## Tutotical Sheet 4

Prodise Problems

O T(n)= 3T(n/2)+nL

Using mosh, method comporting with T(n)= aT(n/b)+ a=3 b=2  $f(n)=n^{2}$  x=1.6 x=1

2) T(n/2) + n<sup>2</sup>

comparing with  $T(n)^2$   $a T(\gamma_b) + f(n)$ comparing with  $T(n)^2$   $a T(\gamma_b) + f(n)$   $C^2$  leg  $a^2$   $e^2$   $e^2$ 

(3)  $T(n) \ge T(n/2) + 2^n$   $Comporing with <math>T(n) \ge a T(\frac{n}{p}) + f(n)$   $K \ge \log_b a \ge \log_b 1 = 0$   $K \ge \log_b a \ge \log_b 1 = 0$   $A_{3,1} = f(n) > n \ge 4 + 2^n (2^n)$  $S_{0,1} = 0$ 

4 T(n)2 2n T(12)+nn Compose IL With T(n)2 CIT( b) +f(n) K2 log 2 2 2 21 As, f(n) == n1e = nn = nn TCZ O(nn lyn) (5) T(n) = 16 T(n) +n Compare ? With T(n)2 16 T(m)+h X2 logy 16 2 Dogy 42 2 2 As, A(n) < nk a n < n2 TC2 0 (n2) T(n)2 2T (n/2) + nlyn Compare FL with T(n)= aT(1/2)+An) 122 doj 2 2 1 Às f(n) > nic a nlagn > n TC 2 (nlogn) 6(7) T(n) = 2T(2) + nlogn

Compare IL with T(n) = 0 T(m) + f(n) K2 log 222 |

n < n' 1. TCZ 0 (n) 08 T(n) 2 27 (n) + n 0.51 Compare it with T(n) = a, T(n) + fin) K2 logs a 2 log 42 2 As f(n) > n 1c 21 no. 17 > no. 5 7 T( 2 0 (no.21) OF TC2 0.5 T(N/2) + 1/n Compare Fr with T(n)= a T(n)+fin) 12 leg 502 leg 20.52 leg 2 2 2 log 2 | -log 2 2 0, - 1 = -1 f(n)2 nk 2) 1/2/n  $a TC = O(\frac{lorn}{n})$ Compare Fr with T(n)2 to T(1)+f(n) T ( 16 T ( 17) + n) K2 loj 4 162 2 f(n) > M/c 2 n) > n2 Te2 0 (n1,)

As  $f(n) < n^k = a$ 

011 TCM2 4T(2) + lyn Company with T(n) 2 a T(x)+f(n) K2 lypaz lyz 422 reactor As f(n) < nkd lyn < n2 TC20(nc) 012 T(n)2 Jn T(2) + lyn As company with T(n) = a T(n) +f(n) a= In 80, moster method Not applicable 013 T(n)2 3T(2)+h Company with T(n) = aT (n) +f(n) K2 lyba2 ly23 ~ 1.6 As A(n) DC n1e a nc n1.6 So, TCZ O(n. Pr.) 914 T(n)= 3T(N3)+ Sn Company with T(n)=aT(n)+f(n) 12 ly 6 a 2 log 3 2 1 As Alm < n1c21 fn < n' 50, TC 2 Q(n)

Composing with  $T(n) = aT(\frac{h}{h}) + f(n)$   $k^2 \frac{\log y}{2} + \frac{2}{2}$ As  $f(n) \leq n$   $f(n) \leq n$  f(

96.  $T(n)=3T(\frac{n}{4})+nlgn$ Comparing with T(n) = a - (n/b) + A(n) 12 lug 43 = 1.6 f(n) > nie 21 nlugn > nib As: TC= O(nlyn)  $T(n)^{2}3T(\frac{n}{3})+\frac{\gamma_{2}}{3}$ company with T(n) = a T(m)+f(n) K2 loj3321 p(n) < nr d n < n :.Tc2 0(n)

T(n) 2  $6T(\frac{n}{3})$  +  $n^2 \log n$ Comporing with T(n) = a T(n) + f(n) 12 = log 3 6 2 1.6 f(n) 2> n1.6 2 n2 logn > n1.6 TC= O(nrlogn)  $\frac{019}{100} + \frac{100}{100} +$ comparing with T(n) = a T(h) +f(n) 12 loj2 4 2 2 f(n) < nk 21 n c n2 : Tez O(n) 020 T(n) = 84T(7) - n'logn comparing with T(n) 2 a T ( b) + f(n) to olypotate and of Dr 12 ly 64 2 2 T(n) = 64 T (n) + (-1) n - logn 到64十(岁)十叶州 TCZ O(n. Joj. of /1)

T(n)2 7 7 7 (13) + 12 Comparing with T(n)= a T(n) + f(n) K2 ly372 11.7 :. fm) > nk u n2 > n1.7 : TC2 O(n2) T(n)2 T(n) + n(2-cosn) Comparing with T(n)= aT(1/b)+f(n) K2 loj2 1= 0 As, Cos(n) Ps bounded above by 1 and below by
-1 So, n (2-(osn) 1s basically O(n) As, f(n) > no 50, tc= 0(n)