponding output to be displayed for each of the corresponding codes in Code 1, Code 2 and Code 3 as given in the boxes after **Program 1**.

[7 marks]

```
 1  // Program 1
 2  #include <iostream>
 3  #include <iomanip>
 4  using namespace std;
 5
 6  int main( )
 7  {
 8     char   x[13];
 9     cout << " Enter a string : ";
10
11     // either Code 1, 2 or 3
12     // will be placed here
13
14  return 0;
15  }
```

Code 1: [2 marks]

```
cin>>x;
cout<<x<<endl;
```

Output:

Code 2: [2 marks]

```
cin.getline(x,13);
cout<<x<<endl;
```

Output:

Code 3: [3 marks]

```
cin>>x;
cout<<setw(13)<<x<<endl;
```

Output:

4. The following C++ program, **`Program 2`** cannot be compiled. Rearrange the lines in the correct sequence in order for the program to be compiled and executed to produce the output as indicated.

[5 marks]

```
 1  // Program 2
 2  cout << "Success\n";
 3  cout << " Success\n\n";
 4  int main()
 5  cout << "Success"; }
 6  using namespace std;
 7  #include <iostream>
 8  cout << "Success\n";
 9  {
10  return 0;
```

Program output :

```
Success
Success

Success Success
```

Use the table below to rearrange the lines based on the output given.

1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

5. Write the corresponding conditional expression for the following if else statements.

[12 marks]

	if…else statement	Conditional expression

i.	`if (score >= 50)`
	`{ numPass++;`
	`cout<<"Pass"; }`
	`else`
	`{ numFail++;`
	`cout<<"Please try again."; }`	

ii.	`if (cpa >= 2.0)`
	`{ if (cpa >= 3.5)`
	`status = "Dean's List";`
	`else`
	`status = "Normal Pass"; }`
	`else`
	`{ if (cpa >= 1.7)`
	`status = "Probation";`
	`else`
	`status = "Fail"; }`	

6. Write C++ **`if`** statement code fragments to satisfy the given conditions.

[10 marks]

i.	Check the range of frequency, **`freq`** to be between 100Hz and 10000Hz. Display **`"Acceptable"`** if within the range and **`"Unacceptable"`** if not. (3 marks)

ii.	Check the prerequisite for a soldier candidate to be of **`age`** between 18 to 30 years, **`weight`** between 50 to 65kg and **`height`** must be greater than 156m. Display **`"Fulfill requirements"`** or **`"Do not fulfill requirements"`** based on these conditions. (3 marks)
iii.	Henry wants to buy a car. It must be under one of these conditions. Either: (a) The **`year`** made: after 2010, cylinder capability: **`cc`** between 1.5 to 2.0. ***or*** (b) The **`year`** made: before 2010 , cylinder capability: **`cc`** greater than 2.0. His decision either to **`"Purchase car"`** or **`"Do not purchase car"`** should be reflected in the code. (4 marks)

8. What is the output for the following code excerpts?

[5 marks]

Code	**Output**

`int n = 0;`
`if (n = 0)`
`  cout << "Yes";`
`else`
`  cout << "No";`
`}`	

`int i=10, j=3,k = 20;` `cout << ((j < 4 )|| (j == 5) && (i <= k));`	

`int x = 13, y = 9;`
`if (x >= y)`
`  if (y > 0)`
`  x = x * y;`
`  else if (y < 4)`
`  x = x - y;`
`cout << x;`	

9. Fill in the spaces provided in order for the program segment to produce the output as shown.

```
// Question 9.a. - [8 marks]
int x = _____;                    //(a)
do {
   x--;
   if (x % _____ == _____)  // (b) and (c)
      continue;
   cout << x << "  ";
} while (x >= _____);             // (d)
```

Output:

```
14  12  10  8  6  4
```

```
// Question 9.b. - [6 marks]
int y = 2;
do {
   if (y _____)                   // (a)
      break;
   cout << y << "  ";
   y = _____;                     // (b)
} while (y >= _____);             // (c)
```

Output:

```
2  4  16  256
```

10. Based on the flowchart given in **Figure 1**, answer parts (i) to (iii) of this question.

[10 marks]

