Answer Scheme Test 1 CSC128

**PART A (10 MARKS)**

1.  _____ translates the source code into machine code.

    A. Linker
    **B. Compiler**
    C. Operating System
    D. Editor

2.  _____ will produce undesired output

    **A. Logic error**
    B. Syntax error    ~ *cannot produce any output because of syntax errors made*
    C. Run-time error  ~ *no output produced*
    D. Hardware error

3.  Which of the following is the **CORRECT** preprocessor directive to support console input and output?

    A. #include<conio.h>    ~ *getch ()*
    **B. #include<iostream.h>**
    C. #include<string.h>   ~ *strcmp(), strcpy()*
    D. #include<math.h>     ~ *pow(), sqrt()*

4.  Which statement demonstrates the appropriate way to declare and initialize a variable named population to 0?

    A. double population;
    B. double population - 0;
    C. int population;
    **D. int population = 0;**

5.  Which of the following statements are **TRUE**?

    i.   The modulus operator can be used only with integer operands.
    ii.  All variables must be declared before they are used.
    iii. During program execution, the content of a named constant can be changed.
    iv.  C++ considers the variables **num** and **Num** to be identical.

    A. i, ii, iii
    B. ii, iii, iv
    **C. i and ii**
    D. i, iii, and iv

6. What is the result of the following expression?

```
int  a = 6, b = 5, c = 4;
cout << ( b % a + b * c * c % 6 );
```

A. 0
B. 8
**C. 7**
D. 2

7. Which statements will return **TRUE** if a = 1, b = 2, c = 3 and d = 4 ?

i.   (!(a / b)   &&   a % b == 1)
ii.  (b > c && b < d || a == 2)
iii. (d || !a)
iv.  (a < b || c < b && b > d)

A. iii
B. i, ii
C. i, iii
**D. i, iii, iv**

8. What is displayed by the following program?

```
int b = 7;
if (b < 7 || b > 7)
     cout << "Please " << endl;
     cout << "Come ";
cout << "Again";
```

Without curly braces { },
if statement will take **one**
statement only

**A. Come Again**
B. Please
   Come Again
C. Please
   Come
   Again
D. Again

9.	Determine the output of the following code fragment:

```
int x = 8, y = 10;
y = 5;
if (x == 8 && y <= 8)
cout << "Rabbit" << endl;
if (x == 3 || y < 10)
cout << "Cat" << endl;
if (x != 5 && y != 112)
cout << "Ant" << endl;
```

Variable y will take the last value assigned to it.

**A. Rabbit**
   **Cat**
   **Ant**
B. Rabbit
   Cat
C. Cat
   Ant
D. Ant

10.	What is the output of the following program?

```
int k = 8;
if (k < 10)
    k = k * k;
if (k <= 64)
    k = k + 10;
cout << k;
```

A. 18
B. 64
**C. 74**
D. 8

## PART B ( 25 MARKS)

## QUESTION 1

a) Based on the given problem, identify the required **input**, **process** and **output**.

> Lionel Messi wants to give out "duit raya" to his muslim fans. He needs a program that can read in an amount of money and determine the number of purple envelopes to put RM50, the number of red envelopes to put RM10, the number of green envelopes to put RM5, and how much money is left without envelope.

(3 marks)

**Answer**

**INPUT:**
```
    amtMoney
```

**PROCESS:**
```
    noPurpleEnv = amtMoney / 50
    noRedEnv    = amtMoney % 50 / 10
    noGreenEnv  = amtMoney % 50 % 10 / 5
    moneyLeft   = amtMoney % 50 % 10 % 5
```

OR

```
    noPurpleEnv = amtMoney / 50
    remainder   = amtMoney % 50
    noRedEnv    = remainder / 10
    remainder   = remainder % 10
    noGreenEnv  = remainder / 5
    moneyLeft   = remainder % 5
```

