4) (a) Likelihood= Vond.
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W) No, because ompo deternos on on but and downs
- Thù in not desirable.

Also,  $\theta_{ml}$  asymptotically converges to the true value, but  $~\theta_{map}\,may$  or may not.

(04) Posterior  $\propto \frac{O_m}{O_m} / \frac{n}{1}$  if  $O > O_m < 0$  man  $(n_0)$ otherwise Posterior  $\propto \frac{O_m^{n+\alpha}}{O^{n+\alpha}}$ So, this is a pareto distribution with parameters C, n+x Posterior mean =  $\int_{c}^{\infty} \frac{C^{n+x}}{O^{n+x}} \cdot O dO$  $\int_{0}^{\infty} \frac{C^{n+\alpha}}{C^{n+\alpha}} d\theta.$ 

$$= \left(\frac{n+\alpha-1}{n+d-2}\right) \cdot C$$

$$O_{\text{Posterior}} = \left(\frac{n+\alpha-1}{n+\alpha-2}\right) \cdot \max\left(O_{m_i} \max_{i} C_{x_i}\right)$$

(d) Ae is clear, lim 
$$\hat{O}_{posterior} = man (O_m, man (x_i))$$

$$= \hat{O}_{map}$$

$$\neq \hat{O}_{map}$$

This is not desirable, because an infinite sample size should mean that likelihood is much more informative than prior.