3)

a) $P(\text{covid} = 1) = 0.08$

$P(\text{test} = 1 \mid \text{Covid} = 1) = 0.9$

$P(\text{test} = 0 \mid \text{Covid} = 0) = 0.97$

we have to find

$$P(\text{Covid} = 1 \mid \text{test} = 1) = \frac{P(\text{test} = 1 \mid \text{Covid} = 1)\, P(\text{Covid} = 1)}{P(\text{test} = 1)}$$

$$= \frac{P(\text{test} = 1 \mid \text{covid} = 1)\, P(\text{covid} = 1)}{P(\text{covid} = 1) \times P(\text{test} = 1 \mid \text{covid} = 1) + P(\text{covid} = 0) \times P(\text{test} = 1 \mid \text{covid} = 0)}$$

$$= \frac{0.9 \times 0.08}{0.08 \times 0.9 + 0.92 \times 0.03} = 0.723$$

We should predict him to be positive

b)

From a,

$$P(\text{Covid} = 1 \mid \text{test} = 1)$$

$$= \frac{P(\text{test} = 1 \mid \text{covid} = 1)\, P(\text{Covid} = 1)}{P(\text{Covid} = 1) \times P(\text{test} = 1 \mid \text{covid} = 1) + P(\text{covid} = 0) \times P(\text{test} = 1 \mid \text{covid} = 0)}$$

$$= \frac{0.9 \times 0.6}{0.6 \times 0.9 + 0.4 \times 0.03}$$

$$= 0.978 \text{ //}$$

Thus, the probability of having corona is ~~0.978~~ 0.978