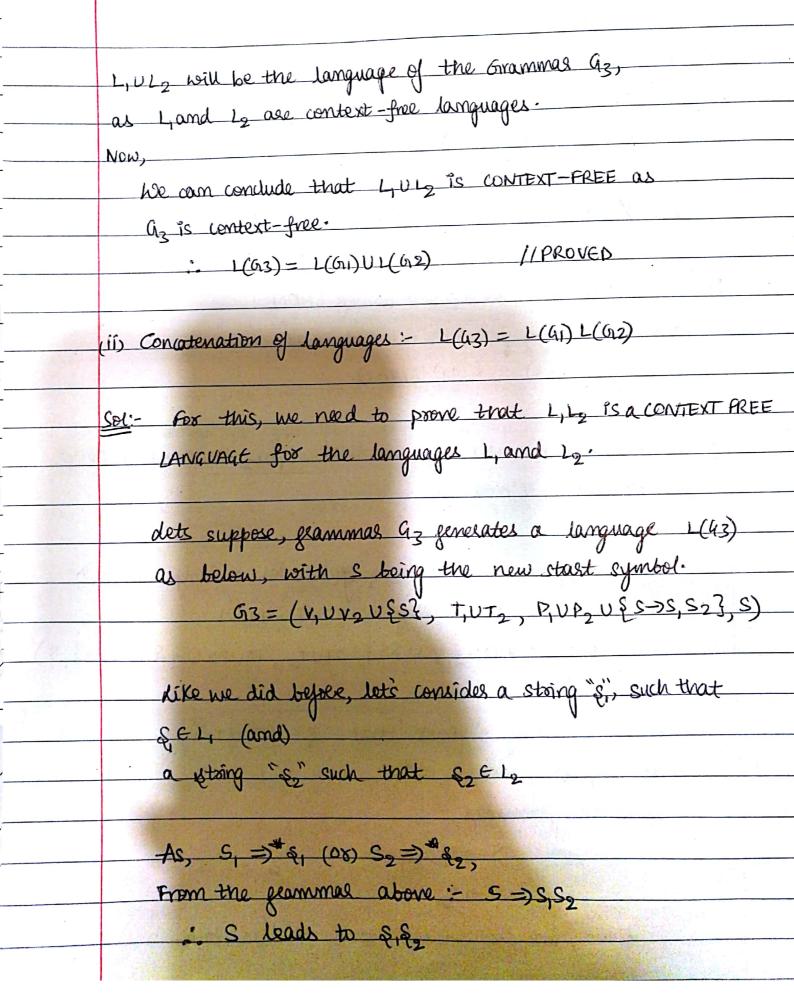
$S \rightarrow S$, (and)

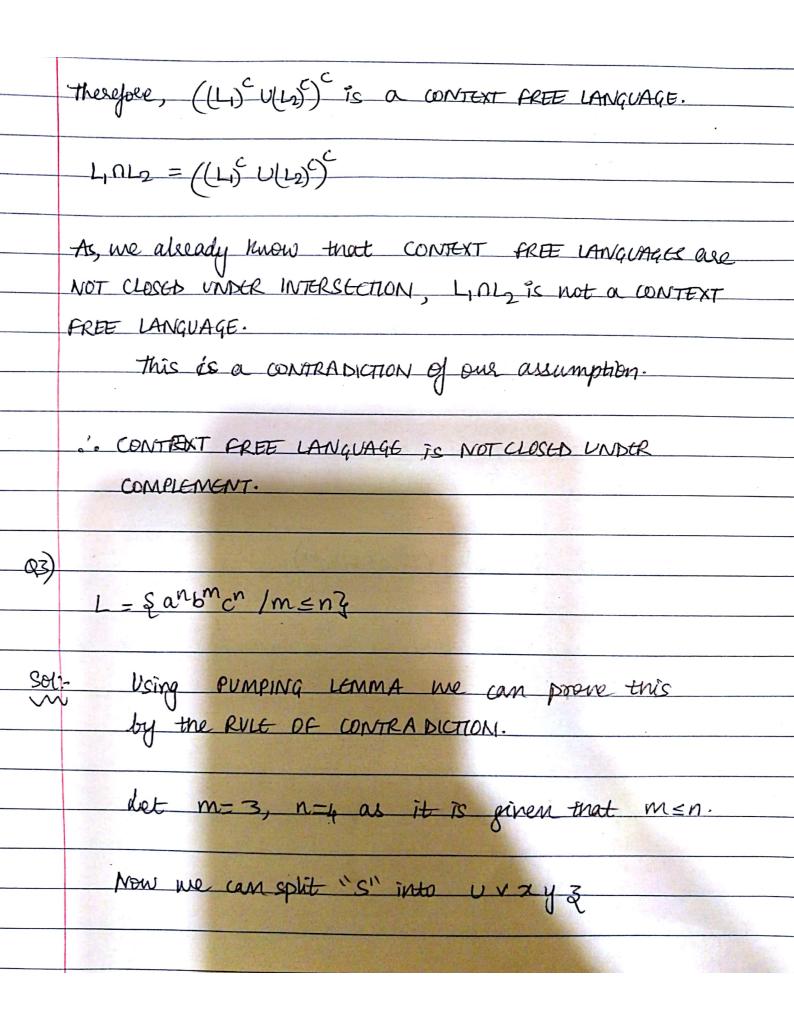
Hence, we can conclude that S leads to &.

