

TED (10)-1018

(REVISION-2010)

Reg. No. ....

Signature .....

SECOND/THIRD SEMESTER DIPLOMA EXAMINATION IN ENGINEERING/  
TECHNOLOGY—MARCH, 2012

PROGRAMMING METHODOLOGY

(For Third Semester CB and for Second Semester all branches except CP and CB)

[Time : 3 hours

(Maximum marks : 100)

PART—A

Marks

I Answer *all* questions. Each question carries 2 marks.

1. The variable sum has the value 5 before the execution of the following statement :

sum = sum + 5

Write the value of sum after the execution of this statement.

2. List the flow chart symbols for :

(a) Input (b) Decision

3. Write the outcome of the following relational expressions if  $N = 1$  :

(a)  $((2*N) + 1 == 3) \text{ AND } (N > 2)$

(b)  $\text{NOT } (2*N == 0)$ .

4. Write the statement to declare an  $M \times N$  matrix.

5. If  $N = 2$  and sum (N) is a function with  $\text{Sum}(1) = 5$ , then after executing the statement

Set  $S = \text{Sum}(N-1) + N$ , predict the value of S.

(5×2=10)

PART—B

II Answer *any five* of the following questions. Each question carries 6 marks.

1. The programming language X supports the following arithmetic operators : '+' for Addition, '-' for Subtraction, '×' for Multiplication, '/' for Division, '^' for Exponent and '%' for Modulus. Express the following equations in the above language syntax. Evaluate the expression if  $a = 2$  and  $b = 1$ . Also show the order in which arithmetic operations are performed.

(a) 
$$X = \frac{((2a - 1)^2 + b)^3}{(a - b^2)}$$

(b) 
$$Y = \frac{ab + 10b}{(a + b)^2}$$

2. Anil has designed an algorithm and program code for a particular problem ((in paper)). Now he wants to execute the program in his computer :
- Suggest the softwares/tools required in his computer to execute the code
  - Write the purpose of each tool/software
  - Write the steps to do this task.

3. Answer question given below if the following portion of the pseudocode is executed :

```

Input Number
If Number < 0 Then
    Write "1"
Else
    If Number == 0
        Write "2"
    Else
        Write "3"
    End If
End If
Write "Done"

```

Write the output when the input is :

- 1
  - 0
  - 1.
4. Write a pseudocode that contains the statement  
 For (Count = 1 ; Count <= 3 ; Count ++)  
 and that would produce the following output if it were coded and run :

```

10
20
30.

```

5. A person wants to enter 100 marks. Write an algorithm to enter these values and compute the sum of these marks. The process should terminate when the user entered all the marks or exit early if the user enters a zero or a negative number.
6. In a programming language strings are implemented as array of characters and end of the string is denoted by # automatically by the programming language. Write a pseudocode to find the length of the string.
7. Write functions to accomplish the following :
- Calculates the integer part of the quotient when integer a is divided by integer b.
  - Calculates the remainder when integer a is divided by integer b.



## PART—C

(Answer *one full* question from each unit. Each question carries 15 marks.)

## UNIT—I

III 1. See the following program segment and answer the following questions :

Set Number 1 = 4

Set Number 1 = Number 1 + 1

Set Number 2 = 3

Set Number 2 = Number 1 + Number 2

Write Number 2

- List the variables and write the possible data types for each variable in the program.
- What number is displayed by this program ?
- Replace each of the first and third statements of this program by a statement that inputs a number from the user.

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2. Joe wants to buy a car. He would like to be able to compute the monthly payment (M) on a loan given the loan amount (P), the annual percentage rate of interest (r) and the number of monthly payments (N). The program should allow Joe to input P, r and N and would then compute and display M using the formula :

$$M = P * R * (1 + R)^N / ((1 + R)^N - 1)$$

where  $R = r/1200$ , the monthly rate of interest expressed as decimal. Write a pseudocode for the solution of this.

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OR

- IV 1. The owner of a supermarket would like to have a program that computes the monthly gross pay of their employees. The input for this program is an employee ID number, hourly rate of pay and number of regular and overtime hours worked. Note : gross pay is the sum of the wages earned from regular hours and overtime hours ; overtime is paid at 1.5 times the regular rate. Write a pseudocode for solving it.

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2. Define Modular Programming. List the benefits of modular programming.

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## UNIT—II

- V 1. Write an algorithm that translates your numerical score (an integer value between 1 to 10) into a letter grade according to the following rules :

| Score   | Grade |
|---------|-------|
| 10      | S     |
| 9 or 8  | A     |
| 7 or 6  | B     |
| 5 or 4  | C     |
| Below 4 | F     |

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2. With the help of a flow chart and examples, explain :
- Post test loops
  - Pre test loops.

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OR

- VI 1. Write a pseudocode that inputs a number x and does all of the following :
- \* Displays the reciprocal of its square root, if x greater than 0
  - \* Displays "Error : Division by zero" if x is equal to 0
  - \* Displays "Error : Square root of negative number" if x less than 0.  
(Hint : the reciprocal of number is 1/number)
2. Write an algorithm to find the sum of all even numbers between two limits.

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UNIT—III

- VII 1. Write an algorithm to find the sum of the elements of a matrix.
2. Write a code that searches an array of 100 names for the name "Smitha". If the name is found, the program should display "Found"; if not it should display "Not Found".

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OR

- VIII 1. Write an algorithm to extract the prime numbers from a list of numbers.  
(Hint : A prime number can be divided only by one and itself. There are no other factors)
2. An array contains a list of marks out of 50. Write a program to create a new array which stores the percentage of marks of corresponding entry in the first array.

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UNIT—IV

- IX 1. Design an algorithm to find the area of a rectangle. Use a sub program to input the sides of the rectangle, use function to calculate the area and a sub program to display the result.
2. List the different methods to exchange data between two sub programs. Compare the two methods of data transfer from calling program to called program.

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3

OR

- X 1. Briefly explain the scope of variable with example.
2. The number N factorial, denoted by N!, is defined to be the product of N positive integers :
- $$N! = 1 \times 2 \times 3 \times \dots \times N$$
- Write a pseudocode for the above computation. Use sub program/function to calculate the factorial.

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