

**FINAL**  
Examination Paper  
(COVER PAGE)

Session : April 2016

Programme : Diploma in Information and Communication Technology (DICTN)  
Diploma in Electrical and Electronic Engineering (DEEI)

Course : ICT1101: Program Logic Formulation

Date of Examination : 26<sup>th</sup> July 2016, Tuesday

Time : 8.00am – 10.00am

Duration : 2 Hours Reading Time : Nil

Special Instructions :

**SECTION A: Answer ALL Questions.**

**SECTION B: Answer any THREE (3) out of FOUR (4) questions.**

**IMPORTANT NOTE : THIS PAPER SHOULD NOT BE TAKEN OUT OF THE EXAMINATION HALL**

Materials Permitted : Nil

Materials Provided : OMR Sheets & Answer Booklet

Examiner(s) : Ms. Koo Lee Chun

Moderator : Ms. Pawani T Rasaratnam

DIPLOMA IN INFORMATION AND COMMUNICATION TECHNOLOGY (DICTN)  
DIPLOMA IN MECHANICAL ENGINEERING (DMEN)  
ICT1101: PROGRAM LOGIC FORMULATION  
FINAL EXAMINATION: APRIL 2016 SESSION

**SECTION A: 40 marks**

**Instruction:** This section consists of **TWENTY (20)** questions. Answer **ALL** questions in the OMR sheet provided. All questions carry equal marks.

1. Which of the following is algorithmic solution?
  - A. Guiding a blind man to cross a busy road.
  - B. Guiding an investor to buy the best stock.
  - C. Finding the best Asam Laksa in Penang
  - D. None of the above
  
2. Which of the following statements are **TRUE** :
  - I. A compiler scans the entire program and translates it as a whole into machine code.
  - II. Machine language required a translator to ensure computer can understand the language.
  - III. A program consists of a set of instructions that tell computer what to do.
  - IV. Assembly language is the native language of a computer.
  - A. I and III only
  - B. II and IV only
  - C. I, II and III only
  - D. I, II, III and IV
  
3. Which of the following data items shall be assigned to *string* data type ?
  - I. A car plate number
  - II. Product number
  - III. Contact Number
  - IV. Number of students in a class
  - A. I and III only
  - B. II and IV only
  - C. I, II and III only
  - D. I, II, III and IV
  
4. \_\_\_\_\_ is a module that execute instructions at the end of the program such as closing of file and database.
  - A. Init module
  - B. Control module
  - C. Process Data module
  - D. Wrap-up module

5. Which of the following variable names are *invalid*?

- I. JamesBond007
- II. 2nd\_Floor
- III. XYZ
- IV. Final-Mark

- A. I and III only
- B. II and IV only
- C. I, II and III only
- D. I, II, III and IV

6. What is the output of the following algorithm when value of Number is 10

```

CASE OF (Number \ 3)
    = 0 : DISPLAY "zero"
    = 1 : DISPLAY "one"
    = 2 : DISPLAY "two"
    = 3 : DISPLAY "three"
END-OF-CASE

```

- A. zero
- B. one
- C. two
- D. three

7. Which of the following statements are VALID about decision logic structure?

- I. Nested IF statements are allowed.
- II. Multiple statements in an IF block are allowed.
- III. Multiple statements in an ELSE block are allowed.
- IV. Every decision logic structure can be replaced by a case logic structure.

- A. I and III only
- B. II and IV only
- C. I, II and III only
- D. I, II, III and IV

8. Assume A, B, C and D are variables with appropriate data types. Which of the following equation is INVALID:

- A.  $A = B + C$
- B.  $B = C \setminus D$
- C.  $C = 2A + 3C$
- D.  $D = (A+B) \wedge C$

9. The iteration of the \_\_\_\_\_ loop in a repetition logic is at least one.

- A. while
- B. repeat/until
- C. automatic-counter
- D. all

10. Assume A and B variables contain the value of 100 and 70 respectively. What is the value of X after the following instructions are processed?

```
X= 0;
IF A < 30 THEN
    IF B >= 70 THEN
        X = X + B;
    END-IF
ELSE
    X = X + A
END-IF
X = X + A;
```

- A. 70
- B. 100
- C. 170
- D. 200

11. Assume A = 5, B = 10, C=15. What is the result of following expression?

$A - C / 2 * B + A \text{ MOD } B$

- A. -45
- B. -65
- C. -5
- D. 5

12. Which of the following symbol represents the off-page connector in flow chart?



13. Suppose that below logic structure shall output: 2, 4, 16, 256

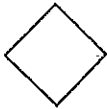
```
BEGIN
X = 2
WHILE ( _____ )
    PRINT X;
    X = X ^ 2;
WHILE-END
END
```

Which of the following expression shall be filling into the blank above?

