STD: XI   AUGUST MONTHLY TEST   Lessons: 7 - 10
Time: 3.00 Hrs.   COMPUTER SCIENCE   Marks: 70
                                       PART– I

Note: i) Answer all the questions.   15 X 1 = 15
      ii) Choose the most suitable answer and write the code with corresponding answer.

1. If C1 is false and C2 is true , the compound statement
       if C1
         S1
       else
       if C2
         S2
       else
         S3
       execute
       a) S1   b) S2   c) S3   d) None

2. How many times the loop is iterated
       i : = 0
       while i ≠ 5
       i : = i + 1
       a) 4   b) 5   c) 6   d) 0

3. If m x a + n x b is an invariant for the assignment a,b :=a = 8, b + 7, the values of m and n are
       a) m = 8, n= 7   b) m= 7 , n =- 8   c) m = 7 , n = 8   d) m = 8 , n= -7

4. If fibonacci number is defined recursively as

$$\begin{cases} 0 & n-0 \\ 1 & n=1 \\ F(n-1)F(n-2) & otherwise \end{cases}$$

   to evaluate F(4) , how many times F() is applied
       a) 3   b) 4   c) 8   d) 9

5. Which of the following is a valid string literal ?
       a) 'A'   b) 'welcome'   c) 1232   d) "1232"

6. Who coined C ++
       a) Rickmascitti   b) Rick bjarne   c) Bill gates   d) Dennis Ritchie

7. Which of the following is the exit control loop?
       a) for   b) while   c) do….while   d) if…else

8. The set of the statements that are executed again and again iteration is called as:
       a) Condition   b) loop   c) statement   d) body of loop

9. ____statements is executed only if the condition is true.
       a) statements   b) loops   c) iteration   d) Conditional

10. How important control flow statements in C++
       a)1   b) 2   c) 3   d) 4

11. A recursion must have at least ____ base case.
       a) One   b) Two   c) Many   d) More

12. _____ operator symbols used for multiplication as well as for pointer to a variable.
       a) &   b) @   c) *   d) $

13. The punctuators are also called as ____
       a) conditional   b) Operators   c) Modifiers   d) separators.

14. Int i;

    for(i=0;i<=5; ++i);

    What is the output of the above code:

    　　a) 012345　　　　　b) 0123456　　　　c) 1-6　　　　d) Not Executed

15. In how many parts of for loop

    　　a) 1　　　　　　　b) 2　　　　　c) 3　　　　　d) 4

PART-II

Answer any six Questions. Q. No. 24 is compulsory.　　　　　　　　　　　6 X 2 = 12

16. Draw a flowchart for conditional statement.
17. List out the flow chart symbols with it names.
18. Define an Iteration with an example.
19. Define loop invariant?
20. Discuss the difference between = and == operators.
21. What is the use of void data type?
22. What is difference between 56L and 56?
23. List out the kinds of statements with an example.
24. Write an example of infinite loop.

PART-III

Answer any six Questions. Q. No. 33 is compulsory.　　　　　　　　　　6 X 3 = 18

25. What is case analysis?
26. Define an control flow with its how many statements are classified.
27. List out the four important points in the algorithm as an noted.
28. Write short note about:　　　i) Iteration　　　ii) Recursion.
29. Write about Bjarne stroustrup.
30. What is the advantage of floating point numbers over integers?
31. How relational operators and logical operators are related to one another?
32. Write the syntax of in nested inside both if part and else part with an example.
33. List out the types of iteration statements.

PART-IV

Answer the following questions:　　　　　　　　　　　　　　　　　　5 X 5 = 25

34. a. Trace the step-by-execution of the algorithm for factorial(4)

    　　Factorial(n)

    　　--input:n is integer,n>=0

    　　--output :f + n?

    　　　　　f,i,:=1,1

    　　　　　while i<+n

    　　　　　f,i,:=f xi,i+1　　　　　　　　　　　　　　　　　(OR)

    b. Explain detail about the parts of for loop with its example.

35. a. Draw the flow chart for integer division.　　　　　　　　　　(OR)

    b. Write the key difference between if-else and switch statements.

36. a. Explain about Recursive problem solving techniques with an example.　(OR)

    b. Define an modifiers with its types to explain.

