

Q4)  $\mu_1 = 20\%$      $\sigma_1 = 25\%$      $\rho_{12} = \rho_{21} = 0.3$   
 $\mu_2 = 13\%$      $\sigma_2 = 28\%$      $\rho_{13} = \rho_{31} = 0.15$   
 $\mu_3 = 14\%$      $\sigma_3 = 20\%$      $\rho_{23} = \rho_{32} = 0.4$

$$m = [0.2 \quad 0.13 \quad 0.04]$$

$$n = [1 \quad 1 \quad 1]$$

$$C_{ij} = R_{ij} \sigma_i \sigma_j$$

$$C = \begin{bmatrix} \rho_{11} \sigma_1 \sigma_1 & \rho_{12} \sigma_1 \sigma_2 & \rho_{13} \sigma_1 \sigma_3 \\ \rho_{21} \sigma_2 \sigma_1 & \rho_{22} \sigma_2 \sigma_2 & \rho_{23} \sigma_2 \sigma_3 \\ \rho_{31} \sigma_3 \sigma_1 & \rho_{32} \sigma_3 \sigma_2 & \rho_{33} \sigma_3 \sigma_3 \end{bmatrix}$$

$$C = \begin{bmatrix} 0.0625 & 0.021 & 0.0075 \\ 0.021 & 0.0784 & 0.0224 \\ 0.0075 & 0.0824 & 0.04 \end{bmatrix}$$

$$C^{-1} = \begin{bmatrix} 17.608 & -4.491 & -0.7860 \\ -4.491 & 16.335 & -8.305 \\ -0.7860 & -8.305 & 29.806 \end{bmatrix}$$

$$mC^{-1} = [12.331 \quad 3.539 \quad 20.715]$$

$$mC^{-1}n^T = 36.585$$

$$w = \frac{mC^{-1}}{mC^{-1}n^T} = [0.337 \quad 0.096 \quad 0.566]$$

$$\mu_o = m w^T = 0.146$$

$$\sigma_w^2 = w C w^T = 0.0188$$