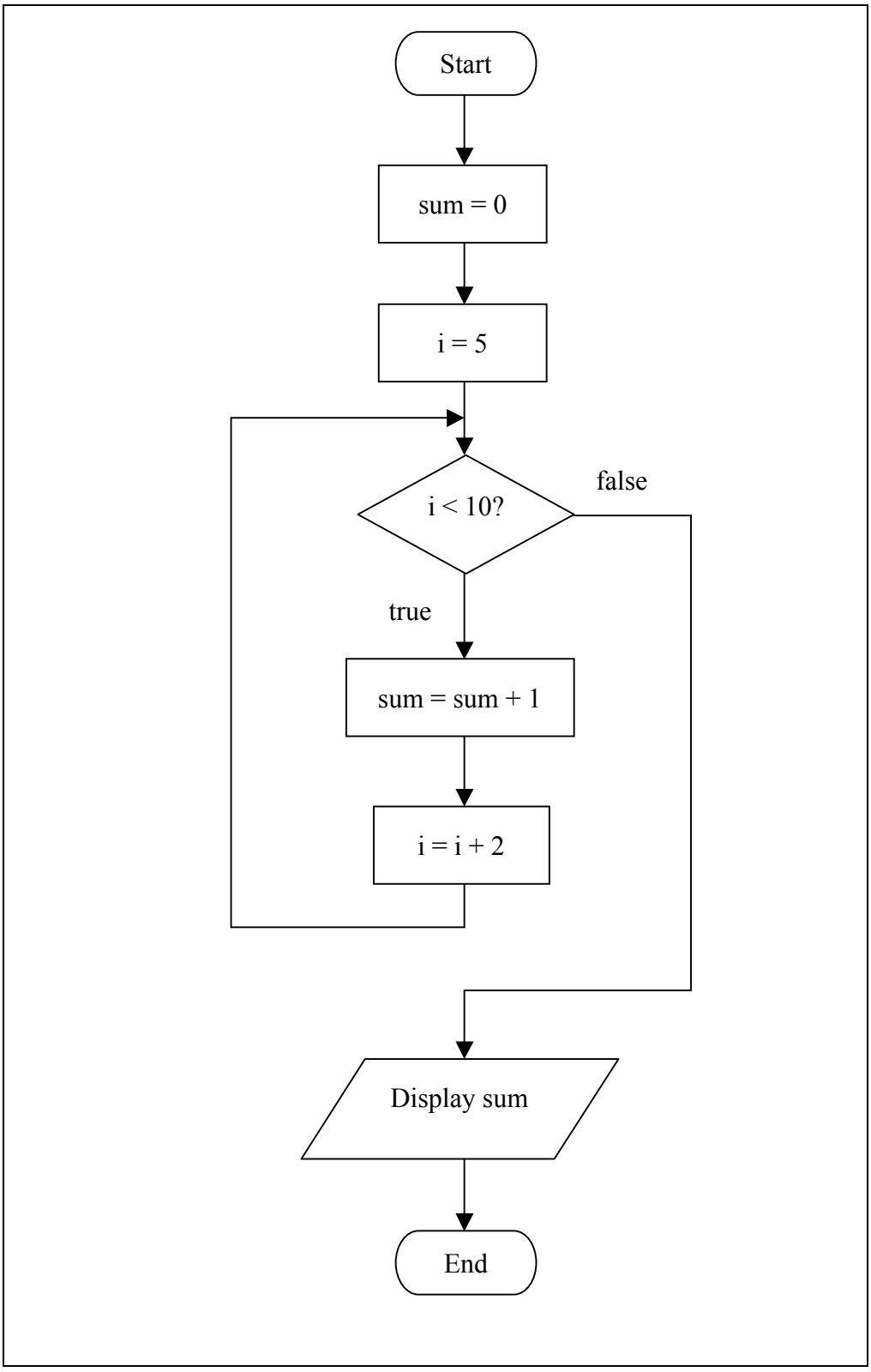

Figure 1

i. Convert the given flowchart into its equivalent C++ code excerpt. (4 marks)

ii. How many times the loop repeat. (1 mark)

iii. Modify your code by using decrement counter loop without changing the variables involved and the number of loops involved. (4 marks)

11. **Program 3** is able to count the number of input character of **A**, **B** and **C**. The program will loop reading the input until the sentinel value **e** is being input. The sample output of the program is as shown:

[20 marks]

```
Enter the letter grades[Enter 'e' character  to end input]
A
Enter the letter grades[Enter 'e' character  to end input]
B
Enter the letter grades[Enter 'e' character  to end input]
C
Enter the letter grades[Enter 'e' character  to end input]
C
Enter the letter grades[Enter 'e' character  to end input]
C
Enter the letter grades[Enter 'e' character  to end input]
e

Totals for each letter grade are:
A: 1
B: 1
C: 3
Press any key to continue . . .
```

