Question 1

a) Total computers = 15
Computers not working = 5
computers working = 10

In order to calculate the probability we need to find the number of combinations in which we can select 3 computers from 15 computers

i.e $C(15,3)$

$$C(n,r) = \frac{n!}{r!(n-r)!}$$

To find the probability of choosing 1 non working computer and 2 working computer, we can calculate

$$\frac{C(5,1) \times C(10,2)}{C(15,3)}$$

$$C(5,1) = \frac{5!}{1!(5-1)!} = 5$$

$$C(10,2) = \frac{10!}{2!(10-2)!} = 45$$

$$C(15,3) = \frac{15!}{3!(15-3)!} = 455$$

$$\frac{5 \times 45}{455} = \frac{225}{455} \approx 0.4945$$

b) Now to find the probability of 2 non working computers and 1 working computer, we need to calculate

$$\frac{C(5,2) \times C(10,1)}{C(15,3)}$$

$$C(5,2) = \frac{5!}{2!(5-2)!} = 10$$

$$C(10,1) = \frac{10!}{1!(10-1)!} = 10$$

$$C(15,3) = \frac{15!}{3!(15-3)!} = 455$$

$$\frac{10 \times 10}{455} = \frac{100}{455} \approx 0.2197$$

Question 2

Let

$P(B|F)$ = Probability of Alice going on trip when her friend is going

$P(F)$ = Probability of her friend going on the trip

$P(B|FN)$ = Probability Alice going on trip when friend is not going

$P(FN)$ = Probability of her friend not going on the trip

$P(B)$ = Probability of Alice going on the trip

Now to find the probability of Alice going on the trip is

$$P(B) = P(B|F) \times P(F) + P(B|FN) \times P(FN)$$

Now substituting the values

$P(B) = (0.90 \times 0.65) + (0.15 \times 0.35)$

$P(B) = 0.6375$