Note: Answer four questions only

Q1 -A-
1- What is software and what is the types of it? (5 marks)
2-Converting the following number from one base to another.
   \((10.5)_{10} \rightarrow (?)_{2}\) (10 marks)

B- Write the necessary equations to draw a unit circle at origin point by Mathcad (10 marks)

Q2- A-Write a program by FORTRAN90 language to find the value of 'Y' from the following equations: (15 marks)

\[
Y = \begin{cases} 
\tan^{-1}(x) + e^x & \text{if } x > 0 \\
0 & \text{if } x = 0 \\
\sqrt{x^2 + 2} & \text{if } x < 0 
\end{cases}
\]

B- If you have the matrix A contains the following numbers. What is the new matrix after running this program on it

Program A
Integer:: A(7), k
Do k=1,6
A(k+1)=A(k)+A(8-k)-2
End do
End

Q3- A- Write program by FORTRAN90 language to find the value of 'S' from the following series (take 20 terms): (15 marks)

\[
s = 1 + \frac{x^2}{2!} + \frac{x^4}{4!} + \frac{x^6}{6!} + \ldots
\]
B -1- Find the result of the following \( (100010110-1111010) \) (5 marks)

2- Write this formula in Fortran90 language (5 marks)

\[
D := -\frac{3}{4} + \frac{\sqrt{2x^2 + 3 - B^{2x}}}{\sqrt{(B + A)^{2+x} - 2B}}
\]

Q4 - A- What is the output of the following program (10 marks)

Program aaa
Real:: k,sum
Do k=4,10,2
    sum=sum+k/2
End do
Do k=1,5
    sum=sum+k/2
End do
sum=k
Print*, sum
End

B- Re-write the following program by using (DO while) (15 marks)

Integer m,j
Do 111 m=1,4
    Do 122 j=3,12,3
    continue
    continue
End

Q5- A- Write a FORTRAN program which calculates the sum of the following series:

\[ \frac{1}{9} + \frac{2}{16} + \frac{3}{25} + \frac{4}{36} + \ldots + \frac{99}{10201} \] (15 marks)

B- What will be printed after the execution of the following programs? (10 marks)

1- \( x = 326.3127 \)
   print 10,x,x,x
   10 format (' ', F7.1,3x,F6.1,2x,F9.5)

2- Character Text*3
   Text= Engineering
   Print 10, Text,Text,Text
   10 format (' ',A,2x,A2,3x,A11)
   End

GOOD LUCK