

Question 1

1a) $\{ \text{BMI} = \text{Medium}, \text{Age} = \text{Lower}, \text{Gender} = \text{Male} \}$

$$P(\text{BMI} = \text{Medium} | \text{Yes}) = \frac{4}{9}$$

$$P(\text{Age} = \text{Lower} | \text{Yes}) = \frac{6}{9}$$

$$P(\text{Gender} = \text{Male} | \text{Yes}) = \frac{6}{9}$$

$$P(\text{Yes}) = \frac{9}{14}$$

$$P(\text{Yes} | \text{Medium, Lower, Male}) = \frac{4}{9} \times \frac{6}{9} \times \frac{6}{9} \times \frac{9}{14}$$

$$= 0.12698$$

$$P(\text{BMI} = \text{Medium} | \text{No}) = \frac{1}{5}$$

$$P(\text{Age} = \text{Lower} | \text{No}) = \frac{1}{5}$$

$$P(\text{Gender} = \text{Male} | \text{No}) = \frac{1}{5}$$

$$P(\text{No}) = \frac{5}{14}$$

$$P(\text{No} | \text{Medium, Lower, Male}) = \frac{1}{5} \times \frac{1}{5} \times \frac{1}{5} \times \frac{5}{14}$$

$$= 0.00285$$

Probability of OSA = Yes is more likely.