

**UNIVERSITY COLLEGE TATI (UC TATI)**

FINAL EXAMINATION QUESTION BOOKLET	
COURSE CODE	: DCT 1123
COURSE	: PROBLEM SOLVING AND ALGORITHM
SEMESTER/SESSION	: 2-2023/2024
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 4 PRINTED PAGES INCLUDING COVER PAGE

PROBLEM SOLVING AND ALGORITHMS (DCT1123)

QUESTION 1

- a) A small company earns RM10000 in revenue each quarter of the year. Your task is to calculate the total annual revenue, which should also include an additional 2.5% profit added yearly to the total revenue.

Refer to the example:

Revenue (quarter) RM:	10000
Revenue (year) RM:	40000
Profit (2.5%) RM:	1000
Total Revenue RM:	41000

- (i) Carry out the required input, process and output.
- (ii) If tax applied 6% from the total revenue, write the formula of finding new total revenue for the company.

(10 marks)

(3 marks)

QUESTION 2

- a) Answer the following questions based on the scenario:

At the community college, all students who enroll in a course owe a tuition of RM72, even if they do not show up or later drop the course.

Example input and output.

Enter number of preregistered students: 30
Enter number of students adding the course: 3
How many students dropped? 5
Total number of students: 28
Total tuition fee owed: RM2376

- (i) Retrieve input, process and output based on the example given.

(8 marks)

- (ii) Interpret the pseudocode.

(6 marks)

- (iii) Draw the flowchart.

(6 marks)

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QUESTION 3

- a) Read the pseudocode below and answer the following questions.

```

Start
Prompt user to input number
User input number
Input assigned to num
Process = num divided by 2
If remainder compared to 0, print the message the number is
even
Else, the false output will be directed to end terminal
End
  
```

- (i) In your opinion, what program did? (2 marks)
- (ii) Create IPO Chart. (6 marks)
- (iii) Draw the flowchart. (6 marks)
- b) Create nested if statement based on the following requirement. (6 marks)
 "If the user's input indicates that they are no more than 12 years old or at least 65 years old, the program outputs that their admission is free. Otherwise, the program outputs that they have to pay."

```

If (age < 12)
  If (age >= 65)
    Print out "Admission is free"
  Else print you have to pay.
Else
  Print out "Admission is free"
  
```

QUESTION 4

- a) Here is the sample output of loop program.

```

Enter a positive number: 0
Number must be positive; please retry: -1
Number must be positive; please retry: 4
Yes, it is positive number!
  
```

- (i) Draw the flowchart. (7 marks)
- (ii) Interpret the pseudocode using while loop. (13 marks)

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QUESTION 5

- a) Figure 1 illustrated one program using selection and combination structures. Answer the following questions based on the Figure 1.

```

1 #include <iostream>
2 using namespace std;
3 int main() {
4     int count = 0;
5     double sum = 0.0;
6     double number;
7
8     // Loop to take user input until a negative number is entered
9     while (true) {
10        // Prompt the user for input
11        cout << "Enter a positive number (or a negative number to exit): ";
12        cin >> number;
13
14        // Check if the entered number is negative
15        if (number < 0) {
16            break; // Exit the loop if the number is negative
17        }
18
19        // Increment the count and add the number to the sum
20        count++;
21        sum += number;
22    }
23
24    // Check if any positive numbers were entered
25    if (count > 0) {
26        // Calculate and display the average
27        double average = sum / count;
28        cout << "Average of positive numbers: " << average << endl;
29    } else {
30        cout << "No positive numbers entered." << endl;
31    }
32
33    return 0;
34 }

```

Figure 1: C++ Program

- (i) What did the program do? (4 marks)
- (ii) Discuss the lines for selection and repetition structures being implemented. (4 marks)
- (iii) Identify **TWO (2)** possible inputs. (2 marks)
- (iv) Draw the flowchart. (17 marks)

-----End of Question-----