Complete **Program 3** based on the comments given

```
1   //Program 3
2   #include <iostream>
3   using namespace std;
4
5   int main()
6   {
7        char grade;      // one grade
8        int aCount = 0; // number of characterAs
9        int bCount = 0; // number of Bs
10       int cCount = 0; // number of Cs
11
12  cout << "Enter the letter grades[Enter 'e' character  to end
13  input]"<< endl;
14  cin>>grade;
15
16  // loop: as long as sentinel value has not been achieved
17  _____ {      // (a)          - 2 marks
18
19
```

```
20 //write appropriate statement for testing input cases
21 _____________________ {          // (b)          - 2 marks
22
23 //in case of input A, increment variable aCount      - 3 marks
24
25 __________:                      // (c)
26           _____________________   // (d)
27           _____________________   // (e)
28
29 //in case of input B, increment variable bCount      - 3 marks
30
31 __________:                      // (f)
32           _____________________   // (g)
33           _____________________   // (h)
34
35 //in case of input C, increment variable cCount      - 3 marks
36
37 __________:                      // (i)
38           _____________________   // (j)
39           _____________________   // (k)
40
41 //add the statement to catch all other alphabets and prints
42 //"Incorrect letter grade entered."                  - 3 marks
43
44 __________:                                  // (l)
45      ____________________________________    // (m)
46      ____________________________________    // (n)
47
48 } // end test cases
49
50 //ask for another input letter grades                - 2 marks
51 ____________________________________________________ // (o)
52 ____________________________________________________ // (p)
53
54 } // end loop
55
56 // output summary of results                         - 2 marks
57
58   _____________________  // (q) display number of A grades
59   _____________________  // (r) display number of B grades
60   _____________________  // (s) display number of C grades
61
62       return 0;
63  } // end function main
```

12. Write a **`Program 4`** that allows user to:
    (i) Input integer number(s) continuously until they decide to terminate/quit the program by entering '0' (zero).
    (ii) Count how many times the user input any extreme values that are numbers, which **not in the range** of 30 to 200.
    (iii) Calculate the average value for the user inputs.

Figure 2 shows the output sample for the case of extreme values are being input, while **Figure 3** shows the output sample for the case of no extreme values are being input.

```
Enter a number (0 to quit) : 201
Enter a number (0 to quit) : 205
Enter a number (0 to quit) : 29
Enter a number (0 to quit) : 25
Enter a number (0 to quit) : 0

Average is: 115.00
There were 4 extreme values
Press any key to continue . . .
```

Figure 2

```
Enter a number (0 to quit) : 30
Enter a number (0 to quit) : 200
Enter a number (0 to quit) : 40
Enter a number (0 to quit) : 0

Average is: 90.00
There were 0 extreme values
Press any key to continue . . .
```

Figure 3

Complete **`Program 4`** below based on the given instructions within the program.

[10 marks]

```
1   //Program 4
2   //Include suitable libraries @ header file                (2 marks)
3   _____________________________________________
4   _____________________________________________
5   using namespace std;
6
7   #define LOW 30                  // lowest value in range
8   #define HIGH 200                // highest value in range
9   #define EXIT 0                  // sentinel value
10
11  int main()
12  {
13     int userVal;                 // user input
14     int extremeCnt = 0;          // extreme values counter
15     int sum = 0;                 // total values of user inputs
16     int num = 0;                 // no of user inputs
17     double avg;                  // average of user inputs
18
19  // Prompt user to input the first number
20     cout << "Enter a number ("<< 0 <<" to quit):";
21     cin >> userVal;
22
```

```
23  /* Write WHILE loop that allow user to:
24     - Input number(s) continuously until user enter '0'
25     - Count no of user inputs and extreme values counter
26     - Calculate total value of user inputs
27                                                    (4 marks) */
28
29  _____________________________________________________________
30  _____________________________________________________________
31  _____________________________________________________________
32  _____________________________________________________________
33  _____________________________________________________________
34  _____________________________________________________________
35  _____________________________________________________________
36  _____________________________________________________________
37  _____________________________________________________________
38  _____________________________________________________________
39  _____________________________________________________________
40  _____________________________________________________________
41
42  /* Calculate the average value for the user inputs
43     Display the number of extreme values          (4 marks) */
44
45  _____________________________________________________________
46  _____________________________________________________________
47  _____________________________________________________________
48  _____________________________________________________________
49
50    return 0;
51
52  } //end main
```