5->5

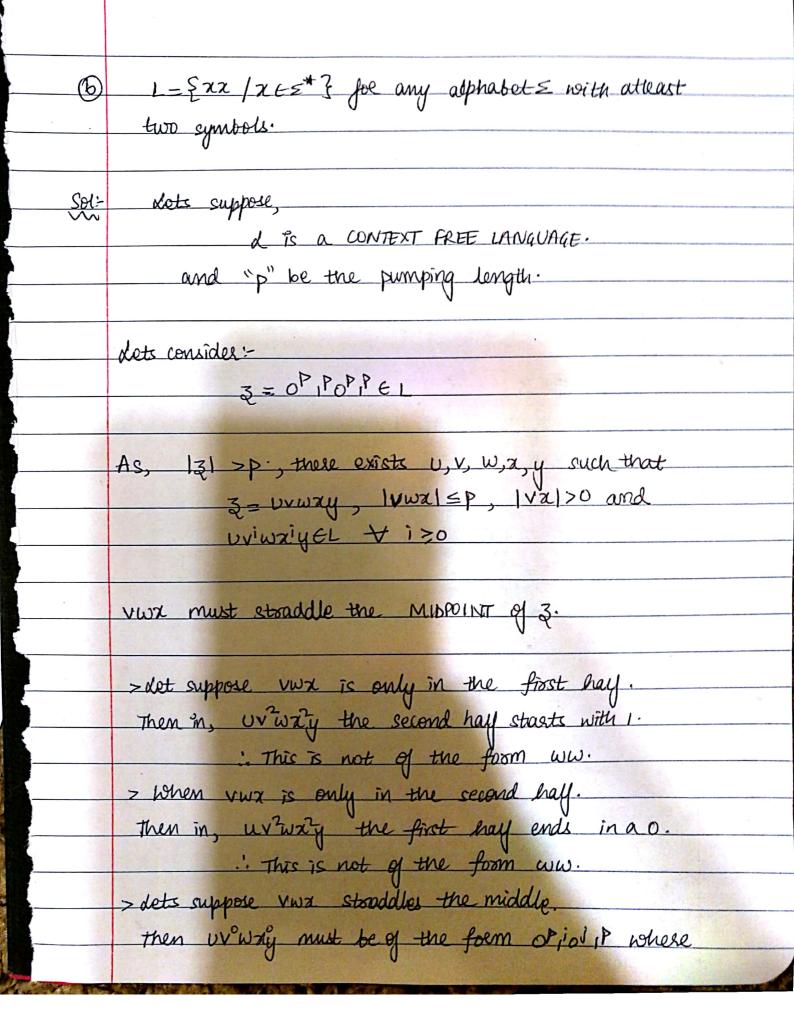


| As, L, and L2 are context free languages, the language of the gammar G3 is going to be L, L2. |
|--|
| Since, G is a context free Grammas, L_1L_2 is a context free Language. $i(G_3) = L(G_1) L(G_2) // PROVED$ |
| (iii) Kleen Closuse: - 1(G!) = 1(G)* |
| Sol:- Fox this, we need to prove that L* is a context free LANGUAGE for the language L. |
| dets suppose, grammae G3 generates a language L(G') as below, with S being the new start symbol. G'=(v, u & s3, T, , P, u & s >> c, s >> s, 3, s) |
| dots suppose, $S_1 \rightarrow aS_1b$ and $S_1 \rightarrow E$ |
| Sface, $S \rightarrow E$ Hence, $S \rightarrow SS$, |
| : L(G') = & a^hbn; n > 03* CONTEXT FREE LANGUAGE. 1/ PROYED |
| |

| Q2) | Prove that CFLs are NOT closed under |
|-----|---|
| | @INTERSECTION |
| | (B) COMPLEMENT |
| | |
| SV: | |
| | We already know that I, and Iz below are |
| | CONTEXT FREE LANGUAGES. |
| | 1 = 50m, mon: m, n>0} |
| | 12 = 50m, non: m, n>03 |
| | |
| | Now: - LIAL2 - & M, Mom: m > 03 |
| | (NOT CONTEXT FREE LANGUAGE) |
| | thence Proved that CFLS are NOT CLOSED under INTERSECTION |
| | (b) |
| | We already know that CPIS are closed under UNION, |
| | for 4 and 12 context free languages, |
| | - LIUL IS OF CONTEXT PREE LANGUAGE. |
| | |
| | dets suppose that, |
| | CFL is dosed under comprement |
| | (L1), (12), (11) V(12) are context free LANGUAGES |
| | |
| | |



| | $S = a^4 b^3 c^4$ (As m=3 and n=4) |
|---|---|
| | => S = aa aa bbb co ccc www.ww y 3 This shortens down to |
| - | $\Rightarrow S = v v^{k} x y^{k} z \text{ where } k=2$ $\therefore v v^{2} x y^{2} z$ |
| | $=) S = \alpha \alpha a a a a a b b b c c c c c c c c c c c c$ |
| | Now as $a^6 \neq c^5$ (:: $a^n b^m c^n$) |
| | ". Our assumption that Lis a CONTEXT PREE LANGUAGE |
| | |



| | cither i or j , is not p. | |
|-------|--------------------------------|------|
| | · vv°wx°y & L | |
| | | |
| | | |
| Q4) | f(x) = 3x | |
| · · | | |
| Sor : | $34 \times 1 = 0 600 c$ | |
| | GOTO E | |
| | [c] 7 2 3 | |
| | [A] IF == 1=0 GOTO B | |
| | GOTO E | |
| | $[8] Z_2 \leftarrow Z_2^{-1}$ | |
| | Z, < n+y | , a |
| | 4 + 2, | |
| | GOTO A | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | 10.0 |