Date: . . No:

Bài 2 : DMC

$$P = \begin{bmatrix} 0,65 & 0,15 & a \\ 0,17 & b & 0,57 \end{bmatrix} \quad ; \quad P(x_1) = 1/5$$

a) $\boxed{a = ?}$

$$\sum_l P(y_l|x_k) = 1$$

$$\Rightarrow P(y_1|x_1) + P(y_2|x_1) + P(y_3|x_1) = 1$$
$$\Rightarrow 0,65 + 0,15 + a = 1$$
$$\Rightarrow a = 0,2 = 1/5$$

$\boxed{b = ?}$ $\quad \sum_l P(y_l|x_k) = 1$

$$\Rightarrow P(y_1|x_2) + P(y_2|x_2) + P(y_3|x_2) = 1$$
$$\Rightarrow 0,17 + b + 0,57 = 1$$
$$\Rightarrow b = 13/50 = 0,26$$

b) $P(x_2) = ?$

$$\sum_k P(x_k) = 1 \Rightarrow P(x_1) + P(x_2) = 1$$
$$\Rightarrow 1/5 + P(x_2) = 1$$
$$\Rightarrow P(x_2) = 4/5 = 0,8$$

c) $P(x_k, y_l) = ?$

$$P(x_k, y_l) = P(x_k) \cdot P(y_l|x_k) = P(y_l) \cdot P(x_k|y_l)$$

$$P(x_1, y_1) = P(x_1) \cdot P(y_1|x_1) = 1/5 \cdot 0,65 = 0,13$$
$$P(x_2, y_1) = P(x_2) \cdot P(y_1|x_2) = 4/5 \cdot 0,17 = 17/125$$

$$P(x_1, y_2) = P(x_1) \cdot P(y_2|x_1) = 1/5 \cdot 0,15 = 0,03$$
$$P(x_2, y_2) = P(x_2) \cdot P(y_2|x_2) = 4/5 \cdot 13/50 = 26/125$$

$$P(x_1, y_3) = P(x_1) \cdot P(y_3|x_1) = 1/5 \cdot 1/5 = 0,04$$
$$P(x_2, y_3) = P(x_2) \cdot P(y_3|x_2) = 4/5 \cdot 0,57 = 57/125$$

KI.ONG

Date: . . No:

c) $P(y_l|x_k) = ?$

$P(y_1|x_1) = 0,65$, $P(y_2|x_1) = 0,15$, $P(y_3|x_1) = 1/5$

$P(y_2|x_1) = 0,17$, $P(y_2|x_2) = 13/50$, $P(y_3|x_2) = 0,57$

d) $P(y_l) = ?$

$$P(y_l) = \sum_{k}^{2} P(x_k) \cdot P(y_l|x_k)$$

$$P(y_1) = \sum_{k=1}^{2} P(x_k) \cdot P(y_l|x_k) = P(x_1) P(y_1|x_1) + P(x_2) \cdot P(y_1|x_2)$$

$= 1/5 \cdot 0,65 + 4/5 \cdot 0,17$

$\Rightarrow P(y_1) = 133/500$

$P(y_2) = P(x_1) P(y_2|x_1) + P(x_2) \cdot P(y_2|x_2)$

$= 1/5 \cdot 0,15 + 4/5 \cdot 13/50$

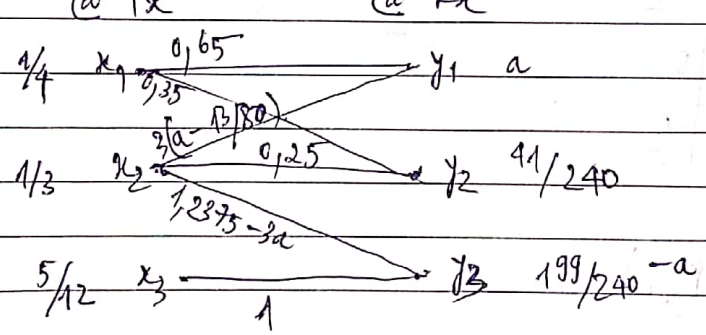
$\Rightarrow P(y_2) = 119/500$

$P(y_3) = P(x_1) P(y_3|x_1) + P(x_2) \cdot P(y_3|x_2)$

$P(y_3) = 1/5 \cdot 1/5 + 4/5 \cdot 0,57$

$= 62/125$

Bài 1 :



c) $P(x_k|y_l)$

$P(x_k, y_l) = P(y_l) \cdot P(x_k|y_l) = P(x_k) \cdot P(y_l|x_k)$

$$\Rightarrow P(x_k|y_l) = \frac{P(y_l) \cdot P(x_k) \cdot P(y_l|x_k)}{P(y_l)}$$

$$P(x_1|y_1) = \frac{P(x_1) \cdot P(y_1|x_1)}{P(y_1)} = \frac{1/4 \cdot 0,65}{a} = \frac{13}{80a}$$

$$P(x_2|y_1) = \frac{P(x_2) \cdot P(y_1|x_2)}{P(y_1)} = \frac{1/3 \cdot 3(a - 13/80)}{a} = \frac{a - 13/80}{a}$$

$$P(x_3|y_1) = \frac{P(x_3) \cdot P(y_1|x_3)}{P(y_1)} = 0$$

KLONG

Date: . . No:

