Given; absolute error = 1E-9

$$f(x) = e^{-0.5x}(4-x) - 2$$

$$x_{i+1} = x_i - \frac{f(x_i)}{f'(x_i)}$$

$$f(x) = e^{-0.5x}(4-x) - 2$$

$$f'(x) = 0.5e^{-0.5x}(x-4) - e^{-0.5x}$$

$$x_{i+1} = x_i - \frac{e^{-0.5x}(4-x) - 2}{0.5e^{-0.5x}(x-4) - e^{-0.5x}}$$

① $$x_1 = 0.5 - \frac{e^{-0.5\times0.5}(4-0.5) - 2}{0.5e^{-0.5\times0.5}(0.5-4) - e^{-0.5\times0.5}}$$

$$x_1 = 0.838890606$$

$$\%\text{ error}, \epsilon_2 = \left(\frac{x_{i+1} - x_i}{x_{i+1}}\right) \times 100$$

$$\%\text{ error } \epsilon_2 = \left(\frac{0.838890606 - 0.5}{0.838890606}\right) \times 100$$

$$\%\text{ error}, \epsilon_2 = 40.39747299$$

② $$x_2 = 0.838890606 - \frac{e^{-0.5\times0.838890606}(4-0.838890606) - 2}{0.5e^{-0.5\times0.838890606}(0.838890606-4) - e^{-0.5\times0.838890606}}$$

$$x_2 = 0.884956$$

$$\%\text{ error} = \left(\frac{0.884956 - 0.838890606}{0.884956}\right) \times 100 = 5.2054$$

③ $$x_3 = 0.884956 - \frac{e^{-0.5\times0.884956}(4-0.884956) - 2}{0.5e^{-0.5\times0.884956}(0.884956-4) - e^{-0.5\times0.884956}}$$

$$x_3 = 0.88571$$

$$\%\text{ error} = \left(\frac{0.88571 - 0.884956}{0.88571}\right) \times 100 = 0.084974$$

④ $x_4 = 0.88571 - \dfrac{e^{-0.5\times0.88571}(4-0.88571)-2}{0.5e^{-0.5\times0.88571}(0.88571-4)-e^{-0.5\times0.88571}} = 0.88570880_2$

$$\%\text{ error} = \left(\frac{0.88570880_2 - 0.8857086071}{0.88570880_2}\right)\times100 = 2.200497\times10^{-5}$$

⑤ $x_5 = 0.88570880_2 - \dfrac{e^{-0.5\times0.88570880_2}(4-0.88570880_2)-2}{0.5e^{-0.5\times0.88570880_2}(0.88570880_2-4)-e^{-0.5\times0.88570880_2}}$

$$x_5 = 0.88570880_2$$

$$\%\text{ error} = \left(\frac{0.88570880_2 - 0.88570880_2}{0.88570880_2}\right)\times100 = 0$$

i	x	E_a (% error)
0	0.5	0
1	0.83890606	40.39747299
2	0.8849559509	5.205386019
3	0.8857086071	0.084974470 61
4	0.88570880$_2$	0