Assignment 2.

Find global minimum point and value for function

$f(x,y) = x^2+y^2+10$

→ Do manual calculations for 2 iterations.

Step-1:-

$x = -1 \cdot y = +1 \quad \eta = 0.1 \quad$ epochs = 2.

Step-2:-

iter = 1

Step-3:-

$$\frac{\partial f}{\partial x} = 2x = -2.$$

$$\frac{\partial f}{\partial y} = 2y = 2$$

Step-4:-

$$dx = -\eta \frac{\partial f}{\partial x} = -2(-0.1)$$

$$= 0.2.$$

$$\Delta y = -\eta \frac{\partial f}{\partial y} = -(0.1)(2)$$

$$= -0.2.$$

Step-5:-

$$x = x + \Delta x = -1 + 0.2 = -0.8.$$

$$y = y + \Delta y = 1 - 0.2 = 0.8.$$

Step - 6 :- iter = iter + 1 = 1 + 1 = 2.

Step - 7 :- if (iter > epochs)

goto step 8

else

goto step 3.

Step - 3 :-

$$\frac{\partial f}{\partial x} = 2x = 2(-0.8) = -1.6.$$

$$\frac{\partial f}{\partial y} = 2y = 2(0.8) = 1.6$$

Step - 4 :-

$$\Delta x = -\eta \frac{\partial f}{\partial x}.$$

$$= -(0.1)(-1.6) = 0.16$$

$$\Delta y = -\eta \frac{\partial f}{\partial y}$$

$$= -(0.1)(1.6) = -0.16.$$

Step - 5 :-

$$x = x + \Delta x.$$

$$= -0.8 + 0.16 \Rightarrow -0.64.$$

$$y = y + \Delta y.$$

$$= 0.8 - 0.16 \Rightarrow 0.64.$$

Step - 6 :- itr = itr + 1 = 2 + 1 = 3

Step - 7 :- if (itr > epochs)

3 > 2

goto' step 8.

else : goto step 3

Step - 8 :-

$x = -0.64$.

$y = 0.64$.

$f(x,y) = x^2 + y^2 + 10$.

$= (-0.64)^2 + (0.64)^2 + 10$

$= 0.4 + 0.4 + 10$

$= \underline{10.8}$