FINAL
Examination Paper

(COVER PAGE)

Session : January 2015

Programme : Diploma In Information And Communication Technology (DICTN)
Diploma In Mechanical Engineering (DMEN)

Course : ICT1101 : Program Logic Formulation

Date of Examination : March 9, 2015

Time : 2:00pm – 4:00pm
Reading Time: Nil

Duration : 2 Hours

Special Instructions : 

Section A : Answer ALL Multiple Choice questions.

Section B : Answer any THREE (3) questions.

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

Materials permitted : Nil

Materials provided : OMR sheets

Examiner (s) : Ms. Shee Fui Chie

Moderator : Ms. Pawani T. Rasaratnam

This paper consists of 11 printed pages, including the cover page.
SECTION A: (40 marks)
Instructions: This section consists of TWENTY (20) questions. Answer ALL questions in the OMR sheet provided.

1. With a _______ error, the program can be execute (supposing there are no other errors), but produces the wrong answer when executed.
   A. syntax
   B. logical
   C. run-time
   D. flaw
   E. failure

2. A compiler scans the entire program and translates it as a whole into ________ code.
   A. machine
   B. source
   C. native
   D. pseudo
   E. all of the above

3. The case symbol has ________.
   A. One entrance and one exit path
   B. One entrance and two exit path
   C. Two entrances and one exit path
   D. Two entrances and two exit path
   E. No entrance and no exit path

4. ________ shows how data can be passed to modules in a program.
   A. Problem Analysis Chart
   B. Structure Chart
   C. Input-Process-Output Chart
   D. Flowchart
   E. Coupling Diagram
5. ____________ loops are useful when you know that you want your loop to execute at least one time.

A. WHILE/WHILE-END
B. REPEAT/UNTIL
C. Automatic-counter
D. All of the above
E. None of the above

6. 
1. BEGIN
2. R = 10
3. WHILE R < 20
   R = R + 1
   PRINT R
   WHILE-END
4. END

Consider the above algorithm. How many iterations are there for the loop after the algorithm is executed?

A. 9
B. 10
C. 11
D. 19
E. 20

7. ____________ contains a collection of descriptions of the variable.

A. Problem Analysis Chart
B. Input-Process-Output Chart
C. Decision Table
D. Coupling Diagram
E. Data Dictionary

8. The functions used to transform string to number are ____________.

A. conversion functions
B. string functions
C. utility functions
D. mathematical functions
E. statistical functions
9. Assume the temperature and pulse variables contain the number 102 and 75 respectively. What message will display after the following instructions are processed?

   IF temperature <= 95
     T ——THEN
     if pulse > 0
       THEN
       DISPLAY "Draw a hot bath for yourself."
     ELSE
     DISPLAY "Better call the ambulance."
   ELSE
   IF temperature > 101
     Then
   T
   DISPLAY "You have a fever!"
   ELSE
   F
   DISPLAY "Your temperature is normal."

A. Draw a hot bath for yourself.
B. Better call the ambulance.
C. You have a fever!
D. Your temperature is normal.
E. None of the above.

10. ____________ allows choosing between two or more execution paths in a program.

A. Straight-through logic
B. Positive logic
C. Negative logic
D. Case logic
E. All of the above

11. Three types of logic structures are sequential, decision and _______.

A. repeat
B. loop
C. redo
D. duplication
E. echo
12. Which of the following variable name(s) is (are) INVALID?

I. Test_mark  
II. 2ndRunnerUp  
III. BillGate  
IV. hotel's  

A. II only  
B. IV only  
C. II and IV only  
D. I and III only  
E. II and III only

13. The constant value in a case logic structure must evaluate to a value that can be promoted to a(an) __________ value.

I. integer  
II. real  
III. character  
IV. Boolean  

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

14. What is the output of the following code fragment when opn is 'B'?

1. Case of opn  
   = 'a': DISPLAY "Platform independent"  
   = 'b': DISPLAY "Program logic formulation"  
   = 'c': DISPLAY "Object oriented"  
   = Otherwise: DISPLAY "Wrong input"  
End-of-case  

A. Platform independent  
B. Program logic formulation  
C. Object oriented  
D. Wrong input  
E. None of the above
15. Which of the following data items shall be assigned to character data type?

