FINAL
ALTERNATIVE ASSESSMENT

(COVER PAGE)

Session	:	**April 2022**
Programme	:	Diploma in Computer Science (DCS) Diploma in Electrical and Electronic Engineering (DEEI)
Course	:	**DCS1101 : Programming Fundamentals**
Date of Examination	:	August 4,2022 (Thursday)
Time	:	12.00pm – 2.30pm Reading Time : Nil
Duration	:	2 Hours 30 Minutes

Special Instructions :

This section consists of **FOUR (4)** questions. Answer **ALL** the questions. **Write ALL your answers** in the foolscap papers.

Material permitted :
Non-Programmable Scientific Calculator

Materials provided :
Nil

Examiner(s)	:	**Ms Yogeswari Suppiah** and Ms Vimala Doraisamy
Chief Moderator	:	Ms Nadhrah Abdul Hadi

*This paper consists of **6** printed pages, including the cover page*

DIPLOMA IN COMPUTER SCIENCE PROGRAMME (DCS)
DIPLOMA IN ELECTRICAL AND ELECTRONIC ENGINEERING PROGRAMME (DEEI)
DCS1101: PROGRAMMING FUNDAMENTAL
FINAL ALTERNATIVE ASSESSMENT : APRIL 2022 SESSION

Instruction: This section consists of **FOUR (4)** questions. Answer **ALL** questions.

Question 1

(a) Given the following declarations:

```
int x = 2, y = 3, z = 5;

float a = 17.5;
```

Evaluate the following expressions.

i. `a + sqrt( pow(x, y % z) * x )`
ii. `x * y / z % y`
iii. `a + 1 / x`

(6 marks)

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

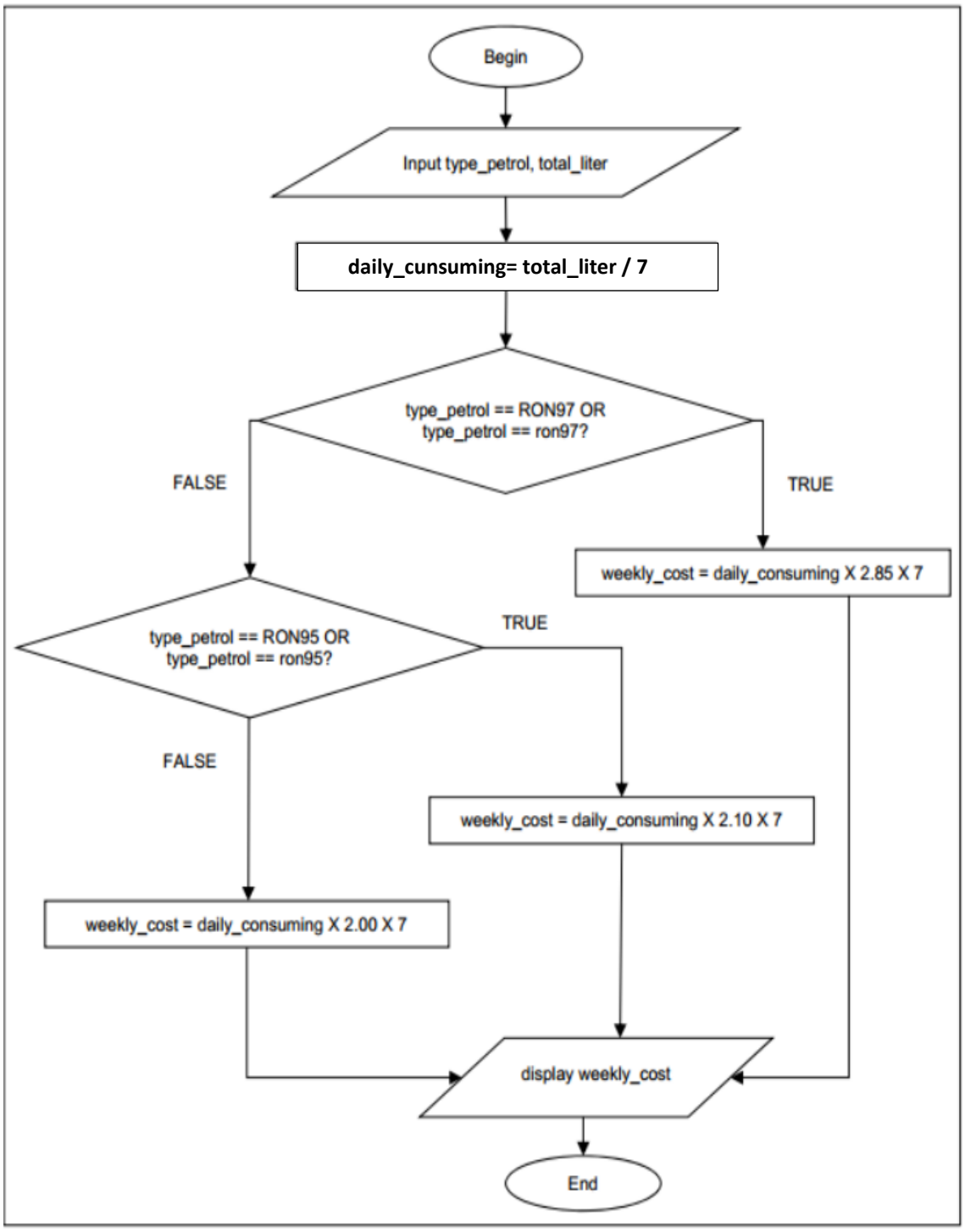
i. $P = \frac{2(x^7y + 12)}{(x-2)(z-2)} - \frac{1}{x+4}$