$P(x_1|y_2) = \frac{P(x_1).P(y_2|x_1)}{P(y_2)} = \frac{1/4 . 0,35}{41/240} =$

$P(x_2|y_2) = \frac{P(x_2).P(y_2|x_2)}{P(y_2)} =$

$P(x_3|y_2) = 0$

$P(x_1|y_3) = 0$

$P(x_2|y_3) = 0 \quad \frac{P(x_2).P(y_3|x_2)}{P(y_3)} = \frac{1/3 . (1,2375 - 3a)}{199/240 - a} = \frac{33/80 - a}{199/240 - a}$

$P(x_3|y_3) = \frac{P(x_3).P(y_3|x_3)}{P(y_3)} = \frac{5/12 . 1}{\frac{199}{240} - a} = \frac{100}{199 - 240a}$

Bài 3:

$P(x_k, y_k)$

X / Y	x_1	x_2
y_1	1/3	0
y_2	1/3	1/3

a) $P(x_k)$; $P(y_k)$

$\sum_k P(y_k|x_k) = 1 \Rightarrow P(y_1|x_1) + P(y_2|x_1) = 1$ (1)

$P(x_1, y_1) = P(x_1).P(y_1|x_1) = 1/3$

$P(x_1, y_2) = P(x_1).P(y_2|x_1) = 1/3$

$\Rightarrow P(x_1).[P(y_1|x_1) + P(y_2|x_1)] = 1/3 + 1/3$

$\Rightarrow P(x_1) . 1 = 2/3 \Rightarrow P(x_1) = 2/3$

Date: . . No:

$\sum_k P(x_k) = 1 \Rightarrow P(x_1) + P(x_2) = 1$

$\Rightarrow P(x_2) = 1/3$

$P(y_\ell) = \sum_k P(x_k)\, P(y_\ell | x_k)$

$P(x_k, y_\ell) = P(x_k) \cdot P(y_\ell | x_k) \Rightarrow P(y_\ell | x_k) = \frac{P(x_k, y_\ell)}{P(x_k)}$

$P(y_1) = P(x_1) \cdot P(y_1 | x_1) + P(x_2) \cdot P(y_1 | x_2)$

$= P(x_1) \cdot \frac{P(x_1, y_1)}{P(x_1)} + P(x_2) \cdot \frac{P(x_2, y_1)}{P(x_2)}$

$= P(x_1, y_1) + P(x_2, y_1)$

$\Rightarrow P(y_1) = 1/3 + 0 = 1/3$

Tương tự $\Rightarrow P(y_2) = P(x_1, y_2) + P(x_2, y_2)$

$\Rightarrow P(y_2) = 1/3 + 1/3 = 2/3$

b) $P(x_k | y_\ell) = \frac{P(x_k, y_\ell)}{P(y_\ell)}$

$P(x_1 | y_1) = \frac{P(x_1, y_1)}{P(y_1)} = \frac{1/3}{1/3} = 1$

$P(x_1 | y_2) = \frac{P(x_1, y_2)}{P(y_2)} = \frac{1/3}{2/3} = 1/2$

$P(x_2 | y_1) = \frac{P(x_2, y_1)}{P(y_1)} = 0$

$P(x_2 | y_2) = \frac{P(x_2, y_2)}{P(y_2)} = \frac{1/3}{2/3} = 1/2$

c) $P(y_\ell | x_k) = \frac{P(x_k, y_\ell)}{P(x_k)}$

$P(y_1 | x_1) = \frac{P(x_1, y_1)}{P(x_1)} = \frac{1/3}{2/3} = 1/2$

$P(y_2 | x_1) = \frac{P(x_1, y_2)}{P(x_1)} = \frac{1/3}{2/3} = 1/2$

$P(y_1 | x_2) = 0$

$P(y_2 | x_2) = \frac{P(x_2, y_2)}{P(x_2)} = \frac{1/3}{1/3} = 1$

Date: . . No:

Bài 2. f:

$$P(x_k, y_l) = P(y_l) \cdot P(x_k | y_l)$$

$$\Rightarrow P(x_k | y_l) = \frac{P(x_k, y_l)}{P(y_l)}$$

$$P(x_1 | y_1) = \frac{P(x_1, y_1)}{P(y_1)} = \frac{0,13}{133/500} = 65/133$$

$$P(x_1 | y_2) = \frac{P(x_1, y_2)}{P(y_2)} = \frac{0,03}{119/500} = 15/119$$

$$P(x_1 | y_3) = \frac{P(x_1, y_3)}{P(y_3)} = \frac{0,04}{62/125} = 5/62$$

$$P(x_2 | y_1) = \frac{P(x_2, y_1)}{P(y_1)} = \frac{17/125}{133/500} = 68/133$$

$$P(x_2 | y_2) = \frac{P(x_2, y_2)}{P(y_2)} = \frac{26/125}{119/500} = 104/119$$

$$P(x_2 | y_3) = \frac{P(x_2, y_3)}{P(y_3)} = \frac{57/125}{62/125} = 57/62$$