37. a. Define an expression with its types to explain.　　　　　　　　(OR)

    b. Write the Rule to creating a switch statements with an example.

38. a. Write a program to find sum of the series $s=1+x+x^2+....+x^n$　　(OR)

    b. Explain control statements with suitable example.

MOUNT CARMEL MISSION MATRIC HR. SEC. SCHOOL – KALLAKURICHI

STD: XI	**AUGUST MONTHLY TEST**	**LESSON: 7 – 10**
TIME: 3 : 00 Hrs	**COMPUTER SCIENCE**	**MARK: 70**

Part – I

I. CHOOSE THE CORRECT ANSWER: 15 X 1 = 15

1. b) S2

2. b) 5

3. b) m = 7 , n = – 8

4. d) 9

5. d) "1232"

6. a) Rick Mascitti

7. c) do . . . while

8. d) body of loop

9. c) iteration

10. c) 3

11. a) one

12. c) *

13. d) separators

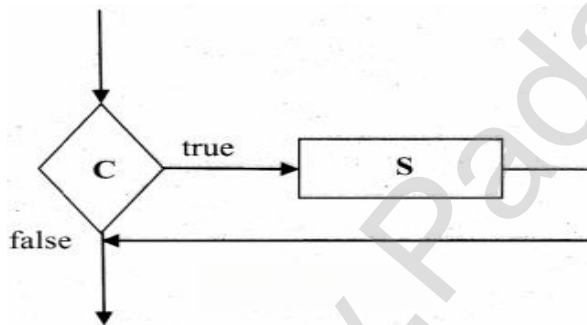**14.** d) Not Executed

15. c) 3

Part – II

II. ANSWER ANY SIX QUESTIONS Q. No: 24 IS COMPULSORY: 6 X 2 = 12

16. Draw a flowchart for conditional statement.

Ans:

Description:

      i. Test whether C is true or false.

      ii. If C is true then do S, otherwise do nothing.

17. List out the flow chart symbols with it names.

Ans:

Symbol	Name	Uses/Represents
Rectangle	Rectangle	Statements
Diamond	Diamond	Condition
Parallelogram	Parallelogram	Inputs, Outputs
Oval	Oral/special boxes	start, end
→ ← ↓ ↑	Arrows	Direction of control flow
○	Circle	Connector

18. Define an Iteration with an example.

Ans: An iteration (or looping) is a sequence of one or more statements that are repeatedly executed until a condition is satisfied. These statements are also called as control flow statements. It is used to reduce the length of code, to reduce time, to execute program and takes less memory space.

Examples: 1. While   2. do . . . . . while   3. For

19. Define Loop invariant?

Ans: In iteration, the loop body is repeatedly executed as long as the loop condition is true. Each time the loop body is executed, the variables are updated. However, there is also a property of the variable which remains unchanged by the execution of the loop body. This unchanging property is called the loop invariant loop invariant is the key to construct and to reason about iterative algorithms.

20. Discuss the difference between = and = = operators.

Ans:

=	= =
'=' is an assignment operator.	'= =' is an equal to operator and it is a relational operator.
It is used to assign the value of variable or expression	It is used for comparison of both left and right side operands.

21. What is the use of void data type?

Ans:

- Void data type specifies an empty set of values.
- It is used as a return type for functions that do not return any value.

22. What is difference between 56L and 56?

Ans: 56L – The suffix L forces the constant to be represented as long int which occupies 4 bytes.
56 – This will be represented as int type constant which occupies 2 bytes as per Turbo C + +

23. List out the kinds of statements with an example.

Ans: There are two kinds of statements used in C + +,
    i. Null statement
    ii. Compound statement

24. Write an example of infinite loop.
   Ans:

infinite loop

An infinite loop will be formed if a test-expression is absent in a for loop. For example,

test - expression is skipped

for(i=0 ; ;   ++i)

cout<<"\n Welcome";   This statement is displayed infinitely

Similarly, the following for loop also forms an infinite loop.