ii. $S = \sqrt{R + \sqrt{Q^3 + R^2}}$

(8 marks)

(a) Write a complete C++ program based on the following flowchart

(11 marks)



Question 2

(a) Given the following C++ program:

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

int main()
{
     int x=5, y=100;
     do {
          x = x + 10;
     }while (x<y);

     cout<<x <<"  "<<y<<endl;
     return 0;
}
```

i. How many times does the do loop execute?

(2 marks)

ii. Rewrite the above program using while loop.

(4 marks)

iii. Show the difference between while loop and do while loop using flowchart.

(5 marks)

(b) Write a complete C++ program to calculate the income tax based on the following information for employees. Ask the user to input their marital status and annual income.

Marital Status	**Annual Income (RM)**	**Tax**
Single	On the first 30000	5%
	On the next 20000	7.50%
	Amount over 50000	10%
Married	On the first 50000	5%
	On the next 30000	7.50%
	Amount over 80000	10%

The output should display the annual income, marital status, the tax amount and the net income for the user.

(8 marks)

(c) Given the following functions:

```
int mystery1(int x)
   {
      int i, j;
      i = 2 * x;
      if (i < 5)
         j = x * 2;
      else
         j = x - 5;
      return (j + 2);

   }
```

```
int mystery2(int a, int b)
   {
      int i, j;
      j = 0;
      for (i = a; i < b+a; i++)
         j = j + 1;
      return (j);

   }
```

What is the output of each of the following program statements? Assume that x, y and k are int variable.

i. x = 10;
cout << mystery1(x+2) << endl;

ii. x = 5; y = 8;
cout << mystery2(x,y) << endl;

iii. x = 10; k = mytery2(x,2);
cout << x<< " " << k << mystery2 (x,k) << endl;

(6 marks)

Question 3

You are working as an application engineer at a car dealer company, Autoworld.com. You are required to develop an application for car loan payment calculator to assist car salesman to calculate loan payment for customers. Your program should accept the following parameters as input:

- Car purchase price (in RM)
- Down payment (in RM)
- Interest rate (e.g. 2.60 %)
- Repayment period in years (e.g. 3 years, 5 years, 9 years)

For example if the car purchase price is **RM150,000.00**, down payment is **RM20,000.00**, interest rate is **2.6%** and repayment period is **5** years, then the monthly instalment that a customer has to pay is RM2,448.33. The loan repayment calculation is based on the following formula:
Total loan = RM150,000.00 – RM20,000.00 = RM130,000.00
Total Interest charged = total loan x interest rate x repayment period = RM130, 000.00 x 0.026 x 5 = RM16,900.00
Monthly instalment = (total loan + total interest charge) / (repayment period in years x 12 months) = RM146,900.00/60 = RM2,448.33

(a) Write the C++ statements in main() for the following :

i. Declare appropriate variables
ii. C++ statements to accept inputs from a user
iii. Function call that calculates the loan payment
iv. Function call that displays the car purchase price, down payment, interest rate, repayment period in years, total interest charge and monthly instalment.

(13 marks)

(b) Write a complete function to compute the instalment amount. This function should return a value to the calling function.

(6 marks)

(c) Write a complete function to display the car purchase price, down payment, interest rate, repayment period in years, total interest charged and monthly instalment.

(6 marks)

Question 4

(a) The following questions are based on struct.

(i) Write a structure declaration to hold data about a savings account:
Account Number (string)
Account Balance (double)
Interest Rate (double)
Average Monthly Balance (double)

(5 marks)

(ii) Write a definition statement for a variable of the structure you declared in question (i). Initialize the members with the following data:
Account Number: ACZ42137-B12-7
Account Balance: $4512.59
Interest Rate: 4%
Average Monthly Balance: $4217.07

(5 marks)

(b) Write a complete C++ program that counts the number of times the vowels appears in the text file `story.txt`, and prints that number to `cout`. You should write all the necessary code in main; Make sure to include the necessary .h files, and check that `story.txt` has been opened successfully.

(15 marks)

-THE END-