

1. $A \perp\!\!\!\perp C$ True

$A \perp\!\!\!\perp D \mid B, H$ True

(i) $A \perp\!\!\!\perp B \perp\!\!\!\perp D$ inactive

(ii) $A \perp\!\!\!\perp F \perp\!\!\!\perp G \perp\!\!\!\perp D$ inactive

(iii) $A \perp\!\!\!\perp F \perp\!\!\!\perp G \perp\!\!\!\perp H \perp\!\!\!\perp E \perp\!\!\!\perp B \perp\!\!\!\perp D$ inactive

$$\begin{aligned} \text{Q1 a)} \quad & P(A, B \mid C) \\ &= \frac{P(A, B, C)}{P(C)} \\ &P(A, B) \end{aligned}$$

$$\frac{P(A \mid C) P(B \mid C)}{P(C \mid B) P(B)}$$

$$\frac{P(A, B, C)}{P(B, C)}$$

$$\frac{P(A \mid C) P(B \mid C) P(C)}{P(B, C)}$$

$$P(A, B \mid C) P(C)$$

$$\text{Q2. } \mathcal{I}_{B_1} = \{ A \perp\!\!\!\perp D, A \perp\!\!\!\perp B, B \perp\!\!\!\perp D \}$$

a) $i \rightarrow G_1, G_3,$

$$\text{q)} \quad P(H \mid +f)$$

$$P(A) P(B \mid A) P(C \mid A) P(D \mid A) P(E \mid A, B) P(F \mid C)$$

$$P(G \mid A, D) P(H \mid E, F, G)$$

$$f_1(B, C, D, E, G) = \sum_A P(A) P(B \mid A) P(C \mid A) P(D \mid A) P(E \mid A, B) P(G \mid A, D)$$

$$f_1(B, C, D, E, G) P(F \mid C) P(H \mid E, F, G)$$

$$f_4(B, E, +f, G) P(H \mid E, F, G)$$

$$f_5(+f, G, H)$$

$$f_6(H, +f)$$

Q8

$$A \perp\!\!\!\perp E \mid C, D$$

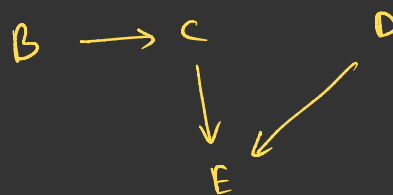
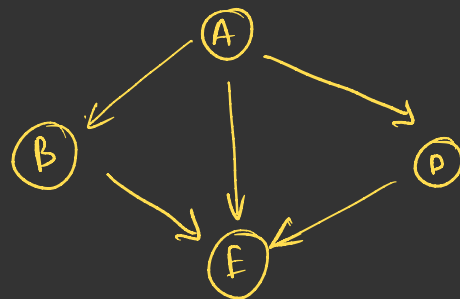
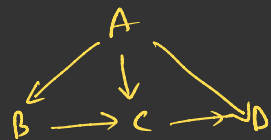
$$B \perp\!\!\!\perp E \mid C, D$$

$$B \perp\!\!\!\perp D \mid A, C$$

$$A \perp\!\!\!\perp E \mid D$$

$$B \perp\!\!\!\perp E \mid D$$

$$B \perp\!\!\!\perp D \mid A$$



$$P(R) P(E \mid R) P(W \mid R) P(F \mid W) P(M \mid E, W)$$

$$P(E \mid R, W, M, F)$$

$$= \frac{P(E, R, W, M, F)}{\sum_E P(E, R, W, M, F)}$$

$$= \frac{P(R) P(E \mid R) P(W \mid R) P(F \mid W) P(M \mid E, W)}{P(R) P(W \mid R) P(F \mid W) \sum_E P(E \mid R) P(M \mid E, W)}$$

$$= \frac{P(E = +e \mid R = -r) P(M = +m \mid E = +e, W = -w)}{P(E = +e \mid R = -r) P(M = +m \mid E = +e, W = -w) + P(E = -e \mid R = -r) P(M = +m \mid E = -e, W = -w)}$$

$$= \frac{0.6 \times 0.45}{0.6 \times 0.45 + 0.4 \times 0.9}$$

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