OR

```
    noPurpleEnv = amtMoney / 50
    remainder= amtMoney - (50 * noPurpleEnv)
    noRedEnv = remainder / 10
    remainder= amtMoney - (50 * noPurpleEnv) - (10 * noRedEnv)
    noGreenEnv = remainder / 5
    moneyLeft  = amtMoney - (50 * noPurpleEnv) - (10 * noRedEnv)
               - (5 * noGreenEnv)
```

**OUTPUT:**
```
    noPurpleEnv, noRedEnv, noGreenEnv, moneyLeft
```

b) Write C++ statement(s) to perform the following tasks:

i) Prompt and allow user to input CSC128 or CSC118 as the value for **courseCode**.

**Answer:**
```
cout << "Enter your course code (CSC128/CSC118): "; // prompt
cin  >> ws;   // optional
cin.getline(courseCode, 10);  // input statement for string
```

ii) Assign value **Bandar Jengka** to variable **town**.

**Answer:**  `strcpy(town,"Bandar Jengka"); // assignment stmt for` **string value**    Or char town[50] = "Bandar Jengka";

iii) If **grade** is equal to **A, B** or **C**, set the variable **gradeStatus** equal to **P**, otherwise set **gradeStatus** equal to **F**.

**Answer:**
```
if (grade == 'A' || grade == 'B' || grade == 'C')
    gradeStatus = 'P';
else
    gradeStatus = 'F';
```

(3 marks)

## QUESTION 2

a)  Given the declarations:

```
int x = 2, y = 3, z = 5;
float a = 17.5;
```

Evaluate the following C++ expressions:

i)  `a + sqrt( pow( x, y % z ) * x )`

**Answer:** ...........21.5..................................................................................................................

ii) `x * y / z % y`

**Answer:** .........1.............................................................................................................

iii) `a + 1 / x`

**Answer:** .........17.5.............................................................................................................

(3 marks)

b) Write the equivalent C++ statement for the following mathematical equations:

i) $P = \dfrac{2(x^7 y + 12)}{(z-2)(z-2)} - \dfrac{1}{x+4}$

**Answer:**

```
P = 2 * (pow(x,7)* y + 12)/((z - 2) * (z - 2)) - 1 / (x + 4);
```
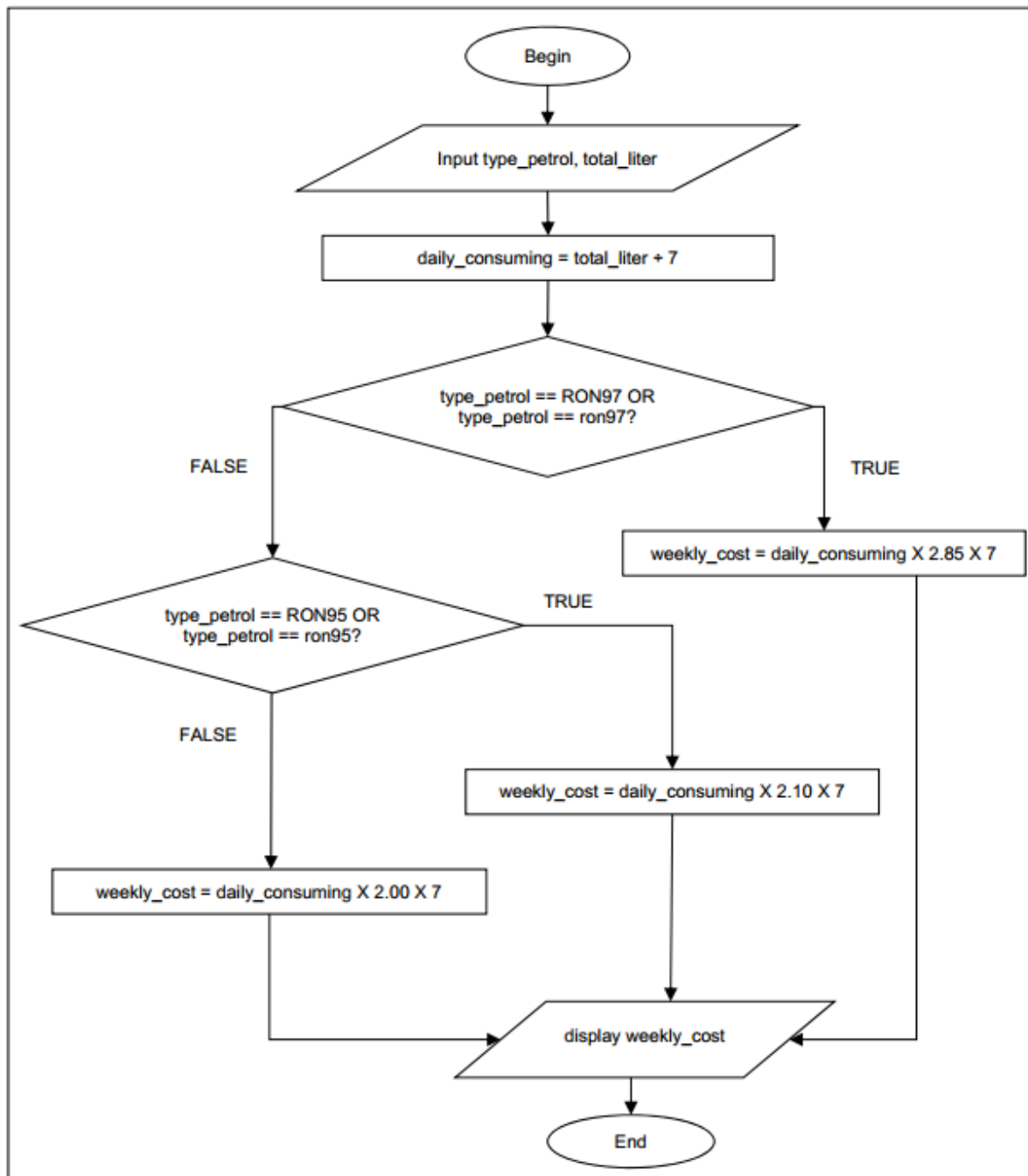
ii) $S = \sqrt{R + \sqrt{Q^3 + R^2}}$

**Answer:**

S = sqrt(R + sqrt(pow(Q, 3) + pow(R, 2))) **or** S = sqrt(R + sqrt(pow(Q, 3) + (R * R)))

(3 marks)

## QUESTION 3

Write a complete C++ program based on the following flowchart.

```
                        ┌─────────────┐
                        │    Begin    │
                        └─────────────┘
                               │
                               ▼
                  ╱─────────────────────────╲
                 ╱  Input type_petrol, total_liter ╲
                  ╲─────────────────────────╱
                               │
                               ▼
              ┌─────────────────────────────────┐
              │ daily_consuming = total_liter + 7 │
              └─────────────────────────────────┘
                               │
                               ▼
                    ◇─────────────────────◇
                   ╱  type_petrol == RON97 OR ╲
          FALSE  ◇   type_petrol == ron97?    ◇  TRUE
                   ╲─────────────────────────╱
                  │                               │
                  ▼                               ▼
                                    ┌──────────────────────────────────────┐
                                    │ weekly_cost = daily_consuming X 2.85 X 7 │
                                    └──────────────────────────────────────┘
        ◇─────────────────────◇  TRUE                 │
       ╱  type_petrol == RON95 OR ╲                    │
      ◇   type_petrol == ron95?    ◇                   │
       ╲─────────────────────────╱                     │
              │                      │                  │
         FALSE │                     ▼                  │
              │       ┌──────────────────────────────────────┐
              │       │ weekly_cost = daily_consuming X 2.10 X 7 │
              │       └──────────────────────────────────────┘
              ▼                      │                  │
  ┌──────────────────────────────────────┐             │
  │ weekly_cost = daily_consuming X 2.00 X 7 │          │
  └──────────────────────────────────────┘             │
              │                      │                  │
              │                      ▼                  │
              │         ╱──────────────────────╲  ◄─────┘
              └───────►╱   display weekly_cost   ╲
                       ╲──────────────────────╱
                               │
                               ▼
                        ┌─────────────┐
                        │     End     │
                        └─────────────┘
```

