CSE - 2017 → Paper II

5/(c) Write the Boolean expression

$z(y+z)(x+y+z)$

in its simplest form using Boolean postulate rules. Mention the rules used during simplification. Verify your result by constructing the truth table for the given expression and for its simplest form

⇒ Let $A = z(y+z)(x+y+z)$

$= (zy+z^2)(x+y+z)$

$= (Zy+Z)(x+y+z) \quad [\because A^2 = A]$

$= Zyx + Zy^2 + Z^2y + Zx + Zy + Z^2$

$= Zyx + Zy + Zy + Zx + Zy + Z$

$= Zy(x+1) + Zy + Zx + Z(y+1)$

$= Zy + Zy + Zx + Z \quad [\because 1+A = 1]$

$= Zy + Zx + Z$

$= Zy + Z(x+1)$

$= Zy + Z$

$= Z(y+1) = Z$

$\therefore A = Z$

x	y	z	z(y+z)	(x+y+z)	z(y+z)(x+y+z)	z
0	0	0	0	0	0	0
0	0	1	1	1	1	1
0	1	0	0	1	0	0
0	1	1	1	1	1	1
1	0	0	0	1	0	0
1	0	1	1	1	1	1
1	1	0	0	1	0	0
1	1	1	1	1	1	1

So, $Z(y+z)(x+y+z) = z$ [proved]

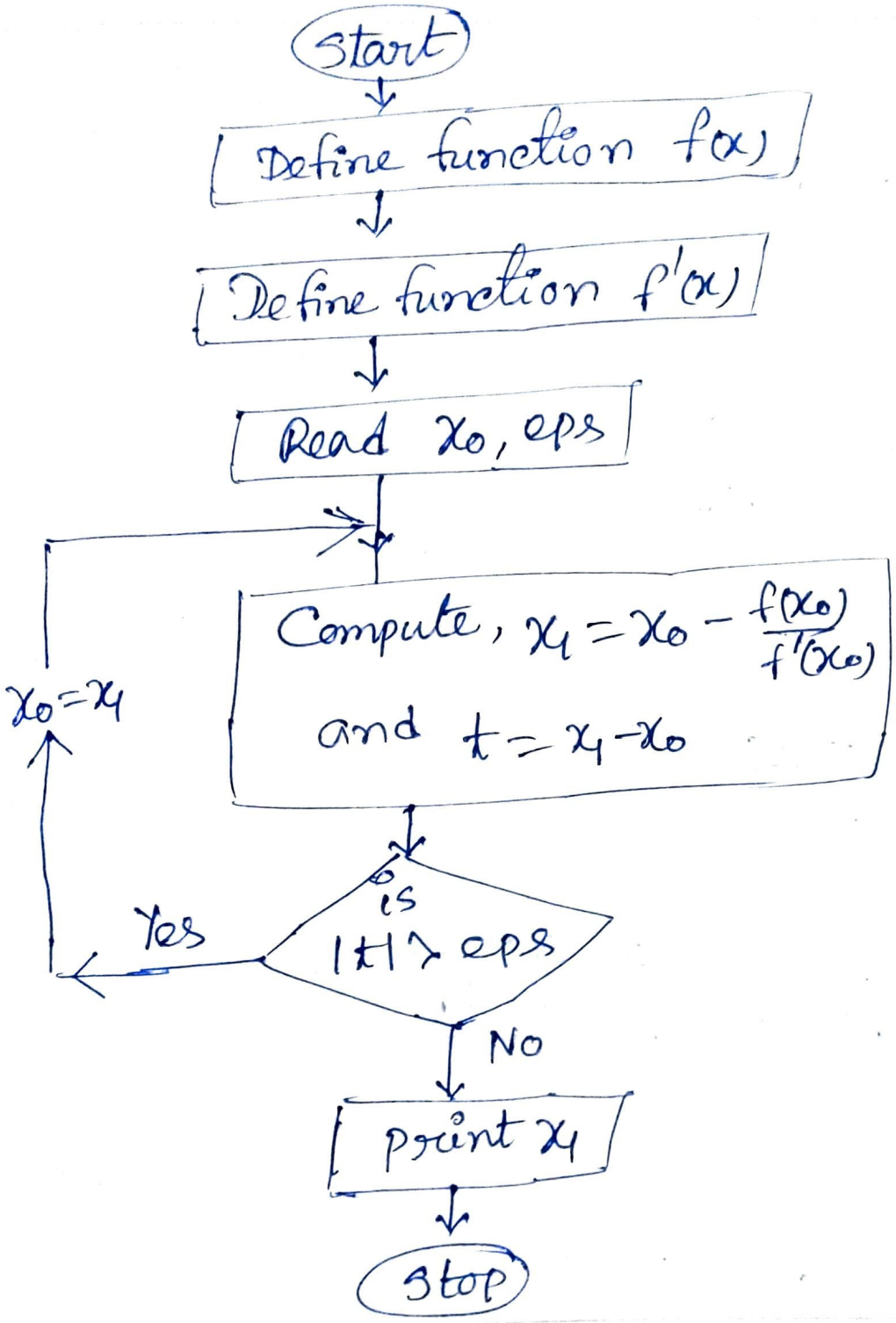
8) (b) write an algorithm in the form of a flow chart for Newton-Raphson method. Describe the cases of failure of this method.

=> Using Newton-Raphson Method to $f(x) = 0$, we have the iteration formula as,

$$x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)}$$

□ The Newton-Raphson Method fails when, $f'(x) = 0$ or very small in the neighbourhood of the root.

Flow chart =>


Start
Define function f(x)
Define function f'(x)
Read x0, eps
Compute, x1 = x0 - f(x0)/f'(x0)
and t = x1 - x0
is
|t| > eps
Yes
No
x0 = x1
print x1
Stop