(6.) a) $54n^3 + 17 = 7 O(n^3)$ $O(n^3) : 54n^3 + 17 \le Cn^3$, $\forall n 7/n$ Since $= |7n^3|$ $= |7n^3|$ $= |7n^3|$ $= |7n^3|$ $= |7n^3|$ $= |7n^3|$ 54n3+17<7/n3=54n3+17n3, for n71=n6 50 T(n) € O(n3) \$ 12 (n3): 54 n3 + 17 7 cn3 V n7 n5 Let C= 53 (N) = 2 (N)T months Since 54n3 753n3 4n 7/= no 50, 54,3 +17 7, 53,3 For n74=No T(n) E A(n3) So, since T(h) EO (n3) 1 T(n) E AD (n3) => T(n) & O(n3) T. Since TON ELLOW A TONE OCH TUDE BLOOM

(6) b) she that 598 + 17 \$ 0000)

(6.) b) show that $54n^3 + 17 \notin \Theta(n^2)$ By contradiction. Assume T(n) & Q(n2) this implies TCn) & O(n2) 1 T(n) & sc(n2) Since $\lim_{n \to \infty} \left| \frac{T(n)}{s(n)} \right| = \lim_{n \to \infty} \left| \frac{54n^3 + 17}{h^2} \right| = \infty \Rightarrow T(n) \in \omega(n^2)$ T(n) 4 O(n2) since T(n) & w(n2) => T(n) \(\begin{aligned} & \text{G(n}^2) & - \text{} \\ \end{aligned} C) T(n) = agnd + agn + ... + ain + ao, a: = constant Show T(n) & O (nd) \\ \text{i = 0, --, d} \\ \dd \text{70} 12 (nd): T(n) 7 agnd, n71=no, c=ax T(n) Z 1 (nd) O(nd): T(n) < \(\frac{1}{2} \) (ai) \(\text{nd} \), \(\text{nz} \) \(\text{l=n} \), \(\text{l=n} \) .. TONCE OCAR) #T: Since TCh) & A Cod) A TCh) & O Cod)

T(n) E O(nd)

T(n) E O(nd)