(7 marks)

**ANSWER**

```cpp
#include<iostream.h>
#include<conio.h>
#include<string.h>

int main()
{
  char type_petrol[10];
  float total_liter, daily_consuming, weekly_cost;

  cout << "Enter the petrol type: RON97 or RON95  or DIESEL:";
  cin.getline(type_petrol,10);

  cout << "Input the total of petrol for a week (Liter):";
  cin  >> total_liter;

  daily_consuming = total_liter / 7;

  if ((strcmp(type_petrol,"RON97") == 0) ||
      (strcmp(type_petrol,"ron97") == 0))
    weekly_cost = daily_consuming * 2.85 * 7;

  else if ((strcmp(type_petrol,"RON95") == 0) ||
           (strcmp(type_petrol,"ron95") == 0))
    weekly_cost = daily_consuming * 2.10 * 7;

  else
    weekly_cost = daily_consuming * 2.00 * 7;

  cout <<" The weekly cost of petrol consumed is :" << weekly_cost;
}
```

**QUESTION 4**

a)

```
float CGPA = 2.33;

if(CGPA >= 3.50 && CGPA <= 4.00)
        cout << "Dean's List";
else if(CGPA >= 2.00 && CGPA < 3.50)
        cout << "Try Harder";
else
        cout << "Under Probation";
```

**ANSWER: Try Harder (1 mark)**

b)

```
int y = 2, z = 0;
if (y > 5)
        z = 14;
cout << z;
```

**ANSWER: 0 (1 mark)**

c)

```
int speed, limit;

speed = 80;
limit = 110;

if (speed < limit)
    cout << "Slow";
    cout << "Drive faster";
else
    cout << "Too fast and furious";
```

More than one stmts (i.e. a block stmt) after an if stmt must be put inside curly braces { } or else it will become a syntax error (misplaced else)

**Answer:** no output ‾‾‾‾‾‾ 1 mark

d)

```
int no = 8;

if(no == 3)
        cout << "The number is three";
else if(no == 8)
        cout << "The number is eight";

if(no >= 1 && no <= 5)
        cout << " and it's between 1 and 5";
else if(no >= 6 && no <= 10)
        cout << " and it's between 6 and 10";
```

**ANSWER: The number is eight and it's between 6 and 10 (1 mark)**

e)

```
int a = 2, b = 6, c = 3, d = 8;
int x = d;
if(b < a)
{
        if(c < d)
                x = a;
}
else if(a < d)
{
        if(d < b)
                x = c;
}
else if(b < d)
        x = b;

cout << x;
```

**ANSWER: 8 (1 mark)**

**PART C (15 MARKS)**

**QUESTION 1**

CS110 Hospital needs a program to compute and print a bill statement for each patient. The charges for each day are as follows:

| Ward Code | Ward Name | Room ID | Room Types | Days Spent | Charges Per Day (RM) |
|---|---|---|---|---|---|
| K | Kiambang | KA | Single Room | First 2 days | 250 |
| | | | | Next 3 days | 200 |
| | | | | Over 5 days | 170 |
| | | KB | Deluxe Room | | 300 |
| C | Cempaka | CA | Single Room | | 150 |
| | | CB | Standard Room | | 50 |

Write a complete C++ program that can perform the following tasks:

- Read the **patient name**, **ward code**, **room id,** and the **no of days** the patient spent in the hospital.

- Accept the **telephone** option (Y or N). The telephone charge is RM3.00 per day.

