Show $\left(\frac{1}{\sqrt{2}} |00\rangle + \frac{1}{\sqrt{2}} |11\rangle\right) \stackrel{\text{then in con mot be}}{} \frac{1}{\sqrt{2}} |00\rangle + \frac{1}{\sqrt{2}} |11\rangle \otimes \left(\frac{\alpha_L}{p_L}\right)$ Ans We assume that $\begin{pmatrix} \alpha_1 \\ \beta_1 \end{pmatrix} \otimes \begin{pmatrix} \beta_2 \\ \beta_2 \end{pmatrix} = \frac{1}{\sqrt{2}} \langle 00 \rangle + \frac{1}{\sqrt{2}} \langle 11 \rangle$ $\begin{pmatrix} \alpha_1 \\ \mu_1 \end{pmatrix} = (\alpha_1 \otimes A + \mu_1 \mu_2), \qquad \alpha_1, \alpha_2, \mu_1, \mu_2 \in \mathcal{C}$ $\begin{pmatrix} a_{\perp} \\ k_{\perp} \end{pmatrix} = \begin{pmatrix} \alpha_{\perp} & 10 \end{pmatrix} + k_{\perp} \begin{pmatrix} 10 \\ 1 \end{pmatrix}$ where 1 ×11 + (B,) = 1 () + (| /2) = 1 (0,10) + p,10) & (0,10) + p,10) = \$\frac{1}{2} (10) \otimes 10 + 10 \otimes 10), Then we obtain the system of town equation. 如之二十二 $p_1 p_2 = \frac{1}{20}$ Since di, de, pi, 1 & Q (field). [Product of mon-zero elements and of or to and B, P, to mever O, in a field) ⇒ メキロ、やキロ、り、キタりにキロ、 - contradiction So the system of equation (1) admits no Solution so the given state can not be written as

broduct state.

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(solution)

we know swap gote takes two imputs and give, two outputs. The truth dalle for swap gote is

1	Inp	t	output			
1	0	0	0	0		
	0	1	1	0		
	1	0	0	1		
•	1	11	1	1		

In matrix representation is
$$\begin{pmatrix}
1 & 0 & 0 & 0 \\
0 & 0 & 1 & 0 \\
0 & 1 & 0 & 0 \\
0 & 0 & 0 & 1
\end{pmatrix}$$

Now CSWAP gate, is controlled SWAP gate.

The first import in a control bit. If it in 0, the second and thind inputs are unchanged. If the control bit is 1, it multiples and 3rd inputs a to the 2nd and 3rd inputs a to the 2nd output to 3rd and 3rd to 2nd. It muth table and given by,

So matrin the presentation of CSWAP-GATE

_				1				-	7
1	Input				output				\dashv
Ì	0	0	0		0	-	2	_	의
	0	0	1	T	0	0)	1	1
+	0	1	C		0	1		C	1
+	0	1	1		0		l		4
1	1	0	1.	0	1	T	O		0
	-	0	+	1	1	1	1		0
	+	1	+	0	1		0		1
	-	+	+	1	1		1	1	1
	1	1.			L		L		سا

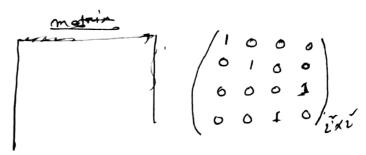
Write matrin po trepresentation of CCNOT Gote.

CNOT gate , takes two inputs and gives two out puts. The first bit is called controlled bit. If 101 bit is 0, then it has no effect on the end lit. If it is 1, it acts like not got on the ond bit.

The function is f(xy) = (x, x xy)

The matrin representation of CNOT gate in

		Inut	4 10	<u>ur</u> q		
	INP	UT	OUT PUT			
	0	0	0	0		
1	0	ı	0	1		
1	1	0	1	١		
Ì	70	١	ι,	0		



Similarly CCNOT is controlled CNOT gate. Here tixos two bit are contralled bit. It is 3 intput 3 out put sate. Here the 3rd Lit change when first two lit are 1, \$(N,7,2) = (N,7,(N,N))⊕Z), This get is reversible

丁 (カックローマ) = (カップ、(ストリ) 田 (カハリ 田モ) = (カップモ)

It materia is