- A.  $X \leq 256$   
 B.  $X < 256$   
 C.  $X \geq 256$   
 D.  $X > 256$
14. Assume expenses = 240, cost = 3240 and profit = 3000, which of following expression will result in TRUE value?  
 A. expenses  $\geq$  cost AND profit  $<$  3000  
 B. expenses + 260  $>$  500 OR cost  $<$  2000  
 C. cost - expenses  $<$  profit  
 D. NOT (expenses  $\geq$  cost)
15. Assume *counter* is an integer variable, how many times the *Print counter* instruction is processed?

```
LOOP : counter = 0 to 5 STEP 1
    Print counter
LOOP-END : counter
```

- A. 3  
 B. 4  
 C. 5  
 D. 6

16. The decision symbol, , in flow chart always has \_\_\_ enter path and \_\_\_\_\_ options of exit path.

- A. one, two  
 B. two, one  
 C. one, three  
 D. three, one

17. Which of the following statements is **VALID** ?

- A. A program must have at least two variables.
- B. The value of a variable always contains an integer value.
- C. The value of a constant cannot be changed once it has been set.
- D. Data type defines the name of a memory location.

18. Given the following instructions:

```
IF X + 1 < 3 THEN
  Y = 10
ELSE
  IF X < 7 THEN
    Y = 15
  ELSE
    Y = 20
  END-IF
END-IF
```

Which of the following statements is **INVALID** ?

- A. If  $X = 3$ , then 10 will be assigned to Y at the end of the algorithm.
- B. If  $X = 5$ , then the instruction  $Y = 15$  will be executed.
- C. Value of X remains the same throughout the whole algorithm.
- D. The algorithm demonstrated an example of positive decision logic.

19. Given the following instructions:

```
BEGIN
  READ R
  WHILE R > 10
    R = R - 2
  PRINT R
  WHILE-END
END
```

What is the output of the above algorithm if R value is entered as 15?

- A. 15 13 11 9
- B. 13 11 9
- C. 13 11
- D. 9

20. If you have a problem with multiple conditions and multiple consequent actions, \_\_\_\_\_ is an excellent tool to discover all actions that correspond to particular conditions.

- A. Coupling Diagram
- B. Data Dictionary
- C. Decision Table
- D. Structure Chart

**SECTION B: 60 marks**

**Instruction:** This section consists of **FOUR (4)** questions. Answer any **THREE (3)** questions in the answer booklet provided. All questions carry equal marks.

**Question 1**

- (a) Name **THREE (3)** categories of programming languages and briefly explain why a translation process is needed before a program can be executed. (4 marks)

- (b) Convert the following mathematics expression into computer expression:

(i)  $a = mx + r^{2-n-i}$

(ii)  $a = 1 + nx + \frac{x^2}{2}$

(iii)  $a = x^2 - \frac{(nx)^2}{2mn} + m^{-i}$

(iv)  $a = \frac{n + \sqrt[3]{mx} - 4}{3n + 1}$

(8 marks)

- (c) A mama restaurant requires 90 gram of flour to make one roti canai dough. Design a solution that will request user to enter the number of roti canai sold. It will then determine and display how many bags of 25kg flour needed to buy. Present your solution in *Program Analysis Chart (PAC)* (8 marks)

**Question 2**

- (a) Outline **THREE (3)** differences between a compiler and an interpreter. (6 marks)

- (b) Convert the following algorithm into a flow chart.

```

BEGIN
SUM = 0
ENTER X, Y
IF X >= 10 THEN
    WHILE (Y < 10)
        SUM = SUM + Y ^ 2
    WHILE-END
    DISPLAY SUM
ELSE
    DISPLAY " X is less than 10"
END-IF
END

```

(10 marks)

- (c) Identify the type(s) of logic structure applied in the algorithm in Question 2 (b) (4 marks)

## Question 3

- (a) State the differences between name of a variable and value of a variable. Give an example for each. (4 marks)

- (b) Draw a *coupling diagram* for the following program :

Write the *readLogin* module to read the login ID and password for a user

Write the *verify* module to verify if the login ID and password are valid, and retrieve the user name from the database.

Write the *displayResult* module to display the main page and greet the user with the user name if the valid login ID and password are entered, otherwise display an error message.

(6 marks)

- (c) By referring to the table below, design a solution to determine and display the charge if user input the number of Sushi taken by a customer. In case where the number of plate is not acceptable, the program should display suitable error message. Present your solution in an IPO.

Sushi Rate	
First 15 <sup>th</sup> pieces	RM2.00 per pieces
Next additional 10 pieces	RM1.70 per pieces
26 <sup>th</sup> pieces and above	RM1.20 per pieces

(10 marks)

## Question 4

- (a) Write logical expression to represent the following condition:
- Y is strictly between 2 and 5 (inclusive 2 and 5)
  - Both A and B are even number

(4 marks)

- (b) Rewrite the following algorithm in *Case Logic Structure* :

```

BEGIN
  Read device
  IF device = 'S' THEN
    DISPLAY "Samsung"

  IF device = 'I' THEN
    DISPLAY "iPhone"

  IF device = 'H' THEN
    DISPLAY "HTC"

  IF device = 'N' THEN
    DISPLAY "Nexus"

  IF device <> 'S' AND device <> 'I' AND device <> 'H' AND device <> 'N'
    DISPLAY "Invalid device"
END

```

(6 marks)

- (c) Write an algorithm that request user to input the price of each item until the value zero (0) entered, then calculate and display total price and average price per item. Use Repeat-UNTIL in your solution.

For example,

Enter price (or 0 to exit) : 2.50  
 Enter price (or 0 to exit) : 4.0  
 Enter price (or 0 to exit) : 17.50  
 Enter price (or 0 to exit) : 0  
 Total price : 24.00  
 Average price per item : 8.00

(10 marks)