- Generate a bill for each patient using the following format – for example, if the input are AARON AZIZUL, K, KA, 5, and Y, then the output screen is as shown below:

```
                 CS110 HOSPITAL
         BILL STATEMENT FOR AARON AZIZUL

     Ward Name        : K - Kiambang
     Room Type        : KA - Single Room
     No of Days in Hospital : 5 days

     Room Charge       : RM 1100.00
     Telephone Charge  : RM 15.00
     Payment Due       : RM 1115.00
```

**ANSWER**

```cpp
#include <iostream.h>
#include <conio.h>
#include <ctype.h>
#include <iomanip.h>        // not required

void main ()
{
    char name[50], wardCode, wardName[20];
    char roomID[5], roomType[50], telephone;
    double charge, telCharge, totalAmount;
    int days;
    bool valid = true;      // not required

    cout << "\n\n\t\t\tCS110 HOSPITAL";
    cout <<"\n\n\tEnter your name: ";
    cin  >> ws;
    cin.getline(name,50);
    cout << "\n\tEnter the ward code (K->Kiambang/C->Cempaka): ";
    cin  >> wardCode;
    cout <<"\n\tEnter the room ID(Kiambang->KA/KB,Cempaka->CA/CB): ";
    cin  >> ws;
    cin.getline(roomID, 5);
    cout << "\n\tEnter number of days in hospital: ";
    cin  >> days;
    cout << "\n\tEnter telephone option (Y/N): ";
    cin  >> telephone;

    if (toupper(wardCode) == 'K')
    {
        strcpy (wardName, "K - Kiambang");

        if(strcmp(roomID, "KA") == 0)
        {
            strcpy (roomType, "KA - Single Room");

            if (days <= 2)
              charge = 250.00 * days;
            else if (days <= 5)
              charge = 250.00 * 2 + (days - 2) * 200.00;
            else if (days > 5)
              charge = 250.00 * 2 + 200.00 * 3 + (days - 5) * 170.00;

        }
        else if(strcmp(roomID, "KB") == 0)
        {
            strcpy (roomType, "KB - Deluxe Room");
            charge = 300.00 * days;
        }
        else
        {
            valid = false;                    // not required
            cout << "\n\n\t\a\aINVALID ROOM ID ENTERED...";
        }
    }
```

```cpp
    else if (toupper(wardCode) == 'C')
    {
        strcpy (wardName, "C - Cempaka");

        if(strcmp(roomID, "CA") == 0)
        {
            strcpy (roomType, "CA - Single Room");
            charge = 150.00 * days;
        }
        else if(strcmp(roomID, "CB") == 0)
        {
            strcpy (roomType, "CB - Standard Room");
            charge = 50.00 * days;
        }
        else
        {
            valid = false;           // not required
            cout << "\n\n\t\a\aINVALID ROOM ID ENTERED...";
        }
    }
    else
    {
        valid = false;              // not required
        cout << "\n\n\t\a\aINVALID WARD CODE ENTERED...";
    }

    if (toupper(telephone) == 'Y')
        telCharge = 3.00 * days;
    else if (toupper(telephone) == 'N')
        telCharge = 0.00;
    else
    {
        valid = false;              // not required
        cout << "\n\n\t\a\aINVALID TELEPHONE CODE ENTERED...";
    }

    totalAmount = charge + telCharge;

    if(valid)
    {
        clrscr();                           // not required
        cout << setiosflags(ios::fixed) << setprecision(2);
        cout << "\n\n\t\t\tCS110 HOSPITAL";
        cout << "\n\t\tBILL STATEMENT FOR "  << name;
        cout << "\n\n\n\t\tWard Name        : "    << wardName;
        cout << "\n\t\tRoom Type          : "    << roomType;
        cout << "\n\t\tNo of Days in Hospital: "  << days << " days";
        cout << "\n\n\n\t\tRoom Charge       : RM " << charge;
        cout << "\n\t\tTelephone Charge   : RM " << telCharge;
        cout << "\n\t\tPayment Due          : RM " << totalAmount;
    } // not required
}
```

**END OF QUESTION PAPER**