EXAM 1 : SOLUTIONS

(1.) $P(\text{at least 2 bulbs must be selected to get a 75-w bulb}) = 1 - P(\text{the first bulb is a 75-watt bulb}) = 1 - \frac{40}{150} = \frac{110}{150} = \frac{11}{15} = .73$

(2.) $4 \cdot \frac{\binom{13}{5}\binom{39}{0}}{\binom{52}{5}}$

(3.) SOL'N 1:

$P(\text{saved}) = 1 - P(\text{NOT saved}) = 1 - (.7)(.8)(.9) = .496$

SOL'N 2: A = cell phone successful B = radio successful C = pigeon succ.

$P(\text{saved}) = P(A) + P(B) + P(C) - P(AB) - P(BC) - P(AC) + P(ABC)$

$= .3 + .2 + .1 - (.3)(.2) - (.3)(.1) - (.2)(.1) + (.3)(.2)(.1) = .496$

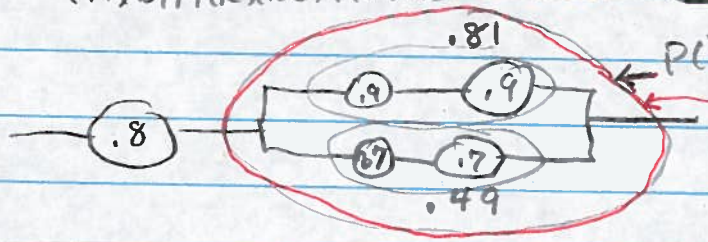
(4.) $P(\text{both get same number of hearts}) = P(\text{both get no hearts or both get 1 heart or both get 2 hearts})$

$= \left(\frac{39}{52}\cdot\frac{38}{51}\right)\left(\frac{39}{52}\cdot\frac{39}{52}\right) + \left[\frac{13}{52}\cdot\frac{39}{51} + \frac{39}{52}\cdot\frac{13}{51}\right]\cdot\left[\frac{13}{52}\cdot\frac{39}{52} + \frac{13}{52}\cdot\frac{39}{52}\right] + \left(\frac{13}{52}\cdot\frac{12}{51}\right)\left(\frac{13}{52}\cdot\frac{13}{52}\right)$

(5.) a) $P(\text{a message is SPAM}) = (.7)(.01) + (.2)(.02) + (.1)(.03) = .014$

b) $\frac{(.7)(.01)}{(.7)(.01)+(.2)(.02)+(.1)(.03)} = \frac{.007}{.014} = .5$

(6.)



$P(\text{this works}) = 1 - (.19)(.51) = .9031$

$\therefore P(\text{network works}) = (.8)(.9031) = .722$