All three expressions are skipped

for(;   ;   )

cout<<"\n Welcome";   This statement is displayed infinitely

Part – III

III. ANSWER ANY SIX QUESTIONS Q. No: 33 IS COMPULSORY: 6 X 3 = 18

25. What is case analysis?
   Ans: Case analysis statement generalizes the problem in to multiple cases. Case analysis splits the problem into an exhaustive set of disjoint cases. For each case, the problem is solved independently.
   If C1, C2 and C3 are conditions,
   and S1, S2, S3 and S4 are statements,
   a 4–case analysis statement has the form,
   General Forms of case analysis statement:
   1. case C1
   2. S1
   3. case C2
   4. S2
   5. case C3
   6. S3
   7. else
   8. S4

26. Define an control flow with its how many statements are classified.
   Ans: Control flow statements are compound statements. They are used to alter the control flow of the process depending on the state of the process. There are 3 important control flow statements:
   - Sequential
   - Alternative
   - Iterative
   When a control flow statement is executed, the state of the process is tested, and depending on the result, a statement is selected for execution.

27. List out the four important points in the algorithm as an noted.
   Ans: i. Input – An algorithm should have zero or more well-defined inputs.
   ii. Output – An algorithm should have one or more well-defined outputs, and should match the desired output.
   iii. Finiteness – Algorithms must terminate after a finite number of steps.
   iv. Feasibility – Should be feasibility with the available resources

28. Write short note about: i) Iteration   ii) Recursion

Ans: i) Iteration: In iteration, the loop body is repeatedly executed as long as the loop condition is true. Each time the loop body is executed, the variables are updated. However, there is also a property of the variables which remains unchanged by the execution of the loop body. This unchanging property is called the loop invariant. Loop invariant is the key to construct and to reason about iterative algorithms.

ii) Recursion: Recursion is another algorithm design technique, closely related to iteration, but more powerful. Using recursion, we solve a problem with a given input, by solving the same problem with a part of the input, and constructing a solution to the original problem from the solution to the partial input.

29. Write about Bjarne Stroustrup.

Ans: Bjarne is a Danish Computer Scientist born on 30th December 1950. He has a Master degree in Mathematics and Computer Science in 1975 from Aarhus University, Denmark and Ph.D in Computer Science in 1979 from the University of Cambridge, England.

30. What is the advantage of floating point numbers over integers?

Ans: If a variable is declared as float, all values will be stored as floating point values.

There are two advantages of using float data types.

(1) They can represent values between the integers.
(2) They can represent a much greater range of values.

For Example:

float num=13.4;

In the above example, num variable is declared as float type.

31. How relational operators and logical operators are related to one another?

Ans: Relational Operators: Relational operators are used to determine the relationship between its operands. When the relational operators are applied on two operands, the result will be a Boolean value i.e 1 or 0 which represent True or False respectively.

Logical Operators: A logical operator is sued to evaluate logical and relational expressions. The logical operators act upon the operands that are themselves called as logical expressions.

Example: An expression involving relational and logical operators

((subject1 >= 35) && (subject2 >= 35))

32. Write the syntax of in nested inside both if part and else part with an example.

Ans:

```
If nested inside both if part
          and else part
if (expression)
{
      if (expression)
      {
       True_Part_Statements;
      }
      else
      {
       False_Part_Statements;
      }
}
else
{
      if (expression)
      {
       True_Part_Statements;
      }
      else
      {
       False_Part_Statements;
      }
}
```

33. List out the types of iteration statements.

    Ans: C++ supports three types of iteration statements;
- for statement
- while statement
- do-while statement

Part – IV

IV. ANSWER THE FOLLOWING QUESTIONS: 5 X 5 = 25

34. a. Trace the step - by – execution of the algorithm for factorial(4)

    factorial(n)

  - - input: n is an integer, n>= 0

  - - output: f = n!

    f , i : = 1 , 1

    while i < = n

     f , i := f x i, i + 1

  Ans: Step by Step execution of factorial(4)

     (n = 4)

Statement	Variables		
	f	i	n
f, i: = 1, 1	1	1	4
while i < = n (i < = n) → (1 < = 4) → True	1	1	4
f, i:= f x i,i + 1	1	2	4
(i <= n) → (2 < = 4) → True	1	2	4
f, i := f x i, i + 1	2	3	4
(i < = n) → (3 < = 4) → True	2	3	4
f, i := f x i,i + 1	6	4	4
(i < = n) → (4 < = 4) → True	6	4	4
f, i := f x i, i + 1	24	5	4
(i < = n) → (5 < = 4) → False	24	5	4
factorial(4) = f = 24			

b. Explain detail about the parts of for loop with its example.

    Ans: The for loop is a entry – controlled loop and is the easiest looping statement which allows code to be executed repeatedly. It contains three different statements (initialization, condition or test-expression and update expression(s)) separated by semicolons.

      The general Syntax is:

```
for (initialization(s); test-expression; update expression(s))
{
        Statement 1;
        Statement 2;
        ………….
}
Statement-x;
```

The initialization part is used to initialize variables or declare variable which are executed only once, then the control passes to test-expression. After evaluation of test-expression, if the result is false, the control transferred to statement-x. If the result is true, the body of the for loop is executed, next Trb control is transferred to update expression. After evaluation of update expression part, the control is transferred to the test-expression part.

Flow Chart of FOR loop
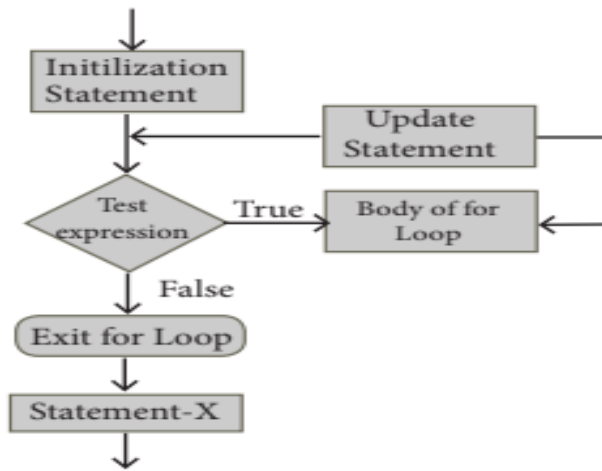
35. a. Draw the flow chart for integer division.

Ans:
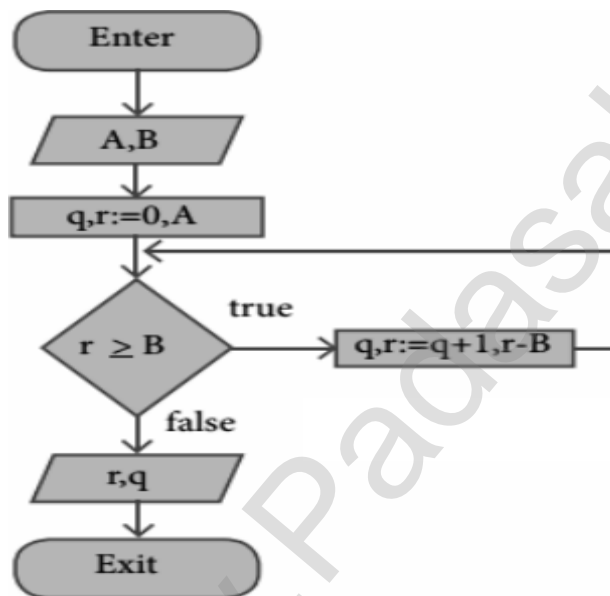
b. Write the key difference between if-else and switch statements.

Ans:

Key Differences Between if-else and switch

S.No	if-else	Switch
1	Expression inside if statement decide whether to execute the if block or under else block.	expression inside switch statement decide which case to execute.
2	An if-else statement uses multiple statements for multiple choices	switch statement uses single expression for multiple choices.
3	If-else statement checks for equality as well as for logical expression.	switch checks only for equality.
4	The **if** statement evaluates integer, character, pointer or floating-point type or Boolean type.	switch statement evaluates only character or a integer data type.
5	If the condition is false the else block statements will be executed	If the condition is false then the default statements are executed.

36. a. Explain about Recursive problem solving techniques with an example.

Ans: Recursion is another algorithm design technique, closely related to iteration, but more powerful. Using recursion, we solve a problem with a given input, by solving the same problem with a part of the input, and constructing a solution to the original problem from the solution to the partial input.

Example: Fibonacci number is defined recursively as

$$F(n) = \begin{cases} 0 & n = 0 \\ 1 & n = 1 \\ F(n-1) + F(n-2) & \text{otherwise} \end{cases}$$

b. Define an modifiers with its type to explain.

Ans: Modifiers are used to modify the storing capacity of a fundamental data type except void type. Usually, every fundamental data type has a fixed range of values to store data items in memory. For example, int data type can store only two bytes of data. In reality, some integer data may have more length and may need more space in memory. In this situation, we should modify the memory space to accommodate large integer values. Modifiers can be used to modify (expand or reduce) the memory allocation of any fundamental data type. They are also called as Qualifiers.

There are four modifiers used in C++. They are:

(1) signed   (2) unsigned   (3) long   (4) short

These four modifiers can be used with any fundamental data type.

37. a. Define an expression with its types to explain.

Ans: An expression is a combination of operators, constants and variables arranged as per the rules of C++. It may also include function calls which return values.

An expression may consist of one or more operands, and zero or more operators to produce a value. In C++, there are seven types of expressions, and they are:

(i) Constant Expression
(ii) Integer Expression
(iii) Floating Expression
(iv) Relational Expression
(v) Logical Expression
(vi) Bitwise Expression
(vii) Pointer Expression

SN	Expression	Description	Example
1	Constant Expression	Constant expression consist only constant values	int num=100;
2	Integer Expression	The combination of integer and character values and/or variables with simple arithmetic operators to produce integer results.	sum=num1+num2; avg=sum/5;
3	Float Expression	The combination of floating point values and/or variables with simple arithmetic operators to produce floating point results.	Area=3.14*r*r;
4	Relational Expression	The combination of values and/or variables with relational operators to produce bool(true means 1 or false means 0) values as results.	x>y; a+b==c+d;
5	Logical Expression	The combination of values and/or variables with Logical operators to produce bool values as results.	(a>b)&& (c==10);
6	Bitwise Expression	The combination of values and/or variables with Bitwise operators.	x>>3; a<<2;
7	Pointer Expression	A Pointer is a variable that holds a memory address. Pointer variables are declared using (*) symbol.	int *ptr;

b. Write the Rule to creating a switch statements with an example.

Ans: Rules:

1. The expression provided in the switch should result in a constant value otherwise it would not be valid.

2. Duplicate case values are not allowed.

3. The default statement is optional.

4. The break statement is used inside the switch to terminate a statement sequence. When a break statement is reached, the switch terminates, and the flow of control jumps to the next line following the switch statement**.**

5. The break statement is optional. If omitted, execution will continue on into the next case. The flow of control will fall through to subsequent cases until a break is reached.

6. Nesting of switch statements is also allowed.

38. a. Write a program to find sum of the series $s = 1+x+x^2+. . . . . + x^n$

Ans:
```
#inlcude<iostream>
#include<math.h>
using namespace std;
int main()
{
  int x,n;
  float sum=0;
  cout<<"\n Enter the value of x:";
  cin>>x;
  cout<<"\n Enter the Number of terms:";
  cin>>n;
  for(int i=0;i<=n;i++)
  sum=sum+pow(x,i);
  cout<<"SUM = "<<sum<<endl;
  retun 0;
  }
```

b. Explain control statements with suitable example.

Ans: Control statements are statements that alter the sequence of flow of instructions.

Types of control statements:
 i. Selection statement
 ii. Iteration statement
 iii. Jump statement
 iv. Function calls

i. Selection statements: The selection statement means the statement(s) are executed depends upon a condition. If a condition is true, a true block (a set of statements) is executed otherwise a false block is executed. This statement is also called decision statement or selection statement because it helps in making decision about which set of statements are to be executed.
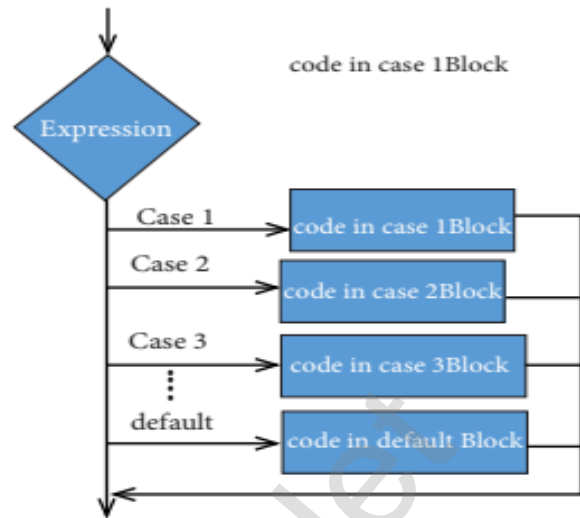
Examples: 1. if   2. switch

Flow chart representation of selection statements:
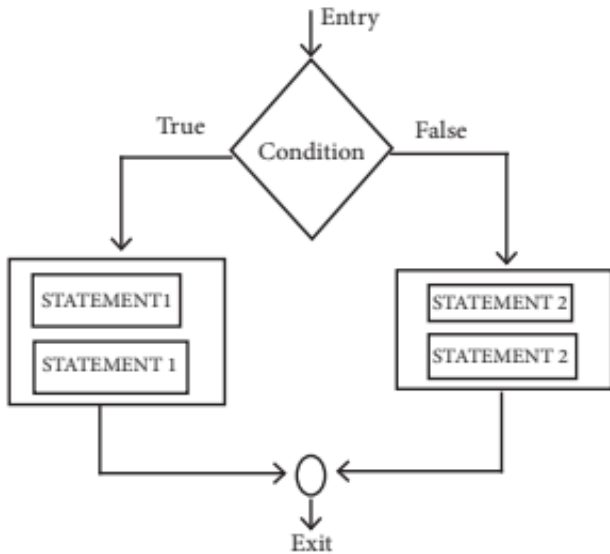
**1. if**   **2. switch**

ii. Iteration statements: An iteration (or looping) is a sequence of one or more statements that are repeatedly executed until a condition is satisfied. These statements are also called as control flow statements. It is used to reduce the length of code, to reduce time, to execute program and takes less memory space.
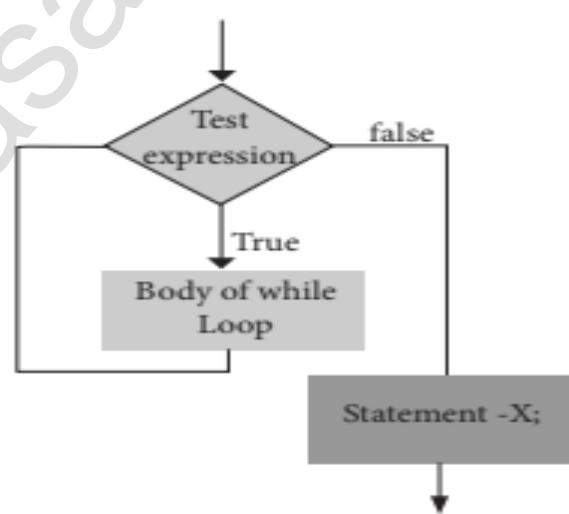
Examples: 1. while   2. do . . . while   3. For

Flow chart representation of iteration statements:
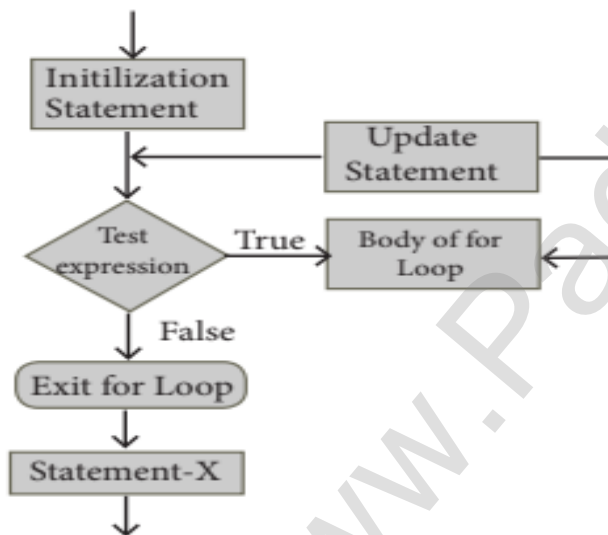
3. for   **1. while**

iii. Jump statements: Jump statements are used to interrupt the normal flow of programs.
Types of Jump statements are
- goto statement
- break statement
- continue statement

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