FINAL
Examination Paper
(COVER PAGE)

Session : April 2013

Programme : Diploma In Information And Communication Technology (DICTN)

Course : ICT1101 : Program Logic Formulation

Date of Examination : July 30, 2013

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

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Moderator : Ms. Kavitha Sivashanmugam

This paper consists of 9 printed pages, including the cover page.
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 variable names is invalid?
   
   (A) Gr02x
   (B) E high
   (C) 4Star
   (D) BigBook
   (E) L

2. Among the problem solving steps, in which step is the solution designed?

   (A) Step 2 – Understand the problem
   (B) Step 1 – Identify the problem
   (C) Step 3 – List all possible solutions
   (D) Step 4 – Select the best solution
   (E) Step 5 – List the step-by-step instruction

3. Programmers use a ________ to show program modules graphically.

   (A) Structure chart
   (B) Problem analysis chart
   (C) Control structure
   (D) Flowchart
   (E) Algorithm

4. A ________ tells the program which action to take, based on a certain condition.

   (A) Sequence logic structure
   (B) Loop logic structure
   (C) Decision logic structure
   (D) All of the above
   (E) None of the above

5. A program to calculate the total of n input numbers can be best solved using ________.

   (A) Sequence logic structure
   (B) Decision logic structure
   (C) Loop logic structure
   (D) Case logic structure
   (E) All of the above
6. Select the TRUE statement about a constant.
   (A) Its value must always be set inside the program code.
   (B) Its value is changeable.
   (C) The data type of a constant is integer only.
   (D) It is a value stored in a computer memory location.
   (E) It doesn’t have a name to represent its value.

7. $54 \underline{\quad} 7 = 7$. Which arithmetic operator can replace the blank to make the statement correct?
   (A) *
   (B) /
   (C) \
   (D) ^
   (E) MOD

8. What is NOT shown in the coupling diagram?
   (A) The step-by-step instruction on how each module is performed.
   (B) The parameters sent from one module to another
   (C) The parameters received by one module from another
   (D) The interaction between two modules
   (E) The parameter that couples modules, either value or address

9. To test a condition means to process a condition to get a ____________ resultant.
   (A) Positive or Negative
   (B) Big or Small
   (C) Greater or Smaller
   (D) High or Low
   (E) True or False

10. The following are the characteristics of local variables except:
    (A) They are declared in a module.
    (B) Their values can be used and changed by any module in the program.
    (C) The variables will be deleted from computer memory when its module ends.
    (D) Their variable name can be the same as other local variables in different modules.
    (E) None of the above.

11. With a logic error, the program can be ____________ (supposing there are no other errors), but produces the wrong answer when executed.
    (A) Executed
    (B) Ran
    (C) Compiled
    (D) Interpreted
    (E) All of the above
12. Parameter is a variable that ____________.
   (A) Has more than one value.
   (B) Is used only in the main function.
   (C) Is sent to a module by another module.
   (D) Cannot change its value.
   (E) Is shared by all modules.

13. The Case Logic Structure replaces a multiple nested IF/THEN/ELSE instruction that uses positive logic and the relative operator ____________.
   (A) Less Than
   (B) Not Equal
   (C) Greater Than
   (D) Equal
   (E) More Than And Equal To

14. Which is the correct expression for the following statement?

   "marks that is not in the range of 1-100"

   (A) mark < 1 AND mark > 100
   (B) mark > 1 AND mark < 100
   (C) mark < 1 OR mark > 100
   (D) mark > 1 OR mark < 100
   (E) mark <= 1 OR mark >= 100

15. What is the type of the control structure of following flowchart?

(A) REPEAT/UNTIL loop
(B) IF/THEN/ELSE
(C) WHILE/WHILE-END loop
(D) CASE logic structure
(E) Automatic-counter loop
16. Modules are coupled through the use of ____________.

   (A) Global variable
   (B) Parameters
   (C) Module name
   (D) A and B
   (E) A, B and C

17. Which of the following is the standard library for a C++ code?

   (A) cmath
   (B) iostream
   (C) string
   (D) stdlib
   (E) iomanip

18. A loop within a loop, an inner loop within the body of an outer one is called ____________.

   (A) Pre-conditioned loop
   (B) Post-conditioned loop
   (C) Nested loop
   (D) Automatic-counter loop
   (E) None of the above

19. The following items are identified in data dictionary except:

   (A) The variable names
   (B) The related module names
   (C) The variable scope
   (D) The module reference numbers
   (E) The data type

20. The following keywords are used in looping except:

   (A) while
   (B) do
   (C) for
   (D) switch
   (E) None of the above
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) Variables can declare with different data types. List and describe TWO (2) predefined data types. (6 marks)

(b) Determine the output of the following code segment.

```cpp
int x = 2, y = 3;
x = y + 2;
cout << x;
cout << y;
y = y + 1;
cout << (x - y);
x = x + 1;
y = 2 * x;
cout << y;  
```

(4 marks)

(c) Write the logic notation for the mathematical expression below:

(i) \[ Q = \frac{M^{20(2m)} + 20}{AB} \]

(ii) \[ Q = \frac{M}{2} + (BC)^2 \text{MOD} \ 2 \]

(iii) \[ Q = \frac{(AB)^2 + (BC)^2}{200} \]

(iv) \[ Q = A^2 + B^4(200M) \]

(v) \[ Q = \frac{-b + \sqrt{b^2 - 4ac}}{2a} \] (10 marks)
Question 2

(a) Build the truth table of all possibilities for the following logical expression:
\[ X = A \text{ OR NOT (C AND B) AND NOT C} \]

(7 marks)

(b) Determine the output of the following flowchart.

(c) Write an algorithm to find how many soft water balls can fit into a rectangular box of any size. On average the diameter of the ball is 10cm.
[volume of ball = \( A = \frac{4}{3}\pi r^3 \)]

(10 marks)

Question 3

(a) Rewrite the following algorithm to use a Case Logic Structure:

```
IF choice = 1 THEN
    DISPLAY “The choice was 1”
ELSE
    IF choice = 2 THEN
        DISPLAY “The choice was 2”
    ELSE
        IF choice = 3 THEN
            DISPLAY “The choice was 3”
        ELSE
            DISPLAY “The choice was not 1, 2, or 3”
        ENDIF
    ENDIF
ENDIF
ENDIF
```

(10 marks)
(b) In a solution, user is required to provide 100 upper case letters. Draw the flowchart to determine and display the number of vowels entered by the user. You must use automatic-counter loop in your answer. (10 marks)

Question 4

(a) Draw a coupling diagram for the following problem:

<table>
<thead>
<tr>
<th>Write the Read module to read a set of three numbers.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write the Calculation module to choose the largest number from the numbers entered.</td>
</tr>
<tr>
<td>Write the Print module to display the largest number.</td>
</tr>
</tbody>
</table>

(10 marks)

(b) Design a solution that will request user to enter a number between 1 and 5. Prompt welcome message if the number is between 1 and 5, otherwise display error message. End the input if user enters 9999. Present your solution in input-process-output chart. (10 marks)

--THE END--