I. Car plate number.
II. Height of a student
III. Postal code
IV. Price of a house

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

16. The ______ loop executes until its loop-termination condition becomes True.

A. WHILE/WHILE-END
B. REPEAT/UNTIL
C. Automatic-counter
D. A and B
E. A and C

17. The ______ expression logically joins two expressions; if both expressions evaluate to false, then it returns false; otherwise it returns true.

A. OR
B. AND
C. NOT
D. A and C
E. B and C

18. Kim has just constructed her first loop for a program. Which of the following is not required for a loop control variable?

A. Initialization
B. Test
C. Update
D. Scanning
E. None of the above
19. Many times, a compound expression can be replaced with a ____________ statement.
   A. single IF  
   B. single IF-ELSE  
   C. multiple IF-ELSE  
   D. nested IF  
   E. All of the above

20. Which of the following statements are correct about decision logic structure?

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

   A. 1 and 2
   B. 2 and 3
   C. 1, 2 and 4
   D. 2, 3, 4
   E. All of the above
SECTION B: (60 marks)

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

Question 1

(a) Show the values of variable Q after the execution of the following statements where A = 2, B = 3, and C = -5:

(i) \( Q = \text{ABS}(6 - B^3 - C) \)

(ii) \( Q = (5 + B) \text{MOD}(A + 1) - (3 + C) \)

(iii) \( Q = 10 \text{ MAX}(A,B,C) \)  

(b) Provide a truth table for \((B \text{ OR} C) \text{ AND NOT} A\).  

(c) List and describe THREE (3) basic types of data.

Question 2

(a) Assume a program will request user to enter the information of a student’s name, age, birth date, final examination mark, and paid tuition fee (TRUE or FALSE). Display the message “Tuition fee is pending!” if paid tuition fee is FALSE, otherwise display “Tuition fee paid.”. Design a problem analysis chart (PAC) for this program.

(b) Identify the appropriate logic structure(s) that can apply to solve the following problem:

\( \text{Write an algorithm to change the value of} \ X \ \text{to 0 when} \ X \ \text{becomes greater than 100, and to change the value of} \ Y \ \text{to 0 when} \ Y \ \text{becomes greater than 250.} \)
(c) Rewrite the following algorithm in case logic structure:

1. IF Grade = 'A' THEN
   T DISPLAY "Excellent"

2. IF Grade = 'B' OR Grade = 'C' THEN
   T DISPLAY "Well Done"

3. IF Grade = 'D' OR Grade = 'E' THEN
   T DISPLAY "Do better next time"

4. IF Grade = 'F' THEN
   T DISPLAY "Try again"

5. IF Grade < 'A' OR Grade > 'F' THEN
   T DISPLAY "Invalid Grade"

(8 marks)

Question 3

(a) Convert the following flowchart into algorithm:

```
BEGIN
  sum = 0
  count = 0
  READ number
  F
  WHILE number MOD 9 <> 0 AND number > 100
    average = sum / count
    DISPLAY average
  sum = sum + number
  count = count + 1
  T
  READ number
END
```

(6 marks)
(b) What are the **THREE (3)** differences between compiler and interpreter? Give **ONE (1)** example of programming languages that is compiler and **ONE (1)** example for interpreter.  

(8 marks)

(c) Identify the logic structure(s) of the following flowchart:

(6 marks)

**Question 4**

(a) Write an algorithm to produce the following output in a nested loop:

1 2 3  
4 5 6
7 8 9  

(6 marks)

(b) Give **TWO (2)** examples of the following functions:

(i) String functions
(ii) Conversions functions
(iii) Statistical functions

(6 marks)
(c) Write an algorithm for a loop logic structure that requests user to input the number of holidays and to calculate the total number of holidays from January to December. Display error message if the number of holidays is not positive.

Sample input and output:
Enter month 1: 5
Enter month 2: 1
Enter month 3: 0
Enter month 4: 2

...

Enter month 12: 4
Total holiday from January to December = 24 days

(8 marks)