CHAPTER 3: Class X
CONTROL STRUCTURE

4. Define control structure. How many control structures are available in BASIC, discuss briefly.
Ans: Control structures are used to control the flow of a program. There are three types of Control Structures.
   (a). Sequence  (b). Selection  (c). Loop structure

In Sequence Structure instructions are executed according to the increment order of line numbers. e.g 10,20,30

Selection Structure: ( IF .... THEN )  OR  ( IF ....... THEN ........ ELSE )
It is used to select alternate program instructions to execute. IF ........THEN, and IF ........THEN........ELSE statements are used to implement the selection structure.

Loop (FOR .....NEXT) and (WHILE ...... WEND): Loop structure is used to repeat the set of instructions up to fixed number of times or until given condition is satisfied. There are two types of loops Counter & Controlled loop structures.

5. Define Nested Loop. Write Syntax of FOR...NEXT & WHILE...WEND loop with the help of examples
Ans: A loop within another loop is called nested loop.

<table>
<thead>
<tr>
<th>Syntax:</th>
<th>FOR variable = x TO y [STEP z] Statements ... NEXT [Variable]</th>
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<tr>
<td>Example:</td>
<td>10 FOR K = 1 TO 100 STEP 2 10 N = 1 50 WEND</td>
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<td>20 PRINT K 20 WHIEL N &lt; 100 60 END</td>
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<td></td>
<td>30 NEXT K 30 PRINT N</td>
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<tr>
<td></td>
<td>40 END 40 N= N + 1</td>
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6. What does it mean by transfer of control? Describe conditional & unconditional transfer of control.
It means to jump from one part of the program to another, conditionally or unconditionally.

Unconditional Transfer of Control: GOTO statement is used for unconditional transfer of control.
It transfers the control to a specific line without any condition like GOTO 80. (It send control Line# 80)

Conditional Transfer of Control: (ON n GOTO ): The conditional transfer of control causes the jump from one part of the program to another depending on a certain condition. E.g

<table>
<thead>
<tr>
<th>10 INPUT “Enter 1-ADD, 2- SUB, 3-MULTIPLY”; n.</th>
<th>40 PRINT A + B : END</th>
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<tr>
<td>20 ON n GOTO 40,50,60</td>
<td>50 PRINT A – B : END</td>
</tr>
<tr>
<td>30 INPUT A : INPUT B</td>
<td>60 PRINT A x B : END</td>
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7. Differentiate WHILE...WEND and FOR...NEXT loop. Which one is better in a situation where you don’t know the number of iteration prior to the execution of the loop?

FOR NEXT Loop
1. It is pre-test loop
2. Number of repetitions is known in advance.
3. Number of repetition depends on variable value.
4. It is called counter loop.
Exp:
10FOR A= 1 TO 10
20PRINT “PIPS”
30NEXT A
40END

WHILE – WEND Loop
1. It is post-test loop
2. Number of repetitions is not known in advance.
3. Number of repetition depends on a certain condition.
4. It is called controlled loop.
Exp:
10 A$ = “Y”
20 WHILE A$ = “Y”
30 PRINT “PIPS”
40 INPUT A$
50 WEND

8. Write a program to calculate the area of a triangle. The program should get the values for base and altitude of the triangle from the user, and display the result. [Area=1/2 x base x altitude]

<table>
<thead>
<tr>
<th>10 CLS</th>
<th>40 AR = 1/2 * B * A</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 INPUT “Enter Value For Base”; B</td>
<td>50 PRINT “AREA = ” AR</td>
</tr>
<tr>
<td>30 INPUT “Enter Altitude ” ; A</td>
<td>60 END</td>
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9. Write a program to calculate area and circumference of a circle. The program should get the radius of the circle from the user and display result. [Area=3.14xradius x radius, and circ = 2x3.14 x radius]

<table>
<thead>
<tr>
<th>10 CLS</th>
<th>50 PRINT “Area = ”;AR</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 INPUT “ENTER RADIUS”; R</td>
<td>60 PRINT “Radius = ”; C1</td>
</tr>
<tr>
<td>30 AR = 3.14 * R</td>
<td>70 END</td>
</tr>
<tr>
<td>40 CI = 2 * 3.14 * R</td>
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</table>
10. Write a program to print first ten odd numbers using WHILE...WEND loop.

  10 CLS
  20 ODN=1
  30 WHILE ODN < 11
  40 PRINT ODN
  50 ODN = ODN + 2
  60 WEND
  70 END

11. Write a program to print the sum of squares of first five even numbers using FOR.NEXT LOOP

  10 CLS
  20 FOR N = 2 TO 10 STEP 2
  30 PRINT N
  30 SQ = SQ + N*N
  40 NEXT
  50 PRINT “SUM OF SQUARES OF 5 NUMBERS =” SQ
  60 END

12. Program to find the larger of two numbers. The program should get the numbers from the user.

  10 CLS
  20 INPUT “ENTER 1ST NUMBER” ; N1
  30 INPUT “ENTER 2nd NUMBER” ; N2
  40 IF N1 > N2 THEN PRINT N1 “IS GREATER NO.” ELSE PRINT N2 “IS GREATOR NO”
  50 END

13. Write a program to print the table of a given number. The program should get the number from the user.

  10 CLS
  20 INPUT “ENTER ANY NUMBER”; N
  30 FOR K = 1 TO 10
  40 PRINT N “X” K “=“ N*K
  50 NEXT
  60 END

14. Write a program that should accept obtained marks of a student in an examination. It should then calculate the percentage and assign a grade to the student.

  10 10 CLS
  11 20 INPUT " Enter Your Name" ; NS
  12 30 INPUT "Enter Your Roll No." ; RN
  13 40 INPUT "Enter you Class & Section "; CS
  14 50 INPUT "Enter Comp Marks(100)"; CM
  15 60 INPUT "Enter Phy Marks(100)"); PHM
  16 70 INPUT "Enter Chem Marks(100)"); CHM
  17 80 INPUT "Enter Math Marks(100)"); MATM
  18 90 INPUT "Enter Eng Marks(150). "; ENGM
  19 100 INPUT "Enter Urdu Marks(150)"); URDM
  20 110 INPUT "Enter Isl Marks(75)"); ISM
  21 120 INPUT "Enter P-Std Marks(75)"; PSTM
  22 130 TMOBT= CM+ PHM+ CHM+ MATM+ ENGM+ URDM+ISM+PSTM
  23 140 PTM = (TMOBT * 100) / 850
  24 150 PRINT "TOTAL MARKS OBTAINT =" TMOBT
  25 160 PRINT "PERCENTAGE MARKS ="PTM
  26 170 IF PTM >= 80 THEN PRINT "GRADE A1"
  27 180 IF PTM >=70 AND PTM < 80 THEN PRINT "GRADE A"
  28 190 IF PTM >=60 AND PTM < 70 THEN PRINT "GRADE B"
  29 200 IF PTM >=50 AND PTM < 60 THEN PRINT "GRADE C"
  30 210 IF PTM >=40 AND PTM < 50 THEN PRINT "GRADE D"
  31 220 IF PTM < 40 THEN PRINT "GRADE F"
  230 END