IFOS-2010 → paper II

5) Convert the following:

(i) $(736.4)_8$ to decimal number.

(ii) $(A1.6875)_{16}$ to binary number.

(iii) $(101101)_2$ to decimal number.

(iv) $(AF63)_{16}$ to decimal place.

(v) $(101111011111)_2$ to hexadecimal number.

⇒ (i) $(736.4)_8 = (7\times8^2 + 3\times8^1 + 6\times8^0 + 4\times8^{-1})_{10}$

$= (448 + 24 + 6 + \frac{1}{2})_{10}$

$= (478.5)_{10}$

(ii) $(41.6875)_{10} = (101001.1011)_2$

2 | 41		
2 | 20	— 1	↑
2 | 10	— 0	
2 | 5	— 0	
2 | 2	— 1	
1	— 0	

$0.6875 \times 2 = 1.375$ → 1

$0.375 \times 2 = 0.75$ → 0

$0.75 \times 2 = 1.5$ → 1

$0.5 \times 2 = 1$ → 1 ↓

$\therefore (41)_{10} = (101001)_2$ & $(0.6875)_{10} = (0.1011)_2$

$\therefore (41.6875)_{10} = (101001.1011)_2$

(iii) $(101101)_2 = (1\times2^5 + 0\times2^4 + 1\times2^3 + 1\times2^2 + 0\times2^1 + 1\times2^0)_{10}$

$= (32 + 0 + 8 + 4 + 0 + 1)_{10} = (45)_{10}$

(iv) $(AF63)_{16} = (A\times16^3 + F\times16^2 + 6\times16^1 + 3\times16^0)_{10}$

$= (10\times4096 + 15\times256 + 6\times16 + 3)_{10}$

$= (44899)_{10}$

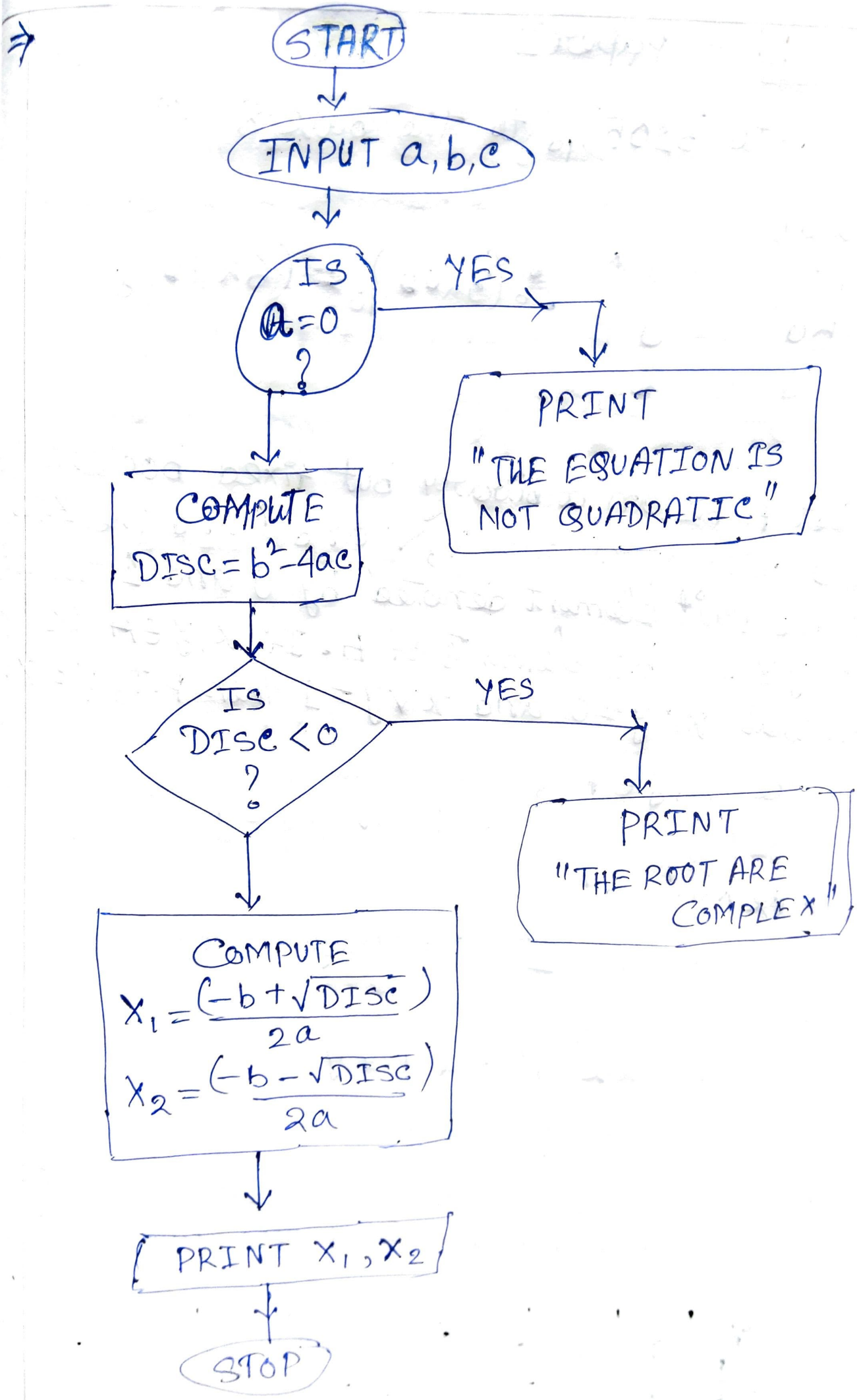
(v) $(101111011111)_{16} = (BDF)_{16}$

we know that,

1011	1101	1111	→ Binary
B	D	F	→ Hexadecimal

6) (b) Draw a flowchart for finding the roots of the quadratic equation,

$ax^2 + bx + c = 0$


START
INPUT a,b,c
IS a=0 ?
YES
PRINT "THE EQUATION IS NOT QUADRATIC"
COMPUTE DISC = b^2 - 4ac
IS DISC < 0 ?
YES
PRINT "THE ROOT ARE COMPLEX"
COMPUTE
X1 = (-b + √DISC) / 2a
X2 = (-b - √DISC) / 2a
PRINT X1, X2
STOP