a)

In the equilibrium point,

So, z = 0 and = 0

So,

So,

b)

based on a), in the equilibrium point, , and is a positive constant,

so x = 0,

so = 0

so,

so,

so, for egio value on

so,

so,

i)

so, so it is stable

ii)

so, then it is stable

or , because

so,

so it is stable

so no matter what, it is stable.

c)