MECH 6325 HW1

6) $f_{XY}(x,y) = \begin{cases} 6e^{-2x}e^{-3y}, & x>0, y>0 \\ 0, & \text{otherwise} \end{cases}$

a) $\bar{X} = \frac{1}{2}$ $\quad E[X^2] = \frac{1}{2}$ $\quad E[XY] = \frac{1}{6}$

$\bar{Y} = \frac{1}{3}$ $\quad E[Y^2] = \frac{2}{9}$

$\sigma_X^2 = E[X^2] - (\bar{X})^2 = \frac{1}{2} - \left(\frac{1}{2}\right)^2 = \frac{1}{4}$

$\boxed{\sigma_X^2 = \frac{1}{4}}$

$\sigma_Y^2 = E[Y^2] - \bar{Y}^2 = \frac{2}{9} - \left(\frac{1}{3}\right)^2 = \frac{1}{9}$

$\boxed{\sigma_Y^2 = \frac{1}{9}}$

$C_{XY} = E[XY] - \bar{X}\bar{Y} = \frac{1}{6} - \left(\frac{1}{2}\right)\left(\frac{1}{3}\right) = 0$

$\boxed{C_{XY} = 0}$