

Q1

f. Prior probabilities

$$P(Y = c_k) \approx \hat{P}_k = \frac{1}{N} \sum^N \mathbb{1}(y_i = c_k)$$

$$1) \quad \frac{14}{40} = \underline{0.35}$$

$$2) \quad \frac{17}{40} = \underline{0.425}$$

$$3) \quad \frac{9}{40} = \underline{0.225}$$

Q2

$$1) \quad P(X' = b \mid Y = \text{red})$$

$$\frac{5}{14} \approx \underline{0.357}$$

$$2) \quad \frac{4}{17} \approx \underline{0.235}$$

$$3) \quad \frac{1}{9} \approx \underline{0.111}$$

Q3

$$1) \frac{1}{14} = \underline{0.07}$$

$$2) \frac{6}{17} = \underline{0.35}$$

$$3) \frac{4}{9} = \underline{0.44}$$

Q4

$$P(Y=c) \cdot P(X^1=b|Y=c) P(X^2=p|Y=c)$$

$$1) Y = \text{red}$$

$$\frac{\cancel{14}}{40} \cdot \frac{5}{\cancel{14}} \cdot \frac{1}{14} = \underline{0.01}$$

$$2) Y = \text{green}$$

$$\frac{\cancel{17}}{40} \cdot \frac{4}{\cancel{17}} \cdot \frac{6}{17} = \underline{0.03529}$$

$$3) Y = \text{blue} = \underline{0.011}$$

Q5

Green