1 Posterior is: $f(\mu, \sigma^2, \log \vec{\theta}|Y)$

$$f(\mu, \sigma^2, \log \vec{\theta}|Y) \propto f(Y|\log \vec{\theta}) * f(\log \vec{\theta}|\mu, \sigma^2) * f(\mu, \sigma^2)$$
$$= \prod_{j=1}^{J} \left[\left(\prod_{i=1}^{N} e^{-w_j e^{\log \theta_j}} \left(w_j e^{\log \theta_j} \right)^{k_{ji}} \right) * \frac{1}{\sigma} e^{\frac{-(\log \theta_j - \mu)^2}{2\sigma^2}} * \frac{1}{\sigma^2} \right]$$