Question 1   Learning the Parameters

(a) *Derive the M-step update rules for Θ and π by setting the partial derivatives of Equation 6 to zero. Be sure to show your steps.*

Equation 6:

$$F = \sum_{i=1}^{N} \sum_{k=1}^{K} r_k^{(i)} [\log Pr(z^{(i)} = k) + \log p(x^{(i)}|z^{(i)} = k)] + \log p(\pi) + \log p(\Theta)$$

(b)

(c)

Question 2   Posterior Inference

(a)

(b)

(c)

(d)

Question 3   Conceptual Questions

(a